ISTM

11th TRANSMEDCON 2023

Chandigarh

3rd - 5th November

Annual National Conference of Indian Society of Transfusion Medicine

Interact

Innovate

Implement

SOUVENIR

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Banwarilal Purohit

Governor of Punjab
and
Administrator
Union Territory, Chandigarh

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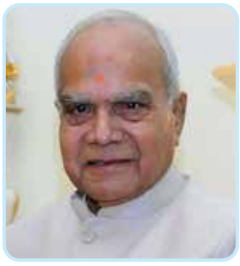
Raj Bhavan
Chandigarh.

September 15, 2023



MESSAGE

I am happy to learn that the Department of Transfusion Medicine, Postgraduate Institute of Medical Education and Research (PGIMER) and Department of Transfusion Medicine, Government Medical College and Hospital (GMCH) Chandigarh are jointly organising the "11th Annual Conference of Indian Society of Transfusion Medicine - TRANSMEDCON 2023" on the theme "Interact, Innovate, Implement" from November 3-5, 2023 in collaboration with International Society of Blood Transfusion (ISBT) Amsterdam, The Netherlands.

Transfusion of Blood and its components is a lifesaving panacea for patients during emergency situations and for transfusion dependent patients suffering from diseases like Thalassemia, sickle cell anemia and others. There have been significant developments in the field of blood transfusion in the last few decades, but still human blood has no substitute till date and the only source is the human body. Timely availability of sufficient safe and quality blood and its components is crucial for saving the precious lives of the needy patients, which can be achieved only by promoting voluntary blood donation.

There is a need to create mass awareness and motivate and encourage the people, especially the youth to come forward and voluntarily donate blood as an act of solidarity and join the efforts to achieve 100% Voluntary Blood Donation in the UT of Chandigarh and across the country to save precious lives.

I congratulate everyone associated with this noble endeavour.

Wishing TRANSMEDCON - 2023 a grand success.

[Banwari Lal Purohit]

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Message from, DGHS

प्रो.(डॉ.) अतुल गोयल

Prof. (Dr.) ATUL GOEL
MD (Med.)

स्वास्थ्य सेवा महानिदेशक
DIRECTOR GENERAL OF HEALTH SERVICES

सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
स्वास्थ्य सेवा महानिदेशालय
Government of India
Ministry of Health & Family Welfare
Directorate General of Health Services

Message

I am delighted to learn that Departments of Transfusion Medicine at PGIMER and Govt. Medical College Hospital (GMCH) are jointly hosting the 11th annual National Conference of Indian Society of Transfusion Medicine: TRANSMEDCON 2023 in collaboration with International Society of Blood Transfusion (ISBT) Amsterdam, The Netherlands from 3–5 November, 2023; theme of this year's conference being "*Interact, Innovate, Implement*".

A well-organized network of Blood Transfusion Services (BTS) is an invaluable component of any health care delivery system. Provision of safe and adequate blood to a patient in need is the objective of any National Blood policy and hence cannot be overemphasized. Despite, being a tissue, Blood has been classified as a drug under the Drugs and Cosmetics Act. Undoubtedly, it and harmful if not used with all precautions. Therefore, it is, imperative that blood transfusion services have an uncompromised focus on quality. Well defined management concepts and protocols are important to optimize use of blood and blood components. There also is a need to have robust adverse event reporting systems for absolute donor and recipient safety. Adoption of technology as per new developments in the field of Transfusion Medicine and the research should also be encouraged as far as possible. But, any technology adoption is meaningless without a technology transfer, otherwise, it becomes an economic burden.

I sincerely hope that this conference will be able to address some of these issues and would come up with meaningful strategies and suggestions to improve blood transfusion services network as well as safety in this part of the world. I am sure that the event will provide an opportunity to medical fraternity not only to get acquainted with recent developments and advances in the field of Transfusion Medicine but also a platform for interaction with eminent resource persons.

I wish the organizers of TRANSMEDCON-2023 success in their endeavor.

(Atul Goel)

Room No. 446-A, Nirman Bhawan, New Delhi-110108
Tel. No.: 011-23061063, 23061438, Fax No.: 011-23061924, email: dghs@nic.in

Message from the Secretary, DG, ICMR

सत्यमेव जयते

डॉ. राजीव बहल, एमडी, पीएचडी
DR. RAJIV BAHL, MD, PhD

सचिव, भारत सरकार
स्वास्थ्य अनुसंधान विभाग
स्वास्थ्य एवं परिवार कल्याण मंत्रालय एवं
महानिदेशक
भारतीय आयुर्विज्ञान अनुसंधान परिषद
Secretary, Government of India
Department of Health Research
Ministry of Health & Family Welfare &
Director-General
Indian Council of Medical Research

MESSAGE

I am pleased to know that the Department of Transfusion Medicine, Postgraduate Institute ofMedical Education and Research (PGIMER) and the Department of Transfusion Medicine,Government Medical College and Hospital (GMCH), Chandigarh are jointly organizing 11th Annual conference of Indian society of Transfusion Medicine- TRANSMEDCON 2023 from 8thNovember, 2023 in collaboration with International Society of Blood Transfusion (ISBT)Amsterdam, The Netherlands.

A well-organized Blood Transfusion Service (BTS) is a vitalcomponent of any health caredelivery system. The need for an integrated strategy focusing on blood safety and provision ofa vital safe, easilyaccessible and adequate blood to the needy cannot be overemphasized. "Safe Blood"encompassing the safety of both the recipient and the donor is of utmost importance as blood isclassified as a drug under the Drugs and Cosmetics Act and can be harmful if not used judiciously. The concept of Total Quality Management, Safe Blood, voluntary reporting ofadverse events through the Hemovigilance program of India and the strategies to mitigate Viraltransmission through blood by use of technological advancements is the current focus. NucleicAcid Testing of the donated units has added an additional safety layer to ensure the recipientsafety of blood and blood components. Upgradation of techniques & technology as per the latestdevelopments in the field of Transfusion Medicine and the research should also be encouraged.

Conference like this is a noble endeavor to streamline and enrich the thought process of all the delegates. I am confident that this conference will give an opportunity toall the stakeholders involved in Blood transfusion services to get acquainted with the recentdevelopment and advances in the field of Transfusion Medicine and imbibe professionalexpertise.

I would like to congratulate all the members of organizing committee for their effort to bring in agalaxy of eminent Transfusion Medicine experts to interact with and enlighten the augustgathering of delegates of this conference.

Rajiv Bahl

(Dr. Rajiv Bahl)

Message from the Director, PGIMER, Chandigarh

स्नातकोत्तर चिकित्सा शिक्षा एवं
अनुसंधान संस्थान,
चण्डीगढ 160 012 (भारत)
आर्त्त सेवा सर्वभद्रः शोधश्च

सत्यमेव जयते

Postgraduate Institute of Medical Education &
Research, Chandigarh 160 012 (India)
"Service to the Community, Care of the Needy &
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Prof. (Dr.) Vivek Lal
MD (Med), DM (Neuro)
Director
&
Head, Department of Neurology

No: DPG(1)-4/23/929

Date: 17/09/2023

MESSAGE

It gives me immense pleasure to know that the Department of Transfusion Medicine, Postgraduate Institute of Medical Education and Research (PGIMER) and the Department of Transfusion Medicine, Government Medical College and Hospital (GMCH) Chandigarh is jointly organizing the *11th annual conference of Indian society of Transfusion Medicine-TRANSMEDCON 2023* from 3rd – 5th November, 2023 in collaboration with International Society of Blood Transfusion (ISBT) Amsterdam, The Netherlands.

The theme of the conference is to *"Interact, Innovate, Implement."* This will give an opportunity to discuss and develop a mutual understanding regarding the role of Transfusion Medicine specialist in clinical practice. Over the last two and half decades, there has been a lot of progress in the field of Transfusion Medicine all over the world and Transfusion Medicine professionals are playing a pivotal role in bringing the bench side laboratory work to bedside clinical practices. I am given to understand that various national and international experts will be deliberating in the conference. I am sure that these deliberations would certainly excite young minds to explore new areas of clinical and basic research collaborations for various aspects of Transfusion Medicine.

The conference will provide an opportunity for the participants to learn various basic and advanced concepts in the subject and interactions with the experts to discuss various day to day operational issues.

I wish the TRANSMEDCON-23 a grand success.

(Prof Vivek Lal) 13/9/23

Message from the Director-Principal GMCH, Chandigarh

DR. JASBINDER KAUR
M.D. (Biochemistry)
Director-Principal
Head, Deptt. of Biochemistry
Government Medical College & Hospital
Sector 32, Chandigarh - 160030
DRME, Chandigarh Administration
Director
Govt. Rehabilitation Instt. for Intellectual Disabilities
Sector 31, Chandigarh - 160030
Director
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No.....

Dated.....

MESSAGE

I extend my warmest greetings and heartfelt welcome to all the delegates for participating 11th Annual Conference of the Indian Society of Transfusion Medicine, TRANSMEDCON 2023, from November 3rd to 5th, 2023.

This year's theme, "Interact, Innovate, Implement," underscores the need for collaboration, creativity, and practical solutions in the ever-evolving landscape of healthcare.

TRANSMEDCON has consistently proven to be a platform for intellectual exchange, and I am confident that this year's conference will be no exception. The program is thoughtfully designed to include insightful keynote addresses, interactive sessions, and engaging discussions that will undoubtedly contribute to the growth and development of transfusion medicine in India.

I encourage all participants to take full advantage of this unique opportunity to connect with peers, learn from experts, and explore innovative approaches that can be implemented to enhance the quality of transfusion medicine services across the nation.

On behalf of GMCH Chandigarh, I would like to express our gratitude to the Indian Society of Transfusion Medicine for entrusting us with the responsibility of hosting this event along with the Deptt. of Transfusion Medicine of PGIMER, Chandigarh. We are committed to ensuring that your experience at TRANSMEDCON 2023 is both academically enriching and memorable.

I look forward to personally welcoming you all to our beautiful city of Chandigarh and the vibrant campus of Government Medical College and Hospital. Let us come together to Interact, Innovate, and Implement ideas that will shape the future of transfusion medicine.

Wishing you all a successful and productive conference.

Jasbinderkaur

(Prof. Jasbinder Kaur)

Message from the Dean (A), PGI, Chandigarh

"संस्थान में हिन्दी पत्रों का स्वागत है"

स्नातकोत्तर चिकित्सा शिक्षा एवं अनुसंधान संस्थान, चण्डीगढ़ – 160012 (भारत)

POSTGRADUATE INSTITUTE OF MEDICAL EDUCATION & RESEARCH, CHANDIGARH-160012 (INDIA)

प्रो. नरेश कु. पांडा

एमएस, डीएनबी, एफआईसीएस, एफआरसीएस, एफएएमएस, एमएफएसटी

संकायाध्यक्ष (शैक्षिक)

Prof. Naresh K. Panda

MS, DNB, FICS, FRCS Ed., FAMS, MFST Ed.

Dean (Academic)

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संख्या/No. DEAN(A)/PGI/ 177

दिनांक/Dated 19/09/2023

MESSAGE

I am happy to note that the Department of Transfusion Medicine, Postgraduate Institute of Medical Education and Research (PGIMER) and the Department of Transfusion Medicine, Government Medical College, and Hospital (GMCH) Chandigarh are jointly organizing the 11th Annual conference of Indian Society of Transfusion Medicine-TRANSMEDCON 2023from 3rd– 5thNovember, 2023in collaboration with International Society of Blood Transfusion (ISBT) Amsterdam, The Netherlands.

The theme of the conference is *"Interact, Innovate, Implement" which* is quite relevant in the present context, due to the fact that we have a separate M.D teaching and training programme in transfusion medicine at around 55 centers in the country. The transfusion medicine professionals are playing a vital role in creating awareness regarding voluntary blood donation in the community, implementing the good laboratory practices and quality assurance programme to provide good quality blood components to the patients. In addition, the transfusion medicine professionals are also emphasizing their role in donor management as well as in clinical transfusion practice.

Beyond the routine provision of cellular blood components such as red blood cells, platelets, and granulocytes, transfusion services are now pivotal in peripheral blood stem cell harvesting, cryopreservation, and its quality control. This evolution positions them as an essential facet of clinical services in top-tier healthcare settings.

I am confident that TRANSMEDCON 2023 will offer an academically stimulating experience for all attendees. My best wishes for the successful execution of this conference.

Naresh K Panda 18/9/2023

Message from the Director, NBTC

डॉ. अनिल कुमार
Dr. Anil Kumar
MD (CHA)
निदेशक (एनबीटीसी) एवं
अपर उपमहानिदेशक
Director (NBTC) & Addl. DDG

सत्यमेव जयते

भारत सरकार
स्वास्थ्य और परिवार कल्याण मंत्रालय
स्वास्थ्य सेवा महानिदेशालय
Government of India
Ministry of Health & Family Welfare
Directorate General of Health Services

MESSAGE

I am glad to know that the Department of Transfusion Medicine, Postgraduate Institute of Medical Education and Research (PGIMER) and the Department of Transfusion Medicine, Government Medical College, and Hospital (GMCH) Chandigarh are jointly organizing the 11th Annual conference of Indian Society of Transfusion Medicine-TRANSMEDCON 2023from 3rd – 5th November, 2023 in collaboration with International Society of Blood Transfusion (ISBT) Amsterdam, The Netherlands.

The theme of the conference is *"Interact, Innovate, implement"*. This is quite relevant in the present context as the Blood banking has evolved from laboratory service to a bedside clinical service as a specialty of Transfusion Medicine in last three decades. This has led to the significant improvement in the standards of transfusion services in the country, including awareness regarding voluntary blood donation in the community, implementing the good laboratory practices and quality assurance programme to provide good quality blood components to the patients. The Government of India, under the able guidance of Hon'ble Prime Minister Shri Narendra Modi, is taking new initiatives to meet all the health needs of the people of India and therefore, with the advent of the new technologies to detect emerging and remerging pathogens and regulatory changes in blood services, blood safety has been ensured for the patient. I also place on record my appreciation to DGHS for taking the initiative for bringing out a revised edition of standards for Blood Centres and Blood Transfusion services and Technical Manual for the benefit and guidance of all the stakeholders involved in managing Transfusion Services across the nation. I Congratulate everyone associated with National Conference 'TRANSMEDCON-2023"for bringing together multiple stakeholders to a common platform for sharing research and development to update and achieve set standards and best practices for the patient care in the field.

I trust that this conference shall be a stimulating and beneficial learning experience for all the delegates.

(Dr. Anil Kumar)

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Message from the Former Head, Transfusion Medicine, PGIMER, Chandigarh

It is gratifying to note that the Department of Transfusion Medicine PGIMER, Chandigarh, and the Department of Transfusion Medicine, Government Medical College, and Hospital (GMCH) Chandigarh are jointly organizing the 11th Annual conference of Indian Society of Transfusion Medicine-TRANSMEDCON 2023from 3rd – 5thNovember, 2023in collaboration with International Society of Blood Transfusion (ISBT) Amsterdam, The Netherlands. The theme of the conference is *"Interact, Innovate, implement"* which is quite relevant in the present context, with transfusion medicine professionals now playing a vital role in clinical transfusion practice by helping in transfusion decision making , provision therapeutic aphaeresis facility in various clinical indications, peripheral blood stem cell collections, quality control & cryo preservation for a successful bone marrow transplant programme. I am sure that the deliberations by the experts will certainly go a long way in recognizing the role of transfusion medicine specialists in clinical patient care and motivate the participants to play proactive in their centers in clinical patient care. Therefore, I am hopeful that this conference will certainly address some of the common issues on blood safety and will provide an opportunity to the delegates to interact with the faculty of national and international eminence. I extend my best wishes to the organizers for successful conduct of this conference and the participant for an academically enriching experience..

Dr. S. K. Agnihotri
Former Professor & Head,
Department of Transfusion Medicine,
PGIMER, Chandigarh

Message from the Founder President of ISTM

It gives me immense pleasure to know that TRANSMEDCON 2023, the 11th National Conference of Indian Society of Transfusion Medicine is being organized jointly by the Departments of Transfusion Medicine at Postgraduate Institute of Medical Education and Research and the Government Medical College and Hospital, at Chandigarh, the city beautiful, from November 3 to 5, 2023

We are witnessing rapid improvements in the functioning of blood transfusion services in the country-voluntary donor recruitment, component preparation, testing of all donated blood for safety from transfusion transmissible infections, advances in immuno-haematology, quality practices, accreditation and planning for centralization of the services. The field of Transfusion Medicine has extended to providing guidance for good clinical transfusion practices and direct patient care services based on apheresis technology for therapeutic plasma exchange, cytoreduction and cellular therapies. Haemovigilance systems assess and improve patient and blood donor safety.

The ultimate goal of all these advancements is to give patients the maximum expected benefit. This can only be realized through interactions with all the key stakeholders in Transfusion Medicine, hence the central theme of the conference "Interact, Innovate, Implement" is a befitting reflection of the requisite global, national, regional and local efforts to realize this aim. The Organizing Committee has worked hard to prepare the scientific programme which will cover all vital areas of the transfusion chain; contemporary issues, challenging situations and the frontiers of scientific research in the field. The ISBT Highlights sessions will provide a direct platform to hear State of the Art presentations from international experts. Pre-conference workshops offer educational and hands-on experience for students and young professionals in transfusion medicine. There will be ample opportunities for research presentations and Transfusion Medicine professionals will also receive the ISTM Awards in recognition of their merit.

I am confident that TRANSMEDCON 2023 will establish benchmarks in scientific and academic deliberations and take this event to great heights.

I congratulate all the members of the Organizing Committee for their dedication and hard work to organize this national conference and extend my best wishes for its grand success.

Prof. Neelam Marwaha
M.D; F.A.M.S
Former Head, Department of Transfusion Medicine
Postgraduate Institute of Medical Education and Research, Chandigarh.
Founder President, Indian Society of Transfusion Medicine.
Chairperson, National Executive Committee,
Haemovigilance Programme of India.

Message from the Founder Secretary of ISTM

It gives me immense pleasure to pen down my thoughts on the occasion of 11th Annual National Conference of Indian Society of Transfusion Medicine - TRANSMEDCON 2023 to be held at Chandigarh from 3rd – 5th November 2023.

The main theme of the conference is "Interact-Innovate-Implement". Keeping with the theme of the conference, the scientific program has been framed so as to cover all important areas of Transfusion Medicine. I am sure the deliberations / discussions in the scientific sessions will provide an opportunity to listen to the leading national / international experts in the field and to exchange ideas with your friends and colleagues.

Best wishes for the successful conference.

Dr. Rajendra Chaudhary
MD, MNAMS, FISHTM, FRCpath
Prof & Head, Dept of Transfusion Medicine
SGPGIMS, Lucknow, India

Message from the President, ISTM

Warm Greetings!

It gives me an immense pleasure to welcome all the eminent faculties and distinguished delegates to the Eleventh National Conference of Indian Society of Transfusion Medicine- TRANSMEDCON 2023 being organized at Chandigarh from 3rd to 5th November 2023.

Transfusion Medicine is a diverse and multifaceted discipline of health care. As a medical discipline, it has made significant strides in this new millennium in India.

The Scientific Committee of TRANSMEDCON-2023 has taken all efforts to design the scientific programme in such a way which will be very innovative and interactive, justifying the theme of the conference "Interact. Innovate. Implement." The conference deliberations will be given by eminent National and International experts that will be fruitful and beneficial to all the participating delegates in updating their knowledge on the recent advances that has taken in Transfusion Medicine, both nationally and globally.

Like every year, TRANSMEDCON-2023 has arranged for a joint academic session in association with International Society of Blood Transfusion which will be providing an opportunity to listen and exchange ideas with our international expert. I would like to thank all the National and International experts for agreeing to address the delegates and sharing their experiences and research work in various subjects of Transfusion Medicine

I am confident that the delegates will enjoy the excellent ambience of Chandigarh known as City Beautiful and the warm hospitality extended to all by the Organizing Committee who will leave no stone unturned in making your stay in Chandigarh a memorable experience.

We look forward to see you in Chandigarh in November 2023.

Dr. Debasish Gupta
President, ISTM

Message from the Vice President, ISTM

Dear Esteemed ISTM Members/Delegates,

I would like to extend my heartfelt congratulations to all of you for successfully electing a new Executive Committee (EC). This achievement marks a significant turning point, breaking the deadlock that persisted for a few years and ushering in a "new beginning."

In my new role as vice president, I want to express my deep gratitude to each one of you for placing your trust in me and in our collective team, led by President Dr. Debashish Gupta. I also want to assure you that, both individually and on behalf of the entire EC, we are committed to upholding this trust. The early meetings we have had, during which we were able to reach unanimous decisions swiftly, have strengthened my confidence in our ability to lead effectively. Official letters to authorities on e-raktkosh data entry, inclusion of Transfusion Medicine in undergraduate teaching programs, updating the members' unique ISTM membership numbers, initiation of ISTM newsletter (under the stewardship of Dr. S S Das), etc. are a few of the tasks, that have been achieved in a quick time.

I am delighted with the diligent preparations that the Chandigarh team led by Dr. Ratti Ram Sharma and Dr. Ravneet Kaur has been making for Transmedcon 2023. It appears that we are in for an academic feast when the event takes place in Chandigarh.

Let us move forward with enthusiasm and dedication, working together to accomplish our shared goals and further advance the objectives of the ISTM. Together, we can make a positive impact on our organization, ISTM, and the field of Transfusion Medicine.

Thank you once again for your trust and support.

Dr. Aseem Kumar Tiwari
Vice-President, ISTM

Message from the Organizing Chairman

Warm Greetings!

It gives me immense pleasure to extend a warm welcome to the eminent national and ineternational faculty, distinguished guests and delegates to the City Beautiful, Chandigarh,who have come to participate in the 11th Annual conference of Indian Society of Transfusion Medicine-TRANSMEDCON 2023from 3rd - 5thNovember, 2023 jointly organized by the Department of Transfusion Medicine PGIMER, Chandigarh, and the Department of Transfusion Medicine, Government Medical College, and Hospital (GMCH) in collaboration with International Society of Blood Transfusion (ISBT) Amsterdam, the Netherlands .The theme of the conference is "Interact, Innovate, implement" which is quite relevant in the present context, with transfusion medicine professionals now playing a vital role in clinical transfusion practice with enhanced interaction with clinical collegues and providing guidance in transfusion decision making in various complex situations such as ,massive transfusion support in Obstetrics and trauma patients, therapeutic apheresis in various clinical indication and mangement of various transfusion related adverse events.

Safety and adequate availability of blood and blood components is an essential pre-requisite for delivering good healthcare services hence, developing a quality system and understanding the need to comply with good manufacturing practices is vital to strengthen the safe blood programme in the country. The present Congress will emphasize and address various critical aspects related to blood donor and patient blood management. Inaddition ,it will give an opputunity to the participants to update themselves with the recent advances in the field of transfusion Medicine .The ISBT Highlights session is a unique oppurtunity where the delegates can listen and interact with the international faculty.We express our sincere gratitude to ISBT to be parterner with event. I am certainly hopeful that deliberations & discussions made during this congress will certainly motivate young minds to explore new avenues of research in this field. I do hope that meaningful interactions will take place between the faculty and delegates and that each one of us will have an academically enriching experience.

Dr. Ratti Ram Sharma
Organizing Chairman
TRANSMEDCON, 2023

Message from the Organizing Secretary

It gives me immense pleasure to welcome all the distinguished Faculty and delegates to Chandigarh the city beautiful to attend the 11th Annual National Conference of Indian Society of Transfusion Medicine, being jointly organized by departments of Transfusion Medicine, Post Graduate Institute of Medical Education and Research Chandigarh and Government Medical College and Hospital, Chandigarh from November 3rd to 5th 2023.

The theme of this year's conference is Interact, Innovate and Implement. The rich scientific programme of the conference would encompass all aspects of transfusion medicine and update our knowledge on new scientific developments. The four pre-conference workshops will provide hands-on experience to the participation. I am certain that the delegates would enjoy the warm hospitality and the scientific programme.

I express my gratitude to Directors of both the institutes. I am also thankful to Dr. R.R. Sharma, his team and my faculty colleagues for all the support. I am extremely grateful to guest faculty and to all delegates whose presence in large numbers will help in making this Conference a success.

I once again extend a warm welcome to all the faculty and delegates.

Thank You.

Prof. Ravneet Kaur
Organizing Secretary
TRANSMEDCON, 2023

Guest Faculty Abstracts

Current trends in Hemovigilance global and Indian Scenario

Akanksha Bisht

Haemovigilance is a system of blood safety surveillance that includes the detection, monitoring, reporting, investigation and analysis of adverse events related to the donation, processing, and transfusion of blood and blood products, as well as the development and implementation of recommendations to prevent their occurrence or recurrence and thus improve safety for blood donors and recipients

Haemovigilance systems exits in many countries and some of the countries are keen to take initiative to establish the same so as to generate evidence based data which leads to recommendations that results in improvement in the blood transfusion services. The first national Haemovigilance program was established in Japan in 1993.Soon afterwards in Europe, starting in France in early 1994 .United kingdom established the first voluntary system in Year 2016. Five countries took the initiative in 1998 to work together in the field of haemovigilance: Belgium, France, Luxembourg, Portugal and The Netherlands and the EHN was born.In Year 2002 European Haemovigilance empowered with European Blood Directive. Further the International Haemovigilance Network was formed in Year 2009. These hemovigilance system may be managed by professional societies, national blood services, regulatory authorities or may be managed by Public private partnership

Further the reporting of haemovigilance vary from country to country in terms of voluntary or mandatory. In India as on date reporting under Haemovigilance Programme is voluntary .

WHO recognizes the importance of Haemovigilance. This is evident from the fact that apart from organizing the training workshops / Meetings /conferences /seminars, the WHO has been actively involved in development and release of the documents such as WHO aide-mémoire for Ministries of Health on National Haemovigilance systems , published in 2015, WHO guide to establishing a national haemovigilance system which was published in 2016

The WHO Action Framework to Advance Universal Access to Safe, Effective and Quality-Assured Blood Products 2020–2023 reaffirms the importance of haemovigilance as one of the strategic objectives of global efforts to improve capacity to monitor, investigate and assess adverse events in blood donors and transfusion recipients.In Year 2022, WHO has developed A User guide for navigating resources on stepwise implementation of Haemovigilance systems, working with experts from the International Haemovigilance Network (IHN),the International Society of Blood Transfusion (ISBT), WHO-related units, and others in Haemovigilance systems worldwide.This User Guide for Navigating Resources on Stepwise Implementation of Haemovigilance Systems 2022 is available on the web which provides an outline the necessary steps for implementation of Haemovigilance systems in blood establishments and hospitals

In India Haemovigilance Programme at the national level was launched on 10th December 2012 in 90 medical institutions across the country by National Institute of Biologicals (NIB), NOIDA, Ministry of Health & Family Welfare, Government of India as the National Coordinating Centre (NCC). Haemovigilance Programme of India envisages to protect public health by promoting safe blood transfusion practices in the country.

Implementation and coordination of activities of Haemovigilance Programme of India (HvPI) is one of the Mandate's of NIB as per its bye-laws.

Haemovigilance is from the vein of the donor to the vein of the recipient. It has two arms:

i. **The recipient's arm** i.e. Reporting of Adverse Reactions with respect to Blood Transfusion in the patient is being covered under **Haemovigilance Programme of India (HvPI)** with the launch of the programme on 10th December 2012 in India.
ii. **The donor's arm** i.e. Reporting of Adverse Reactions associated with Blood Donations is being covered under **National Blood Donor Vigilance Programme (NBDVP)** which was launched on 14th June 2015 on World's Blood Donor Day at Science City Kolkata under the ambit of HvPI.

This system includes monitoring, reporting investigation, identification and analysis of adverse reactions related to transfusion & blood donation. The programme aims to improve the safety & quality of blood being received by the patients and promotes voluntary blood donations with the view to improve safe blood transfusions practices in our country.

The NIB is also actively involved with World health organization (WHO) for organizing workshops for strengthening of blood services and haemovigilance in SEAR countries. Further India is a member of International Haemovigilance Network (IHN) since 2014.

Awareness about the programme, its objectives and its non- punitive implications is being generated through publications in reputed journals/ magazines & Haemovigilance Newsletters and also by organizing CMEs/ Trainings/ Workshops/ Conferences on HvPI in different regions of the country. Till date total **79** CMEs/ Trainings/ Workshops/ Conferences on HvPI have been organized by NIB and about **15,383** blood centre officials, clinicians, nurses, blood centre technical staff, blood donors, motivators etc. all across the country have been trained.

The program is analyzing the reactions being submitted online by Blood Centres through indigenously developed haemovigilance software by NIB (Reporting of Adverse Transfusion Reactions is done online via Haemo-Vigil software & reporting of Adverse Blood Donor Reactions is done via Donor-Vigil software available on NIB website i.e. www.nib.gov.in). Though reporting for the program is voluntary,**1437** centres are enrolled and reported about **74,907** Adverse Reaction Reports. Accordingly data analysis reports with recommendations for stakeholders are being published in reputed Journals from time to time. Such information is a key to introduce required changes in the applicable policies, improve standards, system, processes and assist in the formulation of guidelines.

In Year 2022, NIB has released two National documents :

1. **1st Guidance Document for Reporting Blood Donor Adverse Reaction**
2. **Good Blood Transfusion Practices-Guidance for Rational use of Blood**

Guidance Documents and published Haemovigilance Data Analysis can be freely accessed on NIB Website i.e. www.nib.gov.in

Haemovigilance is one of the potential quality checks in blood transfusion services and could play an essential role to prevent any breach in safety of blood transfusion practices.

As per WHO the main barriers to implementation the Haemovigilance system were : lack of dedicated financial provision leading to financial constraints and limited financial resources ;lack of trained personnel ;the failure to identify all stakeholders and service providers and bring them into a common comprehensive system

Priority areas for technical support and capacity-building were identified as: education support to strengthen the workforce (technical as well as skills development);infrastructure support and technology upgrades; financial support

So, ultimately to promote and improve safe blood transfusion services, Haemovigilance System is utmost important and there is need to sensitize the fraternity about the Blood Safety through Haemovigilance.

Hemophilia Care in India: Transfusion Medicine Perspective

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Hemophilia A and B are genetic disorders of blood coagulation occurring due to mutation in either the coagulation factor VIII gene (hemophilia A) or the coagulation factor IX gene (hemophilia B), resulting in deficient synthesis of coagulation factor VIII and IX. Patients with hemophilia (PWH) suffer from repeated bleeding episodes in the joints and soft tissues. Each episode of bleeding in joint or muscle leads to swelling, severe pain and inability to move for few days or few weeks. The other type of bleeding episodes are serious life threatening episodes of bleeding in brain, abdomen, stomach, nose, spontaneously or following trauma or fall of tooth. If appropriately treated persons with hemophilia can lead fruitful life of normal quality with life expectancy similar to that of other people. The treatment of hemophilia A and B is replacement of deficient factor with factor concentrate VIII and IX respectively. The ideal treatment is prophylactic factor infusions two or three times a week, throughout the life. The other type of treatment is infusion of deficient factor on demand, that is, in case of bleeding episode. In the late 1950s and much of the 1960s, fresh frozen plasma (FFP) was the mainstay of treatment for hemophilia A and hemophilia B. Each bag of FFP contained only miniscule amounts of factor VIII and factor IX, thus large volumes of intravenously administered FFP were needed to stop bleeding episodes. With the discovery of a method for preparing factor VIII from FFP in mid 1960s by allowing it to thaw in the cold (cryoprecipitated plasma) and storing it as in frozen form (cryoprecipitate.) permitted administration of more factor VIII in a smaller volume.

In India, majority of patients with bleeding disorders are still not diagnosed and not properly managed. This is because of lack of awareness about these disorders amongst primary care physicians, inadequate diagnostic facilities and inability to afford investigations and treatment by most of the patients who belong to the lower economic status. In India with a population of 1.4 billion, the number of expected PWH would be approximately 120000-140000. However, less than 15000 are registered so far. Until few years back most of the patients were treated by blood products, that provided suboptimal dose and carried high risks of infections to the patients apart from being not useful in many serious situations, e.g. surgery requiring high factor levels which could not be achieved by transfusion of blood products. This disease has now been accorded a public health priority in most part of India as now many state governments are coming forward for the cause of hemophilia after public interest litigations were filed in courts. National Health Mission, Government of India is helping many states for providing free factors which has transformed the management of hemophilia in India.

Hemophilia was once a neglected disease in India for lack of easy availability of diagnostic and treatment facilities and the high cost of antihemophilic factors. Similarly much work is desired for improving the status of diagnosis for bleeding disorders. This can be achieved by improving hemophilia diagnosis through training in quality diagnosis, creating lab infrastructure, and enabling better access to these facilities. Theses diagnosis and physiotherapy facilities are restricted to select few centers. Thus

there is a need for strengthening of present centers for hemophilia management and establishment of new centers. Supportive care (physiotherapy social worker, counselor) need to be established.

Of late more and more patients have access to factor concentrates mostly plasma derived. There is a need to maintain adequate stock of factors in the hospitals especially for those patients requiring surgery which at present is far from satisfactory in India. What is important is that patients get uninterrupted continuous supply near their place of stay.

Even, this episodic treatment is not considered the optimal treatment as prophylactic factor replacement therapy has proven to be the preferred therapy. Another big challenge is treatment of patients who have developed inhibitor antibodies. Management of PWH with inhibitors in developed nations involves either high-dose FVIII concentrates with immune suppression or FVIII bypassing agents (prothrombin complex concentrates, rFVIIa), both options being readily accessible. However, inhibitor treatment is available to select few due to exorbitant cost of bypassing agents in India.

There is shortage of plasma in the world. The current global plasma supply is not meeting the needs of people with bleeding disorders around the world. Even the majority of countries that are self sufficient in fresh blood components are unable to meet their own needs for plasma-derived products from their domestic plasma collections. The dosage required for prophylaxis therapy with increased diagnostic rate would possibly not be met from plasma derived factor concentrates in India. Coupled with the fact that all newer products are based on recombinant technology and hence in future the recombinant technology seems to be the preferred technology for factor replacement. Even adequate and affordable availability of factor concentrates will depend upon indigenous production of factor concentrates. Presently there is no such setup for production of plasma derived or recombinant factor concentrates in the country. Both these types of antihemophilic products have been found to be safe and effective, although safety profiles are not identical. Currently available plasma-derived products are safe against lipid-coated viruses and not against non-lipid viruses and prions. On the other hand, recombinant factor concentrates do not contain animal or human proteins, which is highly advantageous as it reduces the risk of transmitting animal or human infectious agents. Besides this, the price and the risk of development of FVIII inhibitors due to replacement therapy are other important criteria directing the therapeutic choices for factors. Till India achieves self sufficiency in production of either plasma derived or recombinant factor concentrates, another way would be to introduce single national procurement system based on tenders aimed at getting good bargain from manufacturers to lower the price of plasma or recombinant products. Currently, available screening tests and pathogen inactivation processes must be used especially for plasma-derived concentrates along with measures to minimize the potential presence of pathogens.

Genetic counseling is the main tool for the prevention and control of genetic disorders including hemophilia, targeted at families with an affected birth or with a family history of the disorder. More genetic centers are required in India at least one in every state. Awareness about the disease is equally important involving general population and patients of hemophilia. The first needs to be done by use of newspaper, television, etc so that patients can identify their problem and access the available facilities. Information booklets for hemophilia patients should be circulated to teach them about their disease, correct management, identify at risk situations, home management, physiotherapy etc. This is an important pillar

of good management as patient education is important for prevention and early diagnosis of complications. Similarly primary care physicians need to be educated. Apart from this, training of doctors especially from primary health centers, district hospitals and medical colleges need to be planned. These hemophilia awareness programs can go a long way in identifying cases of hemophilia in the society, guide people about correct treatment and timely referral to hemophilia center for better management which may be life saving.

Thus, making factors available is not enough to ensure adequate hemophilia care. The extremely low per capita use of factors, despite having the largest number of global patients with hemophilia A, illustrates the large treatment gap that exists in India. The challenges faced by hemophiliacs in India are many. The World Federation of Hemophilia (WFH), the global hemophilia patient organization, has prioritized six actions in a bid to address unmet needs in hemophilia care: 1). Increase accurate laboratory diagnosis, 2). Win government support through advocacy, 3). Improve the delivery of medical expertise and care through training, 4). Increase access to products that ensure safe treatment 5). Build a strong national patient organization through capacity building, 6). Track and report patient health outcomes through data collection.

Conclusion: The exact burden of the disease is still unknown, diagnostic and therapeutic centers are few in the country. A comprehensive care from a multidisciplinary team is needed for optimal treatment. Transfusion Medicine specialists should work in collaboration with multidisciplinary team taking care of PWH. India should try to become self sufficient in production of factor concentrates which are mainstay of treatment. It is doubtful that increasing demand for factor concentrates can reliably be met with plasma derived factors because of scarcity of plasma donors. The central and state governments should continue to support these patients and help in establishing the centers of excellence for holistic management of hemophilia patients across India. The specialty of Transfusion Medicine can be a core part of hemophilia care by providing the hemostatic and serology testing services along with maintaining the round the clock availability of factor concentrates.

Managing Transfusion Services during Disaster

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Disaster is "an occurrence that causes damage, ecological disruption, loss of human life, deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community area" (1).

With respect to blood transfusion services, disaster includes any domestic disaster or act or terrorism that: Suddenly requires a much larger amount of blood than usual or temporarily restricts or eliminates a blood collectors ability to collect, test, process and distribute blood or temporarily restricts or prevents the local population from donating blood or restricts or prevents the use of the available inventory of blood products requiring immediate replacement or re-supply of the region's blood inventory from another region or creates a sudden influx of donors requiring accelerated drawing of blood to meet an emergent need elsewhere (2).

Managing the blood system in disasters is one of the main challenges for any blood transfusion service exposed to natural hazards such as earthquakes, floods and tsunamis, biological threats such as pandemic influenza as well as manmade disruptions and terrorism. In most cases the impact of the disaster is directly proportional to the state of disaster preparedness and management plans. There is always uncertainty as to how and when it will occur. The occurrence of disaster creates varying degree of chaos combined with a mismatch between available resources and needs. Emergencies and disaster situations, occurring with or without warning, require a rapid and timely response by various services.

A disaster management plan consists of phase of preparedness, response, reconstruction and mitigation. The neat order suggests that one phase follows another in a clear sequential fashion, whereas in reality, in most disasters, many things occur simultaneously. In a response to disaster situation, it is important that blood centre should ensure the following measures; Blood centre staff must be familiar with the hospital/centre disaster plan, SOPs related to hospital disaster plan are developed, adequate facilities to keep and maintain 3-day supply of blood components, which may need to be expanded up to a 7-day supply. After a disaster, the public usually responds by volunteering to donate large quantities of blood than are needed, so there must be guidelines to smoothly entertain the increased donor influx. Increased resources (personnel, equipment, and supplies) are sometimes allocated for collecting and processing blood which may not be required and centre may be unable to process and issue available and urgently needed components to patients. So there should be separate slot of trained, educated and skilled blood centre professionals within treating facilities to handle such situation (3).

Attempts should be made to determine the true medical need for blood during a disaster and to convey this need to organizations within the blood community, to blood donors, and to the public through a clear and consistent communication strategy. The personnel or authority who is authorized to make public appeals for blood donation should be identified and must coordinate with people in the field who are involved in making the needs assessment (2). Red cell demand for the first 24 hours is a product of the

casualty load, mean blood use and a variable demand factor. The following blood products are the most likely to be needed in each of the following phase of a disaster. • First 24 hours: Type O Red Blood Cells (RBCs) • 1–10 days: RBCs (all ABO/Rh types) and platelets (PLTs) • 11–30 days: RBCs, PLTs, and (for radiologic incidents) stem cells and bone marrow (2).

It is recommend that hospitals consider modified transfusion protocols for disaster management that reduce the number of components per pack and review patient's need for transfusion on a regular basis rather than issuing a fixed blood component ratio for all patients. At the same time, every effort should be made to control haemorrhage through surgical, non-surgical, and radiological interventions. Consideration should also be given to the use of haemostatic adjuncts, such as fibrinogen concentrate and prothrombin complex concentrates, if there is a significant shortage of plasma and cryoprecipitate (4). All blood transfused should be recorded and reviewed, balancing the risk and benefit of treatment.

The biggest transfusion risk during disasters is the accidental transfusion of ABO-incompatible blood. All patients admitted should have two baseline transfusion samples to determine the ABO and RhD blood groups quickly. Universal blood, such as Group O RBCs, should be used until the patient's blood group is confirmed. Group O RhD-positive red cells can be given to ungrouped male patients, whilst Group O RhD-negative red cells should be prioritised for female patients of childbearing age. It has to be switched to group specific blood at the earliest. Transfusion triage of injured patients is therefore essential for the optimal allocation of blood. When disaster strikes, the blood centre should send a delegate along with a transfusion medicine physician to the casualty to help ensure proper labeling and handling of blood centre specimens and coordinating transfusions (5)

Transfusion support during disasters requires a well-rehearsed process within clinical and laboratory services to minimize risk and ensure a prompt and coordinated response. Training of all health professionals involved with handling blood is fundamental to transfusion preparedness. One way to improve and maintain training is through simulation exercises and drills that include blood transfusion service, so that professionals handling blood can obtain confidence in their ability to apply their skills in real-life situations, whilst organizations have the opportunities to test if their protocols and policies work (6).

In emergency situations, blood centres are sometimes more concerned with the quantities rather the safety of the procedure. This happens because emergency management personnel are often unaware of issues related to the collection, processing, storage, and distribution of blood and blood components. The availability of blood may be the primary concern in a disaster, but the safety of the blood supply is also paramount. It is important to follow as per current good manufacturing practice guidelines and regulatory standards. Any regulatory exemptions shall be made on a case-by-case basis by medical need only (2). It should be ensured that units of blood released for transfusion are fully tested, including testing for infectious disease. Blood center procedures for emergency and exceptional release may be applied if absolutely necessary to meet immediate needs. All regulated functions should be performed using trained staff. Volunteers should be used for non-regulated functions only.

In case of disasters, people donate voluntarily and in high numbers. While donating blood is often considered a noble thing to do in the time of crisis, it is counterproductive unless there is an actual need for blood resulting in increased wastage due to outdating and when the disaster has ended, there tend to

be blood shortages, as “everyone” has already donated. However these donors present a high potential of becoming regular voluntary non remunerated blood donors. Management strategies for these donors should include converting them into regular voluntary non-remunerated donors and recruiting them for regular donations in future.

Post Disaster Phase is an important phase of disaster planning were the activities of the disaster/ emergency phase are discussed and the inadequacies are noted for future improvements. Hence, the goal of a proper disaster plan should be to assist staff in helping to keep those involved safe and increase the survival of those harmed. Every minute detail can never be planned for, but having a strong plan in place will help an organization navigate through an event that falls outside of their normal day to day operations.

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Intrauterine Transfusion and Immediate Postnatal Management

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Intrauterine transfusion (IUT) treatment is considered most successful for fetal anemia due to red cell (RBC) alloimmunization.[1] In the early 1960s, IUT by percutaneous intraperitoneal transfusion was introduced by Liley for management of fetal anemia due to RBC alloimmunization.[1] The currently used technique, intravascular intrauterine transfusion into the umbilical cord, was first described by Rodeck et al. in 1981 using guidance of the needle by fetoscopy.[1] Immunogenicity of RBC antigens play a key role since anti-D is one of the most potent immunogenic antigens and globally the most common cause of hemolytic disease of the fetus and newborn (HDFN) with a 15.0% risk of Rh alloimmunization in pregnant women without prophylaxis.2

Indications for IUT:1,2

i) HDFN: it is the most common indication for IUT, where the transfused product consists of plasma-reduced packed red blood cells (PRBC),
ii) human parvovirus B19 infection
iii) fetomaternal hemorrhage (FMH)
iv) twin-twin transfusion syndrome
v) placental/fetal tumors
vi) α- and β-thalassemia
vii) other rare disorders: elliptocytosis, Blackfan-Diamond anemia, hemochromatosis and cytomegalovirus infection

Fetal alloimmune thrombocytopenia is the most common indication for a platelet IUT.[2] In very rare circumstances, fetal blood sampling may be performed to measure the platelet count and if it is found to be less than 50,000/μL then an IUT platelet transfusion could be performed.

Assessment of fetal anemia:

i) Middle cerebral artery-peak systolic velocity (MCA-PSV)
ii) Fetal blood sampling
iii) Amniotic fluid spectral analysis (Liley's curve)

The sensitivity of an increased MCA-PSV for the prediction of moderate or severe anemia was 100% either in the presence or in the absence of hydrops (95% CI: 86- 100% for the 23 fetuses without hydrops), with a false positive rate of 12 %. In comparison with amniocentesis, Doppler ultrasonography was more accurate by 9 percentage points (95% CI: 11–159).[3]

PRBC selection:[4,5]

The PRBC unit characteristics should include:

i) Group O RhD-negative units; type specific RhD-positive units may be used if anti-D is not causative and/or if the fetus is known to be RhD positive
ii) Crossmatch compatible with maternal plasma
iii) Irradiated: to prevent transfusion-associated graft-vs-host disease (TA-GVHD)
iv) Cytomegalovirus (CMV) reduced-risk (leukocyte reduced or from a CMV seronegative donor)

v) Lack hemoglobin S: to prevent sickling under low oxygen tension
vi) Collected within 5 to 7 days
vii) May be washed or concentrated to a hematocrit of 70% to 85% (usually 75–80%).
viii) PRBC suspended in SAGM or Adsol should **not** be used.
ix) **Not** to be transfused straight from 4°C storage: risk of fetal bradycardia
x) 24-h shelf-life following irradiation

Initiation of IUT may done when the amniotic fluid ΔOD 450 nm results in high zone II or zone III, in presence of fetal hydrops noted on ultrasound, when cordocentesis blood sample shows fetal hemoglobin (Hb) < 10 g/dL or Hb < 2 SD below the mean for gestational age (GA), when MCA-PSV Doppler exceeds 1.5 multiples of the median (MoM) (figure 1). Since the prediction using the MCA Doppler is highly reliable, fetal blood sampling is preferably directly followed by IUT and not performed as a diagnostic tool without blood available for immediate transfusion.[6]

Pre-transfusion testing on Maternal sample:

i) ABO and RhD
ii) Extended Rh (C, E, c, e) and K
iii) Typing for other blood group system antigens
iv) Antibody screening and identification
v) Antibody titration (Anti-D)
vi) Compatibility testing

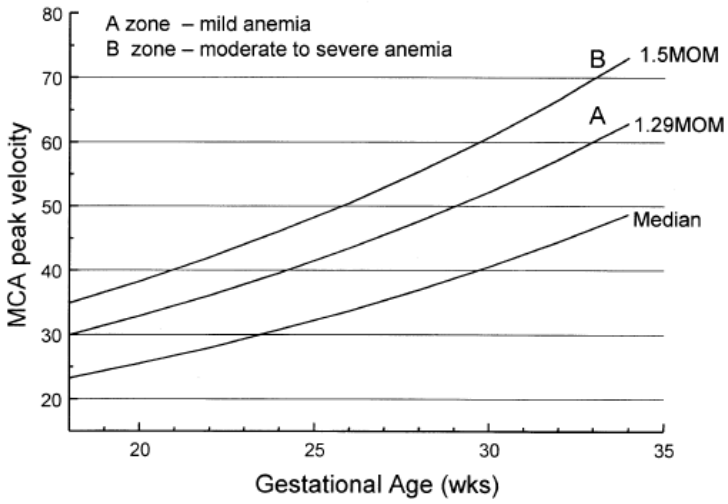

Figure 1. Middle cerebral artery (MCA) Doppler peak velocities based on gestational age.[6]

IUT Volume Calculation of PRBC unit:[2]

Volume to be transfused (mL)

$$= \frac{\text{USG estimated fetal weight (g) x 0.14 ml/g x } (C_{desired} - C_{pretransfuion})}{C_{PRBC}}$$

where, C: Hematocrit

A final target hematocrit of 40–50% is used; a decline of approximately 1% per day can be anticipated between transfusions. In the extremely anemic fetus, the initial hematocrit should not be increased by more than four-fold to allow the fetal cardiovascular system to compensate for the acute change in viscosity.

Tests on the First Pre-IUT Sample:

i) Hb/ hematocrit (Hct)
ii) ABO and RhD
iii) Direct antiglobulin test (DAT)
iv) Extended phenotyping

Complications of IUT:[1]

Nowadays, IUT is considered a safe method to correct severe fetal anemia. However, procedural complications sometimes occur and may affect outcome.

Acute Procedure-Related Complications:

i) Fetal distress: fetal death (0.9 to 4.9%)
ii) Risk of prematurity, neonatal asphyxia or death.
iii) Local cord accidents: rupture, spasm, tamponade from hematoma/excessive bleeding
iv) Volume overload
v) Chorioamnionitis
vi) Preterm rupture of membranes or preterm labor
vii) Emergency delivery

Long-Term Complications:

i) Requirement of more top-up PRBC transfusions during the first 6 months of life, due to suppression of fetal erythropoiesis
ii) Formation of new alloantibodies (19–26%):
    - may complicate present and subsequent pregnancies and future transfusions
    - delayed hemolytic transfusion reactions
iii) Risk of transfusion reactions such as TTI

Neonatal outcomes and management:[6]

Perinatal survival after IUT varies by center and the experience of the operator. In one review series, overall survival was noted to be 84%. Survival of nonhydropic fetuses (92%) was markedly improved over those with hydrops (70%). Suppression of erythropoiesis is not uncommon after several intravascular transfusions. Because exchange transfusion is rarely required, passively acquired maternal antibodies remain in the neonatal circulation for weeks. This results in a 1–3 month period in which the infant may need several top-up red cell transfusions. Weekly neonatal Hct and reticulocyte counts should be assessed. Threshold Hct values of less than 30% in the symptomatic infant or less than 20% in the asymptomatic infant have been suggested for transfusion.

Experience from our centre (PGIMER, Chandigarh):[7]

In a retrospective study (between January 2006 and December 2014) from our centre 7, a total, 363 Rh D alloimmunized women attended antenatal clinic or obstetric emergency between January 2006 and December 2014. MCA-PSV was the screening method for detection of fetal anemia. IUT was given when MCA-PSV was > 1.5 MOM. Totally, 162 women (164 fetuses) received 492 transfusions. Forty-eight women had fetal hydrops at presentation. Five women (three received IUT) were lost to follow-up. Approximately 74% of women who received IUT had anti-D titer ≥ 64 as compared to who did not (38%) [p=0.0001]. The lowest gestation at first IUT was 19.5 weeks, and the highest gestation was 35 weeks. Median number of IUT was 3, and the number of IUTs ranged from 1 to 7. Thirty patients had received single IUT. The mean Hct at first IUT was 13.37 ± 7.28% in hydropic fetuses and 21.71 ± 7.38% in non-hydropic fetuses. IUT-related serious complications were seen in approximately 3.8% of procedures.

Summary:

IUT can nowadays be considered a safe and successful method to treat severe fetal anemia for different indications.[6] A close coordination is required between the transfusion services and the Obstetric team for ensuring timely availability of specially prepared PRBCs, which are also appropriately tested as per the recommended standards. Non-invasive techniques to identify the fetus at risk for HDFN are quite promising.

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Newer Indications for Therapeutic Plasma Exchange

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Therapeutic Plasma exchange (TPE) indicates an extracorporeal therapy that allows removal of pathogenic elements such as immunoglobulins, immune complexes, or inflammatory mediators from plasma (plasmapheresis). TPE is used to treat a variety of medical conditions, including thrombotic microangiopathies (TMAs), immune-mediated hemolytic anemia, and neurological disorders.

General issues to consider when evaluating a new patient for therapeutic apheresis – Rationale (Based on indication and previous published studies), impact (effect of therapeutic apheresis on co-morbidities and medications), technical issues (type of anticoagulant, replacement solution, vascular access, and volume of whole blood processed, therapeutic plan, Clinical and therapeutic end points , timings (e.g., emergent, urgent, routine, etc.) and location (e.g., intensive care unit, medical word, operating room, outpatient setting). The above issues should be considered and explicitly discussed in a clinical note documenting the patient history, review of systems, and physical examination.

The American Society for Apheresis (ASFA) regularly publishes guidelines outlining evidence-based recommendations for the use of therapeutic apheresis. The strength of the recommendation reflects the methodological quality of current evidence using the GRADE system.

Table 1. shows the addition of newer indication in 6th -9th Special Issue, ASFA guidelines. The Ninth Edition of the JCA Special Issue comprises 91 fact sheets and 166 graded and categorized indications. This includes seven new fact sheets, nine new indications on existing fact sheets, and eight changes in the category for existing indications

ASFA Guidelines (Issue, year of Issue, Author)	**Fact Sheets / Indications**	**Newer Indications added in recent ASFA guidelines**
6th Issue, 2013	78 fact sheets, 23 new sheets/ indications	• Henoch-Schconlein purpura (crescentric category III/ grade 2C, severe extrarenal disease III/2C), • HIT (precardiopulmonary bypass III/2C, thrombosis III/2C), • IgA nephropathy (crescentic III/2B, chronic progressive III/2C), • Lipoprotein (a) hyperlipoproteinemia (LDL apheresis: II/1B), peripheral vascular disease (LDL apheresis: III/2C), • Sudden sensorineural hearing loss (LDL apheresis: III/2A, Rheopheresis: III/2A, TPE: III/2C), • Toxic epidermal necrolysis (TPE: III/2B) Voltage gated potassium channel antibodies (TPE: II/ 1C).

7th Issue, 2016 Schwartz et al	87 fact sheets 179 Indications, 14 new Indications	• Atopic (neuro-) dermatitis (atopic eczema), recalcitrant • Cardiac neonatal lupus • Complex regional pain syndrome (III/2C) • Erythropoietic porphyria, liver disease (III/2C) • Hashimoto's encephalopathy: Steroid-responsive encephalopathy assoc. with autoimmune thyroiditis (II/2C) • HELLP syndrome (III/2C) • HSCT, HLA desensitization (III/2C) • Hemophagocytic lymphohistiocytosis; Hemophagocytic syndrome; Macrophage activating syndrome (III/2C) • N-methyl D-aspartate receptor antibody encephalitis (I/1C) • Prevention of RhD allloimmunizn after RBC exposure (III/2C) • Progressive multifocal leukoencephalopathy associated with nataluziamab (I/1C) • Pruritus due to hepatobiliary diseases (III/1C) • Thrombotic microangiopathy, coagulation mediated (III/2C) • Vasculitis
8th Issue, 2019 Padmanabhan Et Al.	84 Fact sheets 157 Indications (12 new fact sheets)	• Alzheimer's disease (III/2A) • Antisynthetase syndrome • Autoimmune myofasciitis • Composite tissue transplantation • Fulminant meningococcemia • Mechanical red cell hemolysis Methemoglobulinemia • Necrotizing myopathy • Pancreatic transplantation • Platelet transfusion allo-refractoriness • Pre-eclampsia Recurrent pregnancy loss
9th Issue, 2023 Connelly-Smith Et Al.	91 fact Sheets/ 166 indications (7 new fact sheets and 9 new indications)	• Alzheimer's disease (III/2A) • Autoimmune dysautonomia (III/2C) • Idiopathic inflammatory myopathies (III/2b) • Immune checkpoint inhibitors, immune-related adverse events (III/2C) • Paraneoplastic autoimmune retinopathies (III/2C) • Transplantation, intestine (III/2C) • Vaccine-induced immune thrombotic thrombocytopenia (III/2C)

A 2022 review article published in SpringerLink discusses the use of TPE in critically ill patients. The indications for TPE in the intensive care unit (ICU) can be divided into three categories: absolute, well-established, and evidence-based (first-line therapy); relative (second-line treatment alone or combined with other interventions); and rescue therapy (used with limited evidence of benefits but a plausible theoretical rationale). The article also highlights that new indications are emerging and ongoing knowledge gaps support the establishment of a TPE registry dedicated to intensive care medicine.

In recent years, there is increasing interest in plasma exchange for the treatment of liver failure. Since Larsen et al published the first open randomized control trial of plasma exchange in patients with acute liver failure in 2016, plasmapheresis has been added to the armamentarium. High volume plasma exchange has been included in European guidelines as level I, grade 1 recommendation in management of acute liver failure.

"Therapeutic Plasmapheresis: A Revision of Literature" published in Karger in 2023 reviews the recent literature on the application and the optimal choice of TP technique ranging from plasma exchange, double filtration plasmapheresis, rheopheresis, immunoadsorptions, plasma adsorption perfusion and lipidoapheresis. Based on current knowledge and clinical experience, TP appears an intriguing and high potential therapy in several specialties of medicine.

Since the development of TPE a century ago, many diseases have been treated by this method. Due to the arrival of better therapeutic alternatives, some initial indications of use have been left behind. However, in many other diseases, TPE is still the front-line treatment option. Available evidence confirms the safety and clinical efficacy of TPE in several disorders. Additional efforts should be made in the future to provide high-quality evidence on the role of TPE in some indications.

Donor Vigilance in Ensuring Blood Donor Safety

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Donor Hemovigilance is a comprehensive and systematic approach to continuously monitor and manage adverse reactions and incidents in both the short and long term, spanning the entire spectrum of care provided to blood donors. This encompasses the proactive identification, meticulous reporting, rigorous investigation, and insightful analysis of any adverse reactions that may occur during the blood donation process. Furthermore, the Hemovigilance system plays a pivotal role in upholding the quality and safety of the blood supply system, prompting timely corrective and preventative actions aimed at sustaining and elevating the standards of quality and safety.

Objectives of reporting blood donor adverse reactions

- Improve donor safety and satisfaction through monitoring, analysing, and researching adverse events
- Analyse risk factors, implement, and evaluate preventive measures
- Provide evidence-based support for blood donation process improvement
- Reduce the frequency of adverse events
- Increase donation frequency

Classification of Donor Adverse Reactions

International Haemovigilance Network in collaboration with the Association for the Advancement of Blood and Biotherapy (AABB) Donor Haemovigilance Working Group and the Donor Vigilance subgroup of the International Society of Blood Transfusion (ISBT) Haemovigilance Working Party developed the "Standard for Surveillance of Complications Related to Blood Donation" in 2014. These definitions served as the foundation for Continually Quality Improvements in the donation process as well as research on DARs. The Indian National Donor Haemovigilance Program incorporated ISBT's internationally approved definitions and categorization for DARs. (Table 1)

Definitions of donor adverse reactions

A. <u>Local Symptoms</u>

A1: Complications mainly characterized by the occurrence of blood outside the vessels: These DARs are directly caused by the insertion of the needle.

Table 1: Classification and categorization of donor adverse events/ reactions

A	Local Symptoms 1. Blood Outside Vessel • Haematoma (bruise) • Arterial Puncture • Delayed (bleeding/ Re-bleeding) 2. Arm Pain • Nerve injury / irritation • Other arm pain 3. Localized Infection/ Inflammation along the course of a vein • Thrombophlebitis • Cellulitis 4. Other major blood vessel injury- Serious conditions needing specialist medical diagnosis and attention • Deep Venous Thrombosis (DVT) • Arteriovenous Fistula • Compartmental Syndrome • Brachial Artery Pseudo aneurysm
B	Complications mainly with Generalized Symptoms: Vasovagal Reactions • Without Loss of Consciousness (LOC) • With LOC (Loss of Consciousness) < 60 sec • With LOC (Loss of Consciousness) > 60 sec • With Injury • Without Injury • Within Blood collection facility • Outside Blood collection facility
C	Complications related to Apheresis • Citrate reactions • Haemolysis • Air Embolism • Infiltration • Infiltration of IV fluids
D	Allergic Reactions • Local Allergic Reactions • Generalized allergic Reactions (Anaphylactic Reactions)
E	Serious Complications • Acute Cardiac Symptoms • Myocardial Infarction (MI) • Cardiac Arrest • Transient Ischemic Attack (TIA) • Cerebrovascular Accident • Death
F	Other Reactions

i. **Hematoma:** It is build-up of blood outside vessels, leading to bruising, swelling, discoloration, and localized pain. It results from blood leakage due to vessel damage or red cell infiltration during apheresis.

ii. **Arterial Puncture:** It occurs when a brachial artery or its branches are inadvertently pierced during

phlebotomy. This results in a swift, bright red blood flow, pulsation on needles and tubing, and potential nagging elbow pain. Compared to venous punctures, arterial punctures carry a higher risk of significant hematoma formation and related pain and pressure issues due to rapid blood flow.

iii. **Delayed bleeding (re-bleeding):** It refers to blood leakage post-venipuncture. It can occur due to improper pressure application, early bandage removal, heavy lifting, or donor medication (e.g., anticoagulants).

A2: Complications mainly characterized by pain

i. **Nerve Injury/ Irritation**: Nerve injury during venipuncture can result from direct needle contact, pressure from hematoma or tissue inflammation. It manifests as sharp, radiating pain, often with tingling or burning sensations in the hand, wrist, or shoulder, away from the venipuncture site. Symptoms can be immediate or delayed, exacerbated by specific positions or arm movements, and may, rarely, lead to arm weakness.

ii. **Other Painful arm:** Arm pain is the main symptom, resembling post-vaccination discomfort. Unlike nerve issues or specific complications, this pain may be linked to deep tissue injury or hematoma. It's typically general and lacks nerve irritation features.

A3: Localised infection/ inflammations

i. **Localised infection/inflammation:**
Inflammation can develop along a vein's path, sometimes leading to localized infection post-phlebotomy. Clotting, tissue damage, or surface bacteria introduction may contribute. Symptoms include site warmth, tenderness, redness, and swelling. Fever may be present, and it can manifest in two types.

a. *Thrombophlebitis:* It occurs in the superficial vein itself and extends along the course of the vein. The redness, swelling, and tenderness extend along the course of the vein.

b. *Cellulitis:* The redness, swelling and tenderness affect the soft tissues, and are not localized to the course of the vein.

A4: Other Major Blood Vessel Injury

i. **Deep venous thrombosis (DVT):** It is the formation of a blood clot in a donor's phlebotomy arm, which can extend from superficial veins. It may occur without prior superficial thrombosis symptoms, particularly in individuals using oral contraceptives, causing upper arm swelling and pain.

ii. **Arteriovenous fistula:** It is an abnormal connection between lacerated vein and artery, occurring after venipuncture or during healing. Often due to arterial puncture, it presents as a pulsating mass with thrill and bruit. In cases of extensive blood shunting, the affected area may feel warm, while the distal arm could be cold, with dilated and pulsating distal veins.

iii. **Compartment syndrome:** It's marked by elevated intra-compartmental pressure due to blood buildup in the forearm's deep regions, leading to muscle and soft tissue damage. Symptoms include pain, swelling, paraesthesia, and partial paralysis.

iv. **Brachial artery pseudoaneurysm:** Pseudoaneurysm forms when blood pools outside an artery, contained by surrounding tissue. It may follow arterial trauma or a large hematoma, presenting with a pulsating mass, pain, and paraesthesia.

B. Complications mainly with generalized symptoms: Vasovagal Reactions

A vasovagal reaction (VVR) entails a feeling of unease, weakness, anxiety, dizziness, nausea, and potential fainting. It's influenced by physiological and psychological factors, activated by the autonomic nervous system, blood volume changes, and psychological stress. VVR can occur at any point in the donation process, either within or outside the donation facility.

Vasovagal reactions are divided in few subgroups:

a. Without loss of consciousness (LOC):
b. With loss of consciousness (LOC): The donor faints for
    i. Less than 60 seconds
    ii. More than 60 seconds

- Based on injury:
    a. With Injury- Injury caused by fall or accident due to a vasovagal reaction
    b. Without Injury
- Based on location:
    a. On collection facility
    b. Outside collection facility

C. Complications related to apheresis

a. Citrate Reaction: Hypocalcemia, caused by citrate anticoagulant infusion during apheresis, leads to neuromuscular hyperactivity. It results in various symptoms, including numbness, tingling, metallic taste, chills, muscle twitching, and can progress to severe manifestations like carpopedal spasms, vomiting, tetany, shock, and cardiac arrest.

b. Haemolysis during apheresis procedure: Red cell damage in apheresis return lines can occur due to various issues like faulty valves, tubing kinks, incorrect setup, or equipment failure. Incompatible replacement fluids, like dextrose D5W, can also contribute. It results in pink or red plasma, dark blood in the kit, and potential pink or red urine in donors.

c. Air embolism:
Air bubbles entering the apheresis donor's circulation can occur due to tubing priming issues, equipment failure, or staff error. It may reach the lungs or brain, causing symptoms like a bubbling sound, cough, dyspnea, chest pain, confusion, and more.

d. Infiltration: During apheresis, solute (e.g., saline) can enter surrounding tissues when the needle isn't properly placed, causing tissue swelling at the venipuncture site.

e. Unable to return red cells: Emergency apheresis procedure termination, often due to technical issues or severe donor reactions, may prevent the return of nearly one unit of packed red blood cells to the donor.

D. Allergic reactions

a. Localised allergic reaction: Skin irritation at the venipuncture site can result from allergens in disinfection solutions, latex gloves, or adhesive bandages. Symptoms include itching, redness, raised rash, or hives, appearing soon after donation or within hours or days.

b. Generalised allergic reaction: Anaphylactic reactions can occur post-apheresis due to donor sensitivity to ethylene oxide gas in collection kits. Symptoms include apprehension, anxiety, flushing, swelling, cyanosis, cough, wheezing, dyspnoea, chest tightness, cramps, nausea, vomiting, diarrhoea, tachycardia, hypotension, and altered mentation.

E. Other serious complications related to blood donation

- **Major cardiovascular event (MCE)**

  Acute cardiac symptoms (other than myocardial infarction or cardiac arrest).
  Myocardial infarction
  Cardiac arrest
  Transient Ischemic Attack
  Cerebrovascular accident
  Death

  Major cardiovascular events, including death, may occur hours after attending the collection centre for blood donation. This is very rarely reported.

F. Other complications

Other systemic reactions or complications not covered previously, like misdiagnosed chest pain or infections due to equipment reuse errors, can be considered here.

Grading of Imputability:

Imputability refers to the strength of relation between donation and the DAR (or complication in the donor). Imputability of harm should be assessed, i.e., the extent to which the harm detected is likely to have been caused by the process of donation. (Table 2)

Table 2: Details of terms used to define the imputability

Definite or Certain	Conclusive evidence beyond reasonable doubt that donation caused the complication (DAR)
Probable or Likely	Clearly in favor that the donation caused the complication (DAR).
Possible	Evidence is indeterminate that complication adverse reaction (DAR) could be caused by donation or by other reason
Unlikely or Doubtful	Clearly in favor that "other" reason is the cause of the complication (DAR) adverse reaction
Excluded	Conclusive evidence beyond reasonable doubt that reasons other than donation caused the complication (DAR)

Severity Grade Tool (SGT):

In January 2018, the AABB Donor Hemovigilance Working Group, ISBT Donor Haemovigilance Working Group, and the chair of the Plasma Protein Therapeutics Association (PPTA) Medical Policy Committee collaborated to create the Severity Grading Tool (SGT) for blood donor adverse events. This tool, meant to complement ISBT's standard definitions of adverse reactions, aims to provide an objective assessment of severity based on how the adverse event is managed. It enhances consistency and reduces observer variation in reporting, facilitating reliable comparisons among reporting centres and pinpointing research priorities for donor care and safety. The grading tool categorizes severity into grades 1-3, roughly aligning with mild, moderate, and severe outcomes. (Table 3)

Table 3: Definitions and general considerations for severity grading tool:

Categories	Grade 1	Grade 2	Grade 3
A.1. Blood outside vessel -Haematoma - Arterial puncture - Delayed bleeding	- No OMC - Localized to the venipuncture site	- OMC (EMR, ER, Urgent care), No hospitalization, or - ADL ≤2 weeks, or - Generalized beyond veni-puncture site	- Hospitalization, or - ADL -2 weeks, or - Severe sequelae, or - Surgical intervention

A.2. Arm Pain - Nerve injury/irritation - Other arm pain	- No OMC - Duration ≤2 weeks	- OMC (EMR, ER, Urgent care), - No hospitalization, or - Duration -2 weeks to ≤6 months, or - ADL ≤2 weeks	- Duration - 6 months, or - ADL -2 weeks
A.3. Localized infection/ inflammation of vein or soft tissue -Superficial thrombophlebitis -Cellulitis	-No OMC	-OMC (EMR, ER, Urgent care), -No hospitalization, or -ADL ≤2 weeks, or -Resolved with oral antibiotics	-Hospitalization, or -ADL -2 weeks, or -Resolved with IV treatment
A.4. Other major blood vessel injury -Deep venous thrombosis -Arteriovenous fistula -Compartment syndrome -Brachial artery pseudoaneurysm			-Diagnosis is medically confirmed, or -Treated with anticoagulant therapy, or -Required surgical intervention
B. Vasovagal reactions -Vasovagal reaction, no loss of consciousness (LOC) -Vasovagal reaction, loss of consciousness (LOC)	-No OMC	-OMC (EMR, ER, Urgent care), -no hospitalization, or -ADL ≤2 weeks, or -Suture of laceration(s),or -IV rehydration	-Hospitalization, or -ADL -2 weeks, or -Fracture(s), medically confirmed concussion, a dental injury requiring dental procedure, e.g., cap/crown, dental implant, bridge, tooth extraction, dentures
C. Related to apheresis -Citrate reaction -Haemolysis -Air embolism -Infiltration	-No OMC -Citrate toxicity (including carpopedal spasm) resolved with or without oral calcium	-OMC (EMR, ER, Urgent care), no hospitalization, or -ADL ≤2 weeks, or -Citrate toxicity requiring intravenous calcium	-Hospitalization, or -ADL -2 weeks, -Abnormal cardiac rhythm medically diagnosed
D. Allergic Reaction -Local allergic reaction -Generalized (anaphylactic) reaction	-No OMC -Managed with over-the-counter medications—topical steroids, antihistamine	-OMC (EMR, ER, Urgent care), no hospitalization, or -Generalized reaction including bronchospasm, Laryngospasm managed with inhalation or oral bronchodilator and/or autoinjector (EpiPen)	-Hospitalization, or -Generalized reaction, including bronchospasm, laryngospasm, or anaphylaxis, requiring management with intravenous steroids and/or epinephrine, but NOT intubation or tracheostomy
E. Other serious complication -Acute cardiac symptoms -Myocardial infarction -Cardiac arrest -Transient ischemic attack -Cerebrovascular accident (Stroke)			-Diagnosis is medically confirmed
F. Other	-No OMC -No injury	-OMC (EMR, ER, Urgent care),no hospitalization, or -Duration -2 weeks to ≤6 months, or -ADL ≤2 weeks	-Hospitalization, or -Duration - 6 months, or -ADL -2 weeks, or -Surgical intervention

OMR: Outside Medical Care, EMR: Emergency Medical Response, HCP: Health Care Professional, ER: Emergency Room, ADL: Activity of Daily Living • Choose the highest applicable severity grade; for example, if a vasovagal reaction caused a fall and the donor was taken to the emergency room where she required sutures (Grade 2) to repair a laceration on her arm and was also diagnosed with a concussion (Grade 3), the final severity assignment would be Grade 3.			

A donor can sometimes experience multiple adverse events. In such situations, assigning a severity grade requires discretion.

- If more than one type of donor adverse reaction, each donor adverse reaction has to assign a separate grade.
- If the donor adverse reaction is related or difficult to differentiate, use the highest applicable severity grade.

Conclusion:

Donor vigilance plays a crucial role in ensuring blood donor safety. Continuous reporting of adverse donor reactions is essential for developing effective guidelines to prevent their recurrence. Since adverse reactions are a leading cause of donor reluctance to give blood, such guidelines can significantly reduce this deterrent.

Technical Aspects and Clinical Outcomes of Buffy Coat Pooled Platelet Concentrates

Dr. Hari Krishan Dhawan

Platelet transfusion is a vital therapeutic approach, especially for haemato-oncological disorders. In our country, the most commonly used platelet concentrates include Random Donor Platelets (RDP) and Single Donor Apheresis Platelets (SDAP). With cost and availability concerns, the introduction of Buffy Coat Pooled Platelets (BCPP) offers a promising alternative.

Buffy Coat Pooled Platelet Concentrate (BCPP) Technical Overview:

BCPP is prepared by pooling 4 to 6 buffy coat from ABO matched donors, followed by addition of plasma/ platelet additive solution (PAS) before a soft centrifugation followed by filtration through a leucofilter into a one litre platelet storage bag.

There are two primary methods of buffy coat pooling: **Pooling Kit method** where a commercial kit enables the connection of individual buffy coat bags to a pooling kit with an integral platelet leucofilter. **Chain method** (used in case of top and bottom bags) which involves connecting the tubing of one buffy coat to another, allowing for pooling by attaching them in a chain. After pooling Buffycoat bags we add plasma / platelet additive solution (PAS) to one end rinse the remaining Buffycoat in the bags and have appropriate volume of BCPP with PAS:Plasma ratio of 70:30. After adding plasma/ PAS this bag looks like a whole blood bag with volume of around 500 ml. A labside platelet leucofilter with a 1L platelet storage bag is attached to this bag (in case of Chain method) and a soft centrifugation is given to the bag (440g X 9 minutes at 22^{o}C at our centre). The supernatant PRP is shifted to a platelet storage bag and a Buffycoat pooled platelet concentrate is ready. Regarding labelling of these bags, a unique ID is provided to BCPP bag along with unit number of all contributing units. As a QC criteria platelet content of the bag should be 2 X 10^{11}.

Advantages of BCPP:

1. Comparable platelet increments to apheresis platelets.
2. Lower cost than apheresis platelets.
3. Readily available in emergencies.
4. Reduced allergic reactions and low incidence of FNHTR.
5. More plasma available for fractionation due to PAS.
6. Cost-effective leucofiltration.
7. No added donor complications compared to apheresis platelets.
8. Comparable allo-sensitization and refractoriness rates to apheresis platelets.

Disadvantages of BCPP:

1. Multiple donor exposure for a single adult therapeutic dose as compared to SDAP. We should also consider, in case facility of NAT is available BCPP product will be NAT tested without any additional cost as compared to NAT testing of SDAP which will have additional cost and difficult logistics in case of emergency requests.
2. Multiple product manipulations are required in the form of multiple sterile docking which can increase the risk of bacterial contamination. Strict adherence to GMP is required in labs preparing BCPP.

As per the literature available there is no significant difference between buffy coat derived pooled platelets and apheresis platelets one-hour post-transfusion CCI. In a study at our centre also showed similar results.

Suspension of pooled platelets in PAS has a lot of advantages. Without affecting the shelf life, PAS ensures that more plasma can be made available for clinical use. Due to lack of plasma, the risk of allergic reactions is minimized.

These PAS suspended group 'O' positive Buffycoat pooled platelets can be used as universal platelets (as O platelets have no ABO antigen and plasma have safe levels of Anti-A and Anti-B as they are PAS suspended) can be lifesaving in emergency bleeds.

Cost Analysis of BCPP as compared to SDAP:

As per the European literature where these platelets are used in majority, BCPP have substantially lesser cost than SDAP. Study at our centre showed that BCPP have lesser cost in terms of human resources, capital infrastructure, furniture costs, costs of medical and non-medical equipment, drugs, consumables, and overhead costs. The unit cost of one SDAP product was found to be Rs. 10,498 while that of one BCPP bag was found to be Rs. 4,063, which was only 38.9% of the former.

Conclusion

Buffy coat pooled platelets have similar efficacy and safety profile as compared to single donor apheresis platelets. BCPP costs significantly lesser than SDAP and hence it can act as a good alternative to SDAP in resource-constrained settings.

Towards Implementation of 100% Voluntary Blood Donation

Dr Jhalak Patel

- Blood transfusion is an indispensable component of health care.
- To ensure a safe and sufficient supply of blood components, the Region needs:
  - **a well-coordinated structure** for conducive policy and legislation,
  - **national guidelines and criteria on blood donor selection, public information and donor education, infrastructure and facilities, adequate financial and human resources, a quality system, including standard operating procedures, documentation and records, donor haemovigilance and monitoring and evaluation.**

- **Voluntary Non-Remunerated Blood Donor (VNRBD):**
  - Definition: "A person who gives blood, plasma, or other blood components of his/her own free will and receives no payment for it, either in the form of cash or in-kind, which could be considered a substitute for money.

- **Blood collection and proportion of VNRBDs in India are as follows** [Voluntary non-remunerated blood donations to ensure blood safety in the WHO South-East Asia Region to support universal health coverage; WHO 2023 Report]:
  - Total Population: 1393.4 million population
  - Total Donations: 12.4 million
  - Total VNRBDs: 9.42 million
  - % VNRBDs: 76%

- **Donor recruitment and retention strategies:**
  - **Regular repeat donors** – why are they safest- Regularly donate blood hence regularly get screened for TTIs and become a part of safe donor pool.
  - **Conversion of first-time donor to regular repeat donor** – strategies:
    - **Appeal to the blood donor** about the need to donate again and again; ignite the passion.
    - **Appreciate the blood donor- thank the donor at least three times** during the process of blood donation. Follow up with thanks message using communications channels like short messaging system (SMS), WhatsApp, emails and/or social media such as Twitter, Facebook, Instagram.
    - **Simply ask for the next blood** donation using the above-mentioned communication channels.
    - **Make it convenient for the donor to donate**; reach out to the workplace of the donor – outdoor blood donation drives and/or reach out to the home of the donor– outdoor blood donation drives with resident welfare associations, market welfare associations and religious associations; where the donor is likely to participate during his/her free time.

- Minimize:
    - Donor **waiting time.**
    - Donor **adverse reactions.**
    - Donor **anxiety** – provide audio-visual engagement.
    - Donor **attrition due to deferral** – explain the deferral and encourage re-induction of temporarily deferred donors after the due waiting period is over.
    - Donor **dissatisfaction** – enhance personal connect between the donor and the service staff.

❖ **Strategies for promotion of voluntary non-remunerated blood donations:**

- Create an enabling environment for 100% voluntary non-remunerated blood donation:
    - **Advocate for 100%** voluntary blood donations.
    - Establish **a national voluntary blood donor programme.**
    - Strengthen collaboration and partnerships by/with-
        - **Awareness campaigns** in schools and college.
        - People at **work places-factory workers.**
        - **Uniformed services** viz. paramilitary, police – Ahmedabad Red Cross have strong association with police department.
        - **Religious and community leaders**- We have celebrated blood donation campaign- "Rang Che Ekta No."
- Foster a culture of voluntary blood donation:
    - **Understand your blood donors**-What motivates people- Benefits of blood donation.
    - **Identify target blood donor** population.
    - **Develop communication strategies** for donor education-Effective communication and campaign.
    - **Build partnerships** with the media.
    - **Good service** and support to donors.
    - Maximize the impact of World Blood Donor Day and National Voluntary Blood Donation Day events.
- Build and maintain a safe, sustainable voluntary donor base:
    - **Educate, motivate and recruit** new blood donors.
    - **Mobilize youth** as a new generation of voluntary blood donors.
    - **Convert eligible replacement donors** to voluntary blood donors.
    - **Ensure blood availability.**
    - **Recall infrequent, inactive and temporarily deferred** blood donors.
    - **Retain suitable voluntary** blood donors.
    - **Recognize blood donors' contribution to society.**
- Provide quality donor service and care
    - **Make it convenient** for donors to give blood.
    - **Elevate donor anxiety.**
    - **Provide blood donor counselling.**
    - **Make blood donation a safe and pleasant experience.**

❖ Common gaps and opportunities:

1. Promote awareness of VNRBDs:
    - **Use information technology/social media** tools such as Facebook, WhatsApp and blogs and reinforce existing contacts using Twitter, emails, and websites.
    - Incorporate a **chapter on VNRBDs in the teaching curriculum** in colleges and universities.
    - **Create "Club 25 donors'** club" in colleges and universities.
      IRCS, Ahmedabad has Mission 25/25; Centurion Blood Donors' Club, Women Blood Donors' Club and Handicapped Blood Donors' Club.
    - **Create a post of District Voluntary Blood Donation Officer** in civil administration and/or health department.
    - Involve **public organizations** such as cyclists and bikers' clubs
2. Management of dropouts:
    - Many persons after blood donation for the first time do not come again to donate blood? WHY?
        - **Lack of time** and communication.
        - **Unfavourable location** or time of blood donation.
        - **Unhappy experience.**
        - **Donor reaction** at the time of blood donation.
        - **Non-availability of blood** in time of his/her need.
        - **Failure to appreciate the efforts of blood donors.**
        - **Impression that blood is being mis-utilized.**

3. Retain blood donors by establishment of regular contacts with them for constant engagement:
    - **Thank donors for the present blood donation** using WhatsApp, Facebook, Twitter and reinforce existing contacts with donors using SMS and emails.
    - **Remind donors of the next blood donation** using WhatsApp, Facebook, Twitter and reinforce existing contacts with donors using SMS and emails.
    - **Wish donors on their marriage anniversary** and reinforce such wishes on birthdays and important days using all communication channels such as WhatsApp, Facebook, Twitter, SMS and emails.
4. Decentralized blood transfusion services.

❖ **STRATEGIES INCORPORATED BY INDIAN RED CROSS SOCIETY, AHMEDABAD DISTRICT BRANCH TO BECOME 100% VOLUNTARY BLOOD CENTRE:**

- Highlights of Indian Red Cross Society, Ahmedabad District Branch
    - 100% voluntary blood donation and having >50,000 donations per year.
    - Apheresis donation is also through voluntary blood donor pool.
    - NABH Accredited since 2014.
    - AABB certified in Quality since 2021.

1. Establishment of different clubs for donor motivation: IRCS, Ahmedabad has **Mission 25/25**; **Ahmedabad Red Cross Centurion Blood Donors' Club, Ahmedabad Red Cross Women Blood Donors' Club, Ahmedabad Red Cross Handicapped Blood Donors' Club.**
   Currently we have 125 centurion blood donors enrolled in the club.
2. We have **mascot for blood donation** promotion- **Sherdil**: Champion Torch Bearer for blood donation.
   and **Caredil**: Visionary Trail Blazer blood transfusion.

3. **Theme song** for blood donation promotion.
4. **Social media platforms** for promotion viz. facebook and instagram.
5. **Mobile application** for easy traceability of donations mentioning date of last donation along with the facility of availing blood through the same.
6. **Social media visibility** to blood donors and camp organizers.
7. **Awareness lecture** on why one should donate blood.
8. **Blood donation at the comfort** of blood donor- (Door to door blood donation drive)
9. **Celebrating special donations**.
10. **Ensuring donor satisfaction** and blood availability at the time of need.
11. Providing **iron supplements** to donors deferred due to low haemoglobin.
12. Taking **regular donor feedbacks** and understanding their needs.
13. "**Be a Thalassemia Blood Parent" proposal** through which a donor can become a blood donor to specific thalassemia patient and donate for him/her regularly to avoid multiple donor exposures.

THANK YOU

Setting up of Transfusion Programme for β-thalassemia Major

Dr Meena Sidhu
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Introduction

- The β thalassemia syndromes constitute the most frequent inherited anemia managed with chronic red cell transfusions around the world.
- The term "thalassemia" is derived from the Greek words "Thalassa" (sea) and "Haema" (blood) and refers to disorders associated with defective synthesis of -globin subunits of hemoglobin A, inherited as pathologic alleles of one or more of the globin genes located on chromosomes 11 and 16.
- More than 200 deletions or point mutations of globin mRNA have been identified

Prevalence in India

India has the largest number of children with Thalassemia major in the world – about 1 to 1.5 lakhs and almost 42 million carriers of ß (beta) thalassemia trait. About 10,000 -15,000 babies with thalassemia major are born every year.In India, **B**-Thalassemia is prevalent across the country, with an average frequency of carriers being 3-4%. A higher frequency has been observed in certain communities, such as Sindhis, Punjabis, Gujaratis, Bengalis, Mahars, Kolis, Saraswats, Lohanas and Gaurs

Blood Transfusion facilities for B-Thalassemia Major patients

➢ **Processing of Blood units**

- Blood to be collected from regular Voluntary Non-remunerated donors
- Component preparation facilities.

➢ **Advanced immune-hematology facilities which include**

- regular antibody screening and
- antibody identification,
- Titration
- DAT
- Elution etc
- Advance testing for Transfusion transmitted diseases- NAAT testing

➢ **Hemovigilance**

Monitoring and reporting of any adverse reaction and near miss cases

Reporting to Hemo-vigilance Programme of India

website- http://nib.gov.in/ haemovigilance.htm

➢ **Quality Assurance of BTS**

Quality control of blood components

Equipment maintanance

Proficiency testing of staff

RED BLOOD CELL TRANSFUSIONS

The primary management of severe anemia in β thalassemia is the provision of adequate red cell transfusions. Chronic anemia has serious consequences

- In children, associated with reduced physical activity, impaired growth, enlargement of liver and spleen, osteopenia, delayed puberty, and cognitive impairment.
- In adults, chronic fatigue, reduced work capacity, cognitive impairment, osteopenia and fractures, hypersplenism, and reduced quality of life are observed.
- Ineffective erythropoiesisleading to anemia and massive bone marrow hyperplasia 60%–80% of progenitors die at the polychromatophilic stage
- The erythropoietin driven expansion of erythroid precursors and shortened red cell survival causes hepatosplenomegaly, elevated basal metabolism, extra-medullary hematopoietic masses, skeletal deformities of face and skull, and fragile bones

Guidelines for Transfusion

➢ **Criteria for initiation of regular transfusion**

I. Hemoglobin <7g/dl on 2 occasions at least 2 weeks apart

β thalassemia major:<7 g/dl on 2 occasions, with or without symptoms

HbE β thalassemia:<7g/dl on 2 occasions and one or more of the symptoms

II. Hemoglobin ≥7 g/dl, with one or more of the following symptoms

a.Growth delay in

i. Infants : failure to gain weight for 3 months without another etiology

ii. Children: Height velocity <3cm/yr

iii.Delayed onset of puberty: >12 years in females, >13 years in males, with endocrine evaluation

b. Skeletal facial changes: subjective, photographic record, discuss with patient and family

c. Splenomegaly: Spleen >6 cm, or enlargement >1 cm/year after 2 years of age

d. Extra-medullary hematopoiesis: symptomatic or moderate to severe EMH

e. Cerebrovascular: overt stroke, silent infarcts, arterial narrowing, moya moya

f. Venous thrombo-embolism

g. Pulmonary hypertension

h. Osteoporotic fracture

i. Poor quality of life in adults: decline in capacity to work or perform usual activities

- **Hemoglobin target, volume, and rate**

Target haemoglobin

a. β thalassemia major: Pre-transfusion hemoglobin of 10.0 g/dl, range 9.5–10.5 g/dl

b. E β thalassemia: Pre-transfusion hemoglobin of 9–10 g/dl

Frequency of transfusion

a. Every 3 weeks in most older children and adults with β thalassemia major

b. Every 4 weeks

i Younger children with β thalassemia major

ii. Most children and adults with E β thalassemia

c. It is preferable to change the volume of blood instead of the interval of transfusion to maintain hemoglobin target

Volume of transfusion

a. Children: Transfuse 4 ml/kg per gram increase in hemoglobin desired. The calculation uses post-transfusion hemoglobin of 13 g/dl on 3-week and 14 g/dl on 4-week schedule

b. Adults: 2, 3 or 4 units per transfusion. Generally: 3 units if pre-transfusion Hb<10gm/dl and 2units if PT Hb is>10gm/dl

Other volume considerations:

Patients with intact spleen have higher transfusion needs

- Adults with body weight > 60 kg may need 4 units on some transfusions
- Higher hemoglobin target or transfusion more frequent than every 3 weeks are needed in rare circumstances

i. Congestive heart failure

ii. Pulmonary hypertension

iii. Symptomatic extramedullary hematopoietic masses

iv. Occurrence of fatigue or bone pain in pre-transfusion

Rate of transfusion

Children: 5 ml/kg/h

a. Adults: 200–300 ml/h, based on tolerance

b. Congestive heart failure: Reduce volume and rate based on cardiac function

Type of PRBCs for β-TM

- **Donor Characteristics**

Careful donor selection & screening - Blood must be collected from regular voluntary non–remunerated blood donors, who are regularly tested

There must be dedicated donor inventory for TM patients

- **Leuoreduced PRBCs**-Patients with β-thalassaemia major should receive leucoreduced packed red blood cells with minimum hemoglobin content of 40g.
- **Storage-**Although transfusion of fresh RBC unit may be desirable, should be **< 14 days** red cells stored in additive solutions for less than two weeks, and in CPD-A for even less days – as fresh as possible.
- **Hematocrit -** Additive solution (hematocrit 55%–60%) or CPD-A (Hct 70%–75%)
- **Washed RBC units**- For patients with severe allergic reactions
- Should be screened with most sensitive techniques having shortest window period preferably **NAAT**

Compatibility testing

- Extended red cell antigen typing that includes at least Rh and Kell before embarking transfusion
- ABO and Rh(D) compatible blood
- Should also be tested for weak D/Du
- Preferably matched for the Rh and Kell antigens
- AHG crossmatch and screen for new antibodies.
- If present, then Ag negative blood to be given
- A careful record of transfused blood should be maintained for each patient, including the volume or weight of the administered units, the haematocrit of the units and patient's weight.
- The annual transfusion requirements is also valuable in identifying changes that may constitute important evidence of hypersplenism or accelerated destruction of donor red *cells.*
- An accurate record of transfusion volume at each visit must be maintained, which can be then used to calculate annual transfusion requirement and iron loading rate.
- Development of iron overload should be evaluated with serial ferritin measurements after the first 6 months of transfusions.

Transfusion Programmes/Regime

- **Supertransfusion regime-** Under this regime, the pre-transfusion Hb is kept above 12g/L
- **Hypertransfusion regime –**The pre-transfusion Hb in this regime is usually above 10-12 g/L
- **Moderate transfusion regime-** In the moderate transfusion regime, the pre-transfusion Hb is maintained between 9-10g/L

Alloimmunization

- Development of red cell antibodies (alloimmunisation) is a known and common complication of chronic transfusion therapy, its frequency ranging from 3% to 23.5%.
- Alloimmunisation was found to involve the Rh system and the Kell system

- It was found to be significantly lower in patients in whom blood transfusion was started before the age of 1yr

Iron overload

Endocrine abnormalities because of iron deposition

- Short stature
- Delayed puberty
- Cardiac problems
- Diabetes Mellitus
- Osteoporosis, osteopenia
- Involvement of thyroid
- Liver failure

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Ethical Considerations in Informed Consent: Transfusion Medicine Perspective

Dr Neetu Kukar

Transfusion medicine, a critical branch of medical science whereby blood is collected from the circulation of one individual and infused into another for practical therapeutics indications. This practice has undoubtedly saved countless lives, but it brings with it a set of ethical considerations, particularly in the context of informed consent.

"Informed consent" is a legal and ethical doctrine derived from the principle of respect for the autonomy or independence of the health care seeker, ("care seeker" is defined as a natural person, including a donor of human blood or blood components and a patient who receives or should have received health care from a licensed health care provider, under contract, expressed or implied.)

Generally, two rights derived from autonomy are accorded legal protection.

1)The Constitutional right to life and the right to the dignity of the human person

2) Right to bodily well-being, protected by professional negligence rules.

Thus, informed consent is a process by which the doctor provides all necessary and relevant healthcare – related information to the care seeker by allowing to choose what they consider best for themselves, based on the information provided by the doctor. Therefore, healthcare providers owe care seekers a duty to seek and obtain an effective autonomous authorization before a treatment or procedure is undertaken on him or her, failure of that may amount to dereliction.

In Blood centre, the process of obtaining informed consent should comprise of open discussion between the doctor and the blood donor, where doctor should provide all relevant information about blood donation and also that, which is specifically asked for by the donor. This informed consent should be voluntary without any coercion, influence or force that will affect the persons autonomy in any way.

Ethical Considerations of the Informed Consent in Transfusion Medicine

Professional ethics as they apply in transfusion medicine has been described as the moral bond that links a profession, the people it serves, and the society. Ethical provisions rigidly regulate transfusion medicine practice because blood is a perishable resource, costly to acquire and requiring good inventory practice for quality service delivery, product availability and for the related implications for liabilities for negligence.

Generally, ethical principles exist in medicine, law and research which revolves around

A) Dignity- A human being has an innate right to be valued and receive ethical treatment.
B) Autonomy - Respect for persons (self-determination, protection of vulnerable groups, informed consent)
C) Beneficence (equitable distribution of risk and benefits, equitable recruitment of study participants, special protection of vulnerable groups)
D) Non-maleficence (avoiding harm)
E) Justice (physical, mental and social well-being, minimal risks) as responsibilities of care providers to care seekers.

Central to the ethical framework of transfusion medicine is the principle of patient/donor autonomy. Informed consent necessitates that patients are provided with comprehensive information about the proposed transfusion, including its purpose, potential benefits, risks, and available alternatives. This information empowers patients to make autonomous decisions regarding their medical care. Healthcare providers must ensure that the information is communicated in a manner that is understandable to the patient/donor, taking into account individual differences in health literacy.

Internationally, International Society for Blood Transfusion (ISBT) published code of ethics, the informed

consent was specified in that, which states that an informed consent should be obtained from blood donors before donation and for the use of his/her donated blood.

Further, it was buttressed on the components of a valid informed consent to include education or disclosure on risks, complications, alternatives or implications of refusal of such consent and the reasonable expectations for actions and inactions.

It is also specified that, patients should give an informed consent before being administered any form of blood therapy and any valid advance directive on blood transfusion must be respected.

The major elements of the informed consent consist of

- Disclosure (benefits, risks, costs, implications of treatment and non-treatments etc.)
- Comprehension (ability to understand information put forward in a language best understood and if possible, by a family member in familiar dialectal ascent for full comprehension)
- Voluntariness (freedom of coercion and the care seeker given sufficient time frame to make decisions)
- Competence (above legal age requirements and not suffering from any mental health disorder)
- Decision or authorization (acceptance or decline).

Professionals like medical practitioners, Nurses, Medical Laboratory Technicians and Scientists and other health care providers competent in the informed consent process owe the ethical obligations of providing the informed consent process to care seekers in their different lines of duty.

Donor Consent

Once the prospective donor is certified to be eligible for donation as per national regulations, written informed consent should be taken before blood donation with the donor's signature or thumb impression. Informed consent signifies that the donor has understood the questionnaire and is willing to donate blood or blood components.

The consent should include that his/her blood will be screened for Human Immunodeficiency Virus (HIV), Hepatitis B & C (HBV & HCV), Malaria, Syphilis and his willingness for post-donation notification as well as counselling in case of any abnormal results.

The donor's consent signifies

• The donor has received, reviewed the educational materials, and understood the hazards and risks of the donation procedure.

• The donor agrees not to donate if the donation could potentially risk the safety, purity, or potency of the blood supply.

• A sample of the donor's blood will be tested for specified relevant transfusion-transmitted infections. If results are found to be reactive for any of the TTI markers, the collected blood will be discarded.

• The collected blood will be processed into blood components and may be further provided to a plasma fractionator for further processing.

Confidentiality

Donors must provide voluntary, informed consent without coercion. The process should involve clear explanations of the purpose of blood donation, potential risks, and the screening process.

Confidentiality of donor information is paramount, and steps should be taken to safeguard their privacy throughout the donation process.

Transparency in Blood Product Information

Donors have the right to know the source and safety measures associated with donation of Blood and blood products. Ethical practice in transfusion medicine requires transparent communication about the testing and processing of blood products. This includes addressing concerns related to infectious diseases, potential adverse reactions, and the overall quality of blood components.

The revised version of the ISBT Ethics of Blood Transfusion, published in 2017 further advised health care provider in transfusion medicine to avail care seekers any required knowledge on the subsequent legitimate use of their donations and if it encompasses both possible commercialization of the products derived from the donation and whether the donation might be used in research.

Patient Informed consent

Timing and Adequacy of Consent

Obtaining informed consent should occur at a time when the patient is cognitively able to comprehend the information and make decisions. In emergency situations, obtaining prior consent may not be feasible, but healthcare providers should strive to obtain consent as soon as possible.

Adequate time should be provided for patient to ask questions and seek clarification. This process is essential in fostering a trusting relationship between healthcare providers and care seeker.

Cultural and Religious Sensitivity

Ethical considerations extend to respecting the diverse cultural and religious beliefs of patients. Healthcare providers must be culturally competent and engage in open and respectful dialogue to understand and address these considerations while upholding patient autonomy.

Continuous Monitoring and Adaptation

Ethical standards evolve with advancements in medical knowledge and technology. Therefore, healthcare providers in transfusion medicine must engage in continuous monitoring and adaptation of consent processes. Regular updates to consent procedures based on emerging evidence contribute to maintain ethical standards aligned with the best available information.

Duty of Care Related to the Informed Consent in Transfusion Medicine

The broad doctor-patient relationship, one of the unique and privileged relationships based on mutual trust and faith forms the legal basis for which medical care activity takes place between the care provider and care seeker. This relationship extends to transfusion medicine with a general acceptance that the doctor (and the blood transfusion service) owe a 'duty of care' to the patient and is in a unique position to prevent harm if responsible steps are taken to make the blood supply chain as safe as possible.

Therefore, whether in the context of blood donation or transfusion, a duty of care arises on the basis of this "doctor-patient" fiduciary.

Breach of Duty of Care in the Informed Consent in Transfusion Medicine

The healthcare provider who fails to obtain an "informed consent" before embarking on blood donation or transfusion or administers a form of transfusion therapy even where a patient or a blood donor withholds consent and the care provider still goes ahead to undertake the opposite action on him or her is in breach of the duty of care in the existent consensual relationship. Such healthcare provider may then be liable for negligence.

Negligence related to the informed consent to transfusion medicine may be hinged on the doctrine of **res ipsa loquitur.** This doctrine is premised or predicated on the mere fact of the event happening which is based on two rebuttable presumptions, viz: (a)That the event happened as a result of a duty of care somebody owes his neighbour (b) And that somebody is the Defendant. To this extent, such health care providers who owe a duty of care to obtain an informed consent but derelict are potentially liable in law.

Legal Effect of Informed Consent to Transfusion Medicine; Malpractice, Negligence and Negligent liabilities

The informed consent otherwise also termed "knowing consent" to transfusion medicine relates to the right to respect the voluntarily, independent and informed decision of the care seeker on adequate comprehension of the risks involved and the benefits thereof in a mentally stable individual without any form of coercion or undue influence for the donation or transfusion service

In case of minors, informed consent must be obtained from their surrogate designates or in line with the law. In the event that specific consent cannot be obtained in transfusion therapy especially in unconscious and in emergency, the basis for treatment by transfusion must be in the best interests of the patient. Any valid advance directive declining a blood transfusion must be respected. Globally, the operations of blood transfusion services are guided by extant laws, Acts, Regulations or statutes which in turn helps in shaping blood transfusion services.

The recent emergence of the informed consent as the foundation in quality Medicare through the patient-centered care model further requires that health care providers fulfil on the informed consent to blood transfusion in the interest of quality service delivery, protection against misconduct or infamous behaviour in their professions and economic losses arising from negligent liabilities.

Finally, the informed consent in transfusion medicine despite being a new concept, represents an ethical and legal requirement as applicable to any other procedure to be carried out on the human body in any branch of Medicine.

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Bracing up for Accreditation: Small Steps Make a Big Difference

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The meaning of Accreditation

Official approval given by an organization stating that somebody/something has achieved a required **standard. (Oxford Dictionary)**

In other words, it is a public recognition of the achievement of accreditation standards by an organisation, demonstrated through an independent external peer assessment of that organisations level of performance in relation to the standards.

Why Accreditation?

Blood centres are integral part of health care system. Accreditation would be the single most important approach for improving the quality of blood centres.

- Helps improve effectiveness, efficiency, cost containment and accountability by reducing errors and increasing safety in the system
- Ensures standardisation of protocols leading to adherence to quality and safety protocols in a blood centre
- Improves the skills and competencies of staffs of the blood centre
- Increases community confidence as adherence to accreditation standards ensures provision of safe blood and blood products for transfusion
- Helps in promoting medical tourism

Perquisites for Accreditation

Accreditation is always a voluntary gesture to excel in quality of service offered. As they say, first things first. **Management Commitment** is the primary step towards accreditation. The next is a **Gap Analysis** against known standards. This will create a platform on which you can move ahead.

Steps to achieve Accreditation

1. **Create a team**
   Identify Key Personnel in each area. Identify their strengths and capabilities. Identify dedicated Quality Manager and Technical manager who are well versed with the existing standards.
2. **Sensitize team and other staff**
   The staff needs to be sensitized about quality, it's need and importance. The Quality management jargon needs to be understood.
3. **Comply to basics and statutes**
   If the basics are in place, the work is half done. Almost all of our blood centres are complying to the D & C act. Hence, it is not an impossible task to achieve quality and accreditation, as we are around 70% already there.

4. **Fill the gaps**
   The findings of Gap Analysis should be discussed and needful done.
5. **Assign responsibilities**
   After identifying the key personnel in each area, specific responsibilities can be assigned to them as per their competency. Some can be assigned managerial tasks, whereas some can be assigned supervisory tasks.
6. **Regular Trainings**
   Trainings are a vital part of any quality management system. Regular, periodic trainings should be conducted on every aspect of operational areas as well as quality management system.
7. **Self Assessment**
   Internal Audit or self assessment is a sort of preliminary test or rehearsal which prepares the blood centre staff for the final day. There are many tools which aid self assessment.

Quality System Elements

The Quality management system comprises of the following elements-

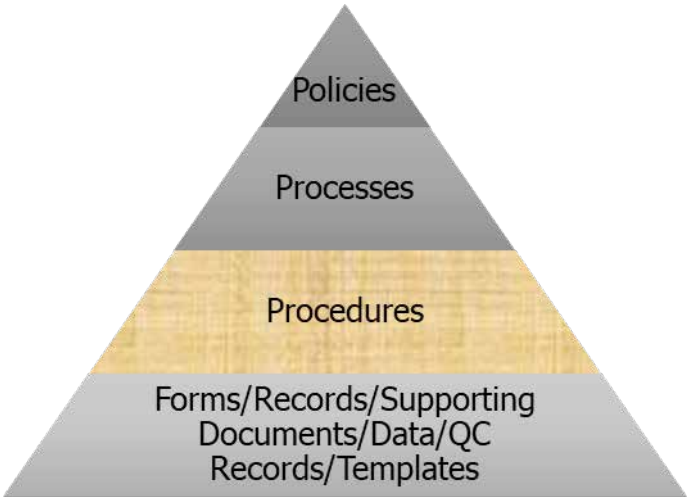
1. Organization - A legal identity of the Blood Centre is a must along with a strong management commitment. There should be a clearly defined organizational structure and staff needs to be acquainted with institutional Quality policy and Ethical Code of conduct. Quality policy should be displayed in the premises.
2. Infrastructure and Environment – The space should commemorate with the workload and should be hygienic, clean and ambient temperature maintained. The interiors should be comfortable and safe for the staff. It should be ensured that there is no risk of injury and occupational illness.
3. Manpower Management – Staff should be well trained, qualified, competent and adequate. The job description of each person should be defined. Regular trainings and competency evaluation should be done. Health check up of staff should be carried out periodically especially related to healthcare hazards.
4. Machine (Equipment) Management – The need and selection of equipment is done by top management but the daily use, regular maintenance is the responsibility of all those who are operating on it. Each equipment should carry a unique identification number. Records of validation, maintenance, calibration and breakdown must be in place.
5. Material Management – Selection and procurement of reagents is the responsibility of Blood Centre Incharge and validation should be done before putting them into use. Records of stock should be maintained and FIFO policy should be used for consumables having a shelf life. Minimum level of critical supplies should be maintained.
6. Processes and Procedures – All activities in the blood centre should be done according to written down procedures. (SOPs)Records should be maintained of each activity and traceability of blood unit should be there. The required Quality Control protocol should be followed in each area.
7. Document management – Each document or format used in blood centre should carry identification number. Documents need to be approved, reviewed and updated from time to time. Obsolete documents should be discarded as per policy. Records should be well organized, easy to retrieve

and preserved for 5 years as per regulations. Blood bank software also, if exists, should be validated.

8. Training – Regular trainings of staff should be conducted for the activities of blood centre as well as safety matters.
9. Monitoring & Evaluation – All activities need to be monitored periodically to detect deviations. Some defined Quality Indicators can be monitored and if deviated, root cause analysis can be done and corrective action taken.
10. Managing Non conformity – Deviations and adverse events should be addressed by analysing the non conformity and taking appropriate steps to prevent it in future.
11. Feedback and Improvement – For continuous quality improvement (CQI), it is important to get feedback of the stakeholders and addressing complaints.
12. Self Assessment – This is an excellent mechanism to identify our own flaws before going for external assessment. It should be conducted at least yearly and as per laid down protocols. Management's involvement in the reports of self assessment and correction of lacunae is required.

Preparing Documents

- The Quality manual is the apex document which states the Quality policy of the organization, Organizational Structure, as well all the quality management system essentials. The policy document enumerates all the policies applicable to the organization. The Standard Operating Procedures mention the steps to perform all tests or methods. The formats of all documents starting from Blood request forms to donor questionnaire and various reports should be assigned a document number.



Global Scenario

Globally, the Association for the Advancement of Blood & Biotherapies (AABB), then called American Association of Blood Banks, was the first to introduce the Standards for Blood Banks and Transfusion Services, in 1958. Europe adopted standards, guidelines and QMS in the area of Blood Transfusion, much later.

Indian Scenario

The National Accreditation Board of Hospitals and Healthcare Providers (NABH), under the Quality Council of India (QCI) introduced the first edition of Standards for Blood Banks in 2007. Currently, the third edition (2016) offers a certificate to Blood Centres based on it's compliance. It is based on ISO 15189.

The AABB Quality Certificate can also be now obtained. It is a Desktop assessment valid for 2 years and based on the Fundamental Standards especially created for Asian countries.

Eligibility to apply for Blood banks/ blood centres in India

Blood Centre should have implemented NABH standards for a minimum of three months.

The organisation has to commit to comply with NABH standards and applicable legal/statutory/ regulatory requirements.

Issue of Accreditation Certificate

- Validity of three years
- Unique number and date of validity.
- Accompanied by the scope of accreditation.
- The applicant Blood Centre must make all payment due if any to NABH, before the issue of certificate.

Surveillance and Re assessment

- NABH conducts surveillance before completion of 15-18 months since the date of accreditation of the accredited blood centre.
- The blood centre may apply online for renewal of accreditation at least six months before the expiry of validity of accreditation for which reassessment is conducted.
- NABH may call for un-announced visit, based on any concern or any serious incident reported upon by an individual or an organization or media.

Conclusion

Achieving accreditation is not an impossible task, if carried out meticulously. An efficient QMS comprises of a series of inter-related elements.

Quality costs, but poor quality costs more!

Role of Transfusion Medicine Experts in ABO Incompatible Renal Transplants

Dr Prashant Pandey

A transfusion medicine expert plays a crucial role in management of ABO incompatible kidney transplants by ensuring safe and successful transplantation. Their major responsibilities in such cases are as followings:

1. Blood Type Compatibility Assessment: They assess the compatibility between the recipient and donor's ABO blood types and identify any incompatibilities. In case of ABO incompatible transplants compatibility testing right from the recipients blood grouping and antibody screening to the organ donors blood grouping and antibody screening are important tests to be performed. Choice of blood components largely dependent on blood type incompatibility between the recipient and donor (Major/minor). It's preferred to transfuse 3 log leukodepleted and NAT tested blood components.

2. Estimation of Isoagglutinin titer: This is the preliminary test done in patient before heading into desensitization protocol. End titer of the patient is crucial in decision making. It is preferred to have separate IgG and IgM titer in the patient. Course and duration of desensitization protocol is solely dependent on isoagglutin end titer.

3. Desensitization Protocols: Transfusion medicine experts play a very important role in help develop and oversee desensitization protocols, which reduce the recipient's antibodies against the donor's blood type, making transplantation possible. Depending upon the patients end titer and financial status approval a transfusion medicine expert chooses one of the three modalities: conventional Plasmapheresis, semiselective plasmapheresis and selective Immunoadsorption. They may perform plasmapheresis or immunoadsorption procedures to remove antibodies from the recipient's blood. Close monitoring of patients is an essential part of desensitization protocol.

4. Crossmatching: They perform crossmatching tests to confirm that the recipient's antibodies are reduced to a safe level and will not harm the transplanted kidney.

5. Blood Product Management: Transfusion experts manage blood products, ensuring that the recipient receives compatible blood components during and after surgery.

6. Post transplant patient follow up: regular frequent Isoagglutin titration is an essential part of post-transplant follow up. Plasma exchange required in case of significant rise in IA titer

1. Blood Type Compatibility Assessment: They assess the compatibility between the recipient and donor's ABO blood types and identify any incompatibilities.

2. Desensitization Protocols: Transfusion medicine experts help develop and oversee desensitization protocols, which reduce the recipient's antibodies against the donor's blood type, making transplantation possible.

3. Plasmapheresis and Immunoadsorption: They may perform plasmapheresis or immunoadsorption procedures to remove antibodies from the recipient's blood.

4. Crossmatching: They perform crossmatching tests to confirm that the recipient's antibodies are reduced to a safe level and will not harm the transplanted kidney.

5. Blood Product Management: Transfusion experts manage blood products, ensuring that the recipient receives compatible blood components during and after surgery.

6. Monitoring and Follow-Up: They monitor the patient's progress post-transplant and provide ongoing care to address any potential complications related to ABO incompatibility.

7. Education: Transfusion medicine experts educate the medical team and the patient about the unique challenges of ABO incompatible transplants and the associated risks.

In summary, transfusion medicine experts are crucial for navigating the complexities of ABO incompatible kidney transplants, ensuring the safety and success of the procedure.

Vicarious liability in Blood Transfusion Services; a Challenge.

Dr Pratul Sinha

Definition:

Vicarious liability is a legal rule that holds a principal (person/company/employer) responsible for the actions of an agent (subordinate/employee). It is based on the principle of "Respondeat Superior". Negligence of the principal is not necessary.

In case of hurt or harm, a claim for compensation can be made out against the person who caused the injury. However, in cases where the harm has been caused by a person who is under employment of another, the principle of vicarious liability is held against the employer.

Unique considerations in Transfusion Services:

Unlike other medical systems 'Transfusion Services' are challenged by this tort because negligence / harm results from actions of multiple persons. Eg. A mismatch transfusion can be a result of wrong blood in tube / mixing of samples / wrong interpretation / issue of wrong unit / transfusion to wrong patient. Clerical error is not a legal defence.

The matter is compounded by the lack of trained technical staff who have a rapid turnover. Technology that has inherent flaws because of the maxim' Safe transfusion is No Transfusion".

Safety / Defences:

Safety mechanism in vicarious liability include documenting errors, training evaluation, and weeding out repeat offenders. License to be in name of employer and all working personnel to be part of agents. Good work ethics and practices. Change in law to incorporate safety mechanisms which can be used as defence. Declaration of risk and quantifying it. Use of medical tliterature in professional declaration.

Appropriate Indications for Platelet Transfusion Therapy

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Platelet transfusions are a commonly used medical therapy to prevent bleeding (prophylactic use), or to treat patients who are actively bleeding (therapeutic use). The most frequent use of prophylactic platelet transfusions occurs in patients with chemotherapy induced thrombocytopenia. A large proportion of platelet transfusions are administered prophylactically to reduce the risk for spontaneous hemorrhage in patients receiving chemotherapy or HSCT.

Considerable advances have been made in platelet transfusion therapy in the last 40 years, some areas continue to provoke debate, especially concerning the use of prophylactic platelet transfusions for the prevention of thrombocytopenic bleeding. Platelets are a crucial component for maintaining vascular integrity. Thrombocytopenia (low circulating platelets) can lead to bleeding symptoms like bruising, petechia, nose bleeding, bleeding gums, intracranial hemorrhage, and death. Maximum platelet life span is of 10.5 days and about 18% of the normal rate of platelet turnover is required to maintain vascular integrity. There is evidence to suggest that patients require only $7.1x10^9$ platelets/l per day to maintain hemostasis (1).

There are number of guidelines on the appropriate use of platelet components, which are important for the rational use of platelet as platelets are a precious and limited resource that has both serious risks and important benefits.

Association for Advancement of Blood and Biotherapies (AABB) has developed guidelines on the appropriate use of platelet transfusion in adult patients (table 1) (2). There are many published platelet transfusion guidelines; however, they are not consistently being followed, lack recommendations on some clinical scenarios, or differ in the platelet threshold recommendations in some clinical settings. Platelet transfusion guidelines from different medical societies concur with strongly recommending prophylactic platelet transfusion in the setting of severe hypoproliferative thrombocytopenia (10,000/mL) following chemotherapy or allogeneic bone marrow transplant. Platelet transfusion decisions, whether for prophylactic or therapeutic indications, should be weighed against the risks of transfusion side effects, refractoriness, contraindications in some clinical settings, and platelet product availability. (3)

The main concerns related to platelet transfusions are at what level to transfuse or whether to transfuse at all. Cochrane systematic review in people with haematological malignancies found that overall prophylactic platelet transfusions appeared to reduce the number of bleeding events and days with significant bleeding (4).

The dose of platelets transfused was originally based upon the perceived need to raise the patient's platelet count above a certain 'safe' threshold. Advances in understanding the mechanism of bleeding in thrombocytopenic patients have occurred. Because of the high cost, short shelf life, and higher risk for transfusion complications such as bacterial contamination, transfusion-related acute lung injury (TRALI), allergic transfusion reactions, and febrile nonhemolytic transfusion reactions, interest in reducing platelet transfusions has evolved in recent years. (4)

Platelet transfusions are divided into Therapeutic and prophylactic. Therapeutic platelet transfusions are administered to arrest active bleeds. Currently, platelet count less than $10x10^9$/L is considered to be the trigger for prophylactic platelet transfusion by Association for Advancement of Blood and Biotherapies

(AABB). They recommended platelets for the prevention of spontaneous bleeding in hospitalized patients with therapy induced hypoproliferative thrombocytopenia at a threshold of 10 x 10^9 /L. Randomized controlled trials have determined that prophylactic platelet transfusions for the prevention of bleeding in chemotherapy and hematopoietic stem cell transplant patients are superior to a therapeutic approach. (5) While in other patient groups like those in critical care who require prophylactic platelet transfusions, the optimal platelet transfusion management may differ depending upon the underlying clinical diagnosis. Platelet transfusions can have adverse effects and have cost and resource implications for health services, so unnecessary transfusions should be avoided.

The findings of the review led to the following main conclusions: Overall, a standard transfusion trigger of 10 x 10^9 /L appears to be as effective as a higher transfusion trigger of 20 x 10^9 /L or 30 x 10^9 /L at preventing clinically significant bleeding (4). Authors found low to moderate grade evidence that a therapeutic only platelet transfusion policy is associated with increased risk of bleeding when compared with a prophylactic platelet transfusion policy in hematology patients who are thrombocytopenic due to myelosuppressive chemotherapy or HSCT. (6)

In case of thrombocytopathy wherein the platelets are not able to complete all the complex metabolic steps necessary for activation, granular release and aggregation may have increased chances of bleeding. In these circumstances, the decision whether to transfuse should be based on clinical status rather than on platelet counts.

Thrombotic thrombocytopenic purpura (TTP) has traditionally been regarded as a contraindication for platelet transfusion. Platelet transfusion is usually avoided in Heparin-induced thrombocytopenia (HIT). The transfusion of platelets in stable, non-bleeding patients with Idiopathic autoimmune thrombocytopenia (ITP) offers no benefits as the platelets are rapidly cleared by circulating antibodies.

Monitoring of the effectiveness of platelet transfusion is required to decide ongoing requirements in a given clinical condition and to identify causes of inadequate response. As some patients may have inadequate post-transfusion response and develop platelet refractoriness. Platelet refractoriness can cause significant issues in multiply transfused patients. The causes of platelet refractoriness are often multifactorial and can be grouped into non-immune and immune causes. Approximately two-thirds of refractory episodes are due to non-immune causes which include fever, sepsis, DIC, medications etc. Approximately one-third of refractory episodes are due to immune causes. Immune causes include human leucocyte antigen (HLA) alloimmunization and/or human platelet antigen (HPA) alloimmunization due to prior exposure from pregnancy, transfusion or transplantation. Other causes include ABO incompatibility, platelet autoantibodies (e.g. autoantibody to platelet glycoprotein) and drug-related platelet antibodies. In cases of non-immune platelet refractoriness, the underlying illness must be treated. In cases of immune-mediated refractoriness, there are several strategies to consider when selecting platelets for these patients: provision of human leukocyte antigen (HLA)-matched platelets or HLA “compatible” (antigen-negative) platelets; platelets selected by crossmatch tests; and methods to reduce alloimmunization. For the treatment of immune refractoriness, an observational study identified that of the two main ways to treat, the provision of human leukocyte antigen-matched or cross-matched platelets, neither appears to be as effective as previously believed. (7)

The goal of platelet transfusions is to prevent severe and life-threatening bleeding in patients with thrombocytopenia. Platelet transfusion therapy has significantly decreased the morbidity and mortality in thrombocytopenic patients. The optimum therapeutic dose and triggers have been constantly evolving, as they are largely influenced by the cost and availability of a particular product. This aim needs to be balanced against the risks associated with platelet transfusions as well as the challenge of maintaining an adequate supply.

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Table 1: Indications for platelet transfusion (2)

Recommendation	Platelet count	Grade
Prophylactic	<10,000	Strong recommendation; moderate-quality evidence
Elective central venous catheter placement	<20,000	weak recommendation; low-quality evidence
Elective diagnostic lumbar puncture	<50,000	weak recommendation; low-quality evidence
Major elective non-neuraxial surgery	<50,000	weak recommendation; low-quality evidence
Surgeries involving the central nervous system	<80,000-1,00,000	Low-Quality evidence

Transfusion Support in Cardiac Surgery

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Cardiac surgery is associated with numerous peri- and post-operative haemostatic complications and blood transfusion requirements. Complex procedures such as redo-sternotomy heart transplantation or type A aortic dissection repairs are at high-risk for severe coagulopathy and significant transfusion requirements.

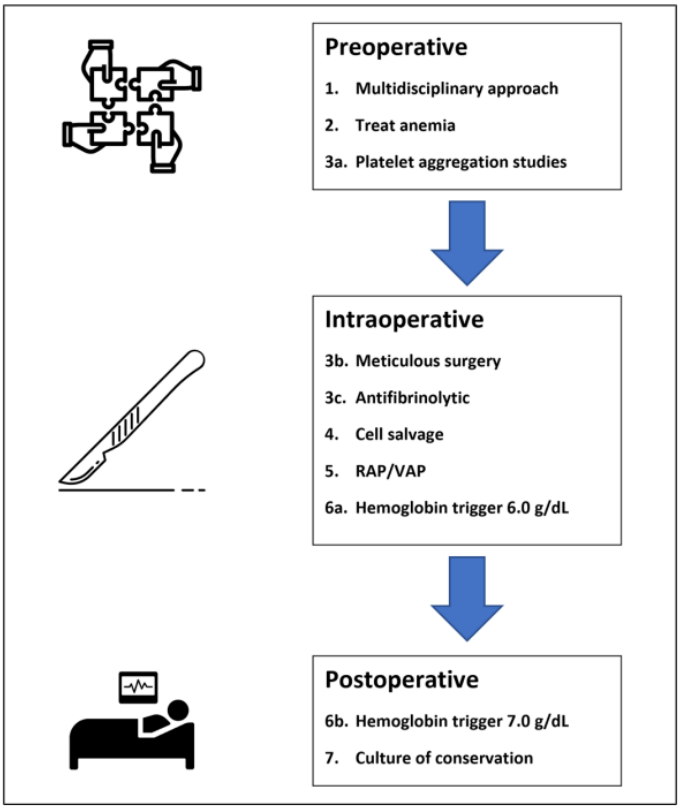
The transfusion of blood and blood products represents a critical and complex issue in the care of cardiac surgical patients. While the transfusion of these products can be lifesaving, it can also be associated with significant morbidity and mortality. This dichotomy generates many difficult clinical scenarios for caregivers.

A policy regarding perioperative blood conservation strategies and blood component therapy for cardiac surgical patients is required.

The policy included the following principles:

- The judicious use of blood components will be a priority
- Blood component replacement therapy after assessment of the clinical situation in conjunction with as much scientific evidence, i.e. laboratory data, as can be reasonably obtained;
- To assure receipt of blood products in an efficient and timely manner.

A. Blood Conservation in Cardiac Surgery



B. **Patient Blood Management approach-**

- Concept 1:Limiting loss through phlebotomy for testing
- Concept 2:Optimizing patient Hb levels before surgery
- Concept 3:Using autologous donation and red cell recovery techniques
- Concept 4:Minimizing perioperative blood loss
- Concept 5:Making evidence-based hemo-therapy decisions

1. **First Strategy: Manage Patient's Anemia**

   a. Preoperative management of anemia: Patient assessment 3-4 weeks prior to surgery, Identification of anemic patient, Diagnosis of nutritional anemia, Treatment of anemia – IV iron, Vit B12, folic acid

   b. Optimizing CVS & Pulmonary function: Improve tolerance of anemia, Increase oxygen delivery, Decrease oxygen consumption, Hemodynamic monitoring in high risk cases, Optimization of cardiac output , Acute normovolemic haemodilution

   c. Management of anemia on hospitalized patients: Diagnosis of anemia, Treatment of anemia, Consider erythropoiesis stimulating agents, Avoid unnecessary top-up transfusions

2. **Second Strategy: Optimization of Coagulopathy**

   a. Preoperative management of coagulopathy : Algorithm for management of patients on anticoagulants/ antiplatelet therapy, Tests for hemostasis , scoring – identify at risk patients

   b. Hemostasis management in hospitalized patients: Optimize physiological conditions, normo-thermia, pH, Ca, POC testing,

   c. Use of coagulation algorithm for administration of blood products, Administration of Tranexamic acid, Empiric therapy of platelet dysfunction - desmopressin

3. **Third Strategy: Interdisciplinary blood conservation modalities**

   a. Reduction of diagnostic associated blood loss: Reduced size of blood collection tubes and frequency of collection, Reduced sampling for blood culture, Closed in-line flush device

   b. Reduction of surgery related: blood loss, Minimize blood loss, hemostatic adjuncts, Laparoscopic surgery/minimal invasive techniques/modern surgical instruments, Limited numbers of swabs for blood absorption, cell salvage, Controlled hypotension, autologous blood, Cardiac surgery: Small circuits, endoscopic vein removal

C. **<u>Use of an Evidence-Based RBC Transfusion Trigger</u>**

A transfusion protocol helps implement programmatic decisions about blood utilization. The Transfusion Requirements in Cardiac Surgery (TRICS) III Trial published results with 6 months of postoperative follow-up showing that a restrictive transfusion strategy (trigger Hb 7.5 g/dL) was noninferior to a more liberal transfusion strategy (trigger Hb 9.5 g/dL). Anemia tolerance is one of the most effective means of achieving transfusion reduction. However, the lowest safe threshold of anemia tolerance is unknown. Common Hb threshold values include 6 g/dL intraoperatively and 7 g/dL postoperatively.

The Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists emphasizes and suggest a transfusion trigger of hemoglobin <7 g/dL in postoperative cardiac surgery patients (class IIa recommendation). In addition, they suggest (class IIb recommendation) that it is "not unreasonable to transfuse red cells in certain patients with critical noncardiac end-organ ischemia (eg, central nervous system and gut) whose hemoglobin levels are as high as 10 g/dL, The decision to transfuse should not be entirely based upon Hb concentration. Helpful parameters of compromised end-organ perfusion can include elevated lactate, base deficit, or low serum bicarbonate. SvO2-guided transfusion also shown to reduce RBC transfusion in cardiac surgical patients.

D. **Techniques for RBC conservation**

a. Acute normovolemic hemodilution (ANH): A meta-analysis concluded that ANH reduces RBC transfusion after cardiac surgery. In contrast, other studies have seen modest or no effect of ANH on RBC transfusions. The ambiguity of the evidence has led to Class IIb recommendations for the routine use of ANH in guidelines from ISMICS and EACTS. Current STS guidelines give ANH a Class IIa recommendation although the guidelines state that the extent of the benefit from this technique is unclear

b. Minicircuits for CPB,: Minicircuits for CPB have been shown to be helpful in decreasing hemodilution; however, effective Retrograde autologous priming (RAP) and venous autologous priming (VAP) can also effectively minimize or eliminate the priming volume and prevent hemodilution.

c. Intraoperative viscoelastic testing: intraoperative hemostasis management based on viscoelastic coagulation testing and platelet function testing has been shown in a randomized controlled trial to reduce RBC transfusion by about 10%

The Society of Thoracic Surgeons/Society of Cardiovascular Anesthesiologists clinical practice guideline provide valuable strategies for minimizing bleeding in the perioperative period. The experience with Jehovah Witnesses demonstrates that when a commitment is made to avoid blood transfusion, the effort is successful in the vast majority of cases. Recognition that blood transfusion poses significant risk for what is frequently an uncertain benefit can inspire a similar level of commitment.

Fresh versus Old Blood: Ongoing Debate

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Red blood cells degrade during their storage. These changes include change in shape, acidosis, loss of DPG, ATP and membrane deformation. As a result these stored red cells may break down or fail to circulate properly. Though our body clears such cells from circulation, this storage lesion may be a problem in the scenario of massive transfusion and may lead to susceptibility to sepsis and multiple organ failure

The debate about fresh versus stored blood transfusion has existed since decades and if we look at the answer to the question whether there is really any difference between the two, the answer is yes! However if we look at current scientific evidence about whether this difference between Fresh and stored blood matters really clinically, we do have conflicting evidences available in literature. A deep insight into the RBC storage lesion is of fundamental importance to be able to answer the above question objectively. A large variety of retrospective studies have been reported in literature on this debatable aspect. However, the outcomes derived from well planned prospective studies will provide robust scientific evidence in this regard.

The single most common clinical scenario in which fresh blood is requested for transfusion is cardiac surgery (pediatric as well as adult). Various clinical trials have reported that rather than fresh or stored blood transfusion, it is the number of units transfused that is directly proportional to adverse clinical outcome. Hence minimizing the number of units transfused and critical appraisal of the transfusion threshold for RBC units will be very beneficial.

Novel mRNA Genomic Technologies for Precision Medicine and Oncology

Dr Rajvir Dahiya

Based on the recent Nobel Prize in medicine dated October 2nd 2023, on “mRNA genomic technologies based COVID-19 vaccine” (Dr. Katalin Kariko and Dr. Drew Weissman), it is clear that mRNA genomic technology can be used for diagnosis and treatment of various diseases including cancer. I will discuss the role of mRNA technologies for precision medicine and oncology.

Donor Lymphocyte Infusion: Risks and Benefits

Dr Rasika Setia

Donor Lymphocyte infusion (DLI) is an adoptive immune therapy approach to decrease the risk of relapse for wide array of hematologic malignancies following allogeneic hematopoietic stem cell transplantation (HSCT), or to convert a patient's mixed to full donor chimerism, a state where both donor and recipient stem cells coexist. Mixed chimerism is defined when < 90% donor cells are detected, whereas full or complete chimerism is defined as 100% donor cells detected, suggesting completed hematopoietic replacement. The hematological malignancies treated by DLIs include chronic myeloid leukaemia, acute myeloid leukaemia, acute lymphoblastic leukaemia, lymphomas, multiple myeloma, and myelodysplastic syndrome.

In this procedure, donor lymphocytes from the original stem cell donor are infused into the transplant recipient to cause an immune-mediated graft-vs-leukaemia (GvL) or graft-vs-tumor effect (GvT). The discovery that T cells are one of the main drivers of the GvT or GvL response led to the development of donor leukocyte (lymphocyte) infusions (DLIs) after HSCT. These lymphocytes for DLI are collected from the donor via leukapheresis using a process similar to peripheral blood stem cell collections, except that pre stimulation with a colony-stimulating factor or mobilizing agent is not usually required. The leukapheresis product is usually then aliquot into doses starting from as low as 1 x 10^6 CD3-positive cells/kg recipient weight, followed by half- or 1-log increments. The initial dose most often infused fresh, and aliquots for subsequent doses cryopreserved.

DLI has remained a cornerstone of therapy for hematologic relapse after HSCT, originally described in 1990 by Kolb and colleagues as a treatment protocol for three patients who had relapsed after bone marrow transplantation for chronic myeloid leukaemia. Patients with chronic myeloid leukaemia (CML) that relapsed after HSCT could achieve long lasting remission with the administration of DLIs. The efficacy of DLIs is dependent on the type and aggressiveness of the underlying disease and the disease burden at the time of relapse. Studies have shown that patients with relapsed CML benefit most from DLIs with an 80% complete response rate for those in cytogenetic relapse; patients in hematologic relapse respond less well. Compared to only 15% to 40% of patients with relapsed acute lymphocytic leukaemia (ALL) have virtually no response to DLI. The lack of efficacy of DLI in acute leukaemia compared to CML maybe possibly related to lack of antigen expression on the tumor cells and more rapid proliferation kinetics associated with leukaemias. Multiple myeloma is another hematological malignancy with the potential to respond to DLI. Among varying reports, the response rate of relapsed multiple myeloma to DLI is approximately 22-52%. The propensity of multiple myeloma patients to receive autologous and not allogenic transplants could have a role in this outcome.

DLI is categorized into two types: therapeutic DLI (tDLI) and pre-emptive DLI (pDLI)

tDLI vs pDLI :

Therapeutic DLI is administered to patients in whom the desired outcome of transplant has not been achieved, that is the treatment of relapse (most situations), and more recently, the correction of incomplete donor chimerism after non-myeloablative or reduced intensity conditioning (RIC).

pDLI involves the planned administration of T cells at some interval after allogeneic HCT, often in the setting of donor graft T-cell depletion, as in case of haplo-identical HSCT. Infusion of pDLI generally is however, withheld in the setting of active GVHD.

Complications of DLI

The majority of DLI is GVHD, caused by alloreactive T cells attacking healthy host cells. In earlier reports up to 50-90% of patients developed GVHD after DLI. However recently GVHD following DLI has reduced due to an improved understanding of the biology of DLIs and predictive risk factors for GVHD in this setting. The GVHD that occurs after DLI can be very severe and requires systemic immune suppression, which can lead to significant morbidity and mortality due to opportunistic infections. Another very serious complication of DLI is development of bone marrow aplasia that can occur in 2-5% of patients following DLI , suggested to be due to the immune mediated destruction of host hematopoiesis. Infection and bleeding are compounding risks associated with the onset of aplasia following DLI. The infusion of subsequent donor stem cells can reverse marrow aplasia.

DLI has recently become indispensably integrated into modern HSCT therapies, but its final impact has yet to be determined. Questions still being addressed in ongoing studies are the most appropriate dosage, timing, cell type, and disease states to be treated. Novel statistical techniques have been developed to describe the effect of DLI on disease progression.

Critical Quality Issues of Various Red Cell Products

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Introduction

Quality of blood components can achieve, if all aspects of blood collection, component preparation, testing, storage & transport are controlled and monitored. Blood Centres should lay down policies for sampling techniques. Quality control testing should be performed to verify conformance of the product characteristics with defined specifications based on minimum standards & regulatory requirements for key parameters of each blood component type.

The preparation of Red Blood Cell concentrates is broadly classify on the basis of method of collection, i.e. from whole human blood and apheresis. **[1]** These are further modified on the basis of clinical indications or available methodologies, for e.g., Whole Blood/ Apheresis PRBC, with Additive solution, Leukodepleted, Irradiated, Saline Washed, Pathogen Inactivated, Frozen Deglysorized and Rejuvenated etc.

During Red blood cells (RBCs) circulatory lifetimes, they are poised to transport oxygen by metabolic/ redox enzymes until they accumulate damage and are promptly removed by the reticuloendothelial system. These elaborate evolutionary adaptations, however, are no longer effective when RBCs are removed from the circulation and stored hypothermically in blood banks, where they develop storage-induced damages ("**storage lesions**") that accumulate over the shelf life of stored RBCs**. [2]**

Root causes

Generally, the quality of stored RBCs is highly related to the conditions of storage, so refrigerator temperature, intact bags, residual leucocyte counts and visible haemolysis remain excellent general measures. Specific biochemical measures, such as adenosine 5′-triphosphate (ATP) and 2,3-diphosphoglycerate (DPG) concentrations, calcium and potassium content or lipid breakdown products, require specialized measures that are not widely available, involve destructive testing and generally reflect only a part of the storage lesion. **[3]**

The root causes of the development of the RBC storage lesion and compromising quality of red cell products are mentioned below:

Physiological consequences of transfusing RBC with storage lesions: When stored RBCs are transfused to autologous healthy volunteers, a significant fraction (median 17.6%) of RBCs is cleared from circulation within 24-hr. **[4]** Visible changes include the loss of biconcave disc morphology, the formation of echinocytic spines and the blebbing of microvesicles.

Metabolic impairments as a cause for storage lesion development: Low pH additive solutions (5.5-6.0) reduce the activities of the rate-limiting enzymes of glycolysis, and contribute to the rapid depletion of 2,3-diphosphoglycerate (2,3-DPG) and a gradual reduction of ATP during storage.

Chemical changes include consumption of glucose and accumulation of lactic acid, loss of potassium and gain of calcium, loss of haemoglobin-bound nitric oxide (NO) and decreases in the concentrations of adenosine5′-triphosphate (ATP) and 2,3-diphosphoglycerate (DPG). Enzymatic and oxidative injury to proteins, lipids and carbohydrates occurs. Functional changes include decreases in the abilities to deliver oxygen at conventional partial pressures, survive in the circulation and remain intact **[3].**

Countermeasures to reduce and reverse storage lesion and improve quality of various red cell components [2]

Several groups are already developing new strategies for better RBC preservation. The general approaches were proposed to reduce oxidative damage during hypothermic storage:

i) **Additive solution:** The guidelines of 75% recipient survival at 24 h post-transfusion and less than 1% (sometime 0.8%) hemolysis allow RBC storage in SAGM or derivatives for up to six weeks at 4 °C.
Compared with the frequently used SAGM and AS-1/3/5 solutions, the experimental storage solutions (EAS) was created with a lower salt concentration, higher adenine content (higher AS volume), and a more alkaline AS pH, which seemed to enable longer preservation of ATP and 2,3-DPG concentrations in RBCs. In particular, in the early 2000s,the **Hess group [5]** published four papers in four years, introducing experimental storage solutions (EAS) allowing effective RBC preservation for 9 wk in EAS-61, 10 wk in EAS-64, 11 wk in EAS-67, and 12 wk in EAS-76.

ii) **Pretransfusion washing of long stored RBCs**: Washing of RBCs used in patients with IgA defiencency, and/or in patients presenting with recurrent severe allergic transfusion reactions and to remove complement to prevent intravascular hemolysis in patients suffering from paroxysmal nocturnal hemaglobinuria. It also to removing accumulated storage-related compounds (potassium and lactate) generated during prolonged storage or exposure to irradiation of RBCs.

iii) **Rejuvenation**: In addition to developing more efficient additive solutions, the rejuvenation of stored RBCs before transfusion could produce RBCCs of better quality. Rejuvesol™ is a solution comprising pyruvate, inosine, adenine, Na2HPO4, and NaH2PO4. Incubating RBCs in Rejuvesol™ for 1 h at 37 °C, reactivates RBC metabolism allowing replenishment of depleted ATP and 2,3-DPG levels. Afterwards, the rejuvenated cells must be washed to remove excesses of inosine, which are potentially toxic to the recipient.

iv) **Inclusion of anti-oxidants in the additive solution:** Chemicals such as nicotinic acid, melatonin, L-carnosine, ascorbic acid, quercetin, iron chelators, and N-acetylcysteine have been suggested as antioxidants to be included in additive solutions, but the improvements appeared insufficient and none has been tested extensively for commercial production.

v) **Reduction of pro-oxidants in stored RBCs by hypoxic storage**: Hypoxic storage, where the oxygen content of RBC units is reduced to low levels (e.g., less than 4% oxy-haemoglobin

[%SO2]) prior to refrigeration and maintained throughout storage, was proposed as an alternative to antioxidant-based additive solutions to reduce oxidative stress during hypothermic RBC storage.

vi) **Cryopreserved (Oxygen Free) RBCs Storage**: In frozen and stored RBCs, oxidative stress challenges proteins involved in redox regulation, energy metabolism, and cytoskeleton organization. To deal with this issue, research has investigated the use of anaerobic RBC storage. ***Yoshida et al*** **[6]** have reported promising results regarding the maintenance of 2,3-DPG and ATP levels during anaerobic RBC storage, as well as diminished micro vesicles (MVs) release by these RBCs throughout the storage period.

Conclusion:

Placed outside of the donor's circulation and stored in a blood bank refrigerator, RBCs incur storage lesions. Because of these considerations, continued efforts to improve RBC processing/storage methods in order to reduce the storage lesion and improving quality of red cells should benefit recipients with overall cost-effectiveness of the patient-care system.

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Management of Sickle Cell Anemia: Transfusion Medicine Perspective

Dr. Sankalp Sharma

1 The Burden of Sickle Cell Disease

Sickle Cell Disease (SCD) is an inherited condition characterized by a mutation in HBBgenes of Hemoglobin (Hb), which results in comorbidities due to dysfunctional blood rheology and veno-occlusive events.

Indian subtype of SCD mutation (Arab-Indian haplotype) is considered milder than African haplotypes, with Hospitalizations requiring fewer blood transfusions with mosthospital admissions during childhood < 5 years of birth.[1–3]

1.1 Demographic prevalence of SCD in India, Chhattisgarh

Central India considered the 'Sickle cell belt,' has an SCD carrier state prevalence in about 8.75% of the population (n=37,077). Chhattisgarh has a frequency of Sickle CellTrait of 9.64% and SS phenotype of SCD of 0.20%.[2,4,5]

2. Genomics in classifying transfusion requirements.

I. In the SCD population, disease-modifying variants include Hoff%, alpha thalassemia, and compound heterozygotes. HbS/ß thalassemia, which correlate with crisis events and total morbid events, severe anemia, acute painful events, and acute febrile illnesses.[1,2,3,5]

II. Initial genotyping of the patient must include Homozygous p.Glu6Val (HbS/S) with screening for compound heterozygotes HbSC disease; Sicklebeta-thalassemia (HbS/$ß^+$ thalassemia; HbS/$ß^0$ thalassemia) and other pathogenic variants HbS/D and HbS/E.[6]

a. Genotyping influences SCD transition towards crisis and reduces alloimmunization rates.

b. HBB pathogenic variants in the General population with HbF forming loci in the DNA in SCD include BCL11A protein in Chromosome 2p15, Xmn-1 on Chr 11p15, and HBS1L-MYB on Chr-6, which determine HbF in the tribal population of central India. SNP at these loci may be able to predict the possiblevariation of HbF levels.[7,8]

c. Recent Gene-editing therapy, CRISPER Cas-9 disruption of BC11a gene, offers a therapeutic option for the cure of SCD.[9,10]

3. SCD clinical management

Clinical Management in SCD is multi-disciplinary with the following objectives: (a)Premarital counseling, (b) Prenatal and disease screening of patients, (c) Pain management, (d) Blood Transfusion, (e) therapeutic management of complications.[11]

4. Blood transfusion support – Available Transfusion regimens

Packed RBCs aim to reduce HbS% with increased HbA% levels in patients.

Table 1 Comparison of Simple and exchange transfusion regimen for SCD[12]

S.no	Simple top-up transfusion	Manual Exchange transfusion	Automated Exchange transfusion
1.	Minimal staff training.	Staff training needed.	Staff training needed
2.	Peripheral venous access	May require central venous access (CVA)	High dependency on CVA
3.	Increases the Oxygen- carrying capacity, Bloodviscosity, and serum ferritin.	Increased Allogenic RBC requirement, alloimmunization preventshyper viscosity.	Increased overall allogenic RBC alloimmunization. Blood viscosity not increased, minimal iron overload

4. A Role of Platelet Plasma Support in SCD

SCD exhibits increased platelet activation, an activated state of the coagulation system, and an abnormal fibrinolytic response in crisis and non-crisis states. A study (n=64) with SCD patients in a steady (non-crisis) state with an evaluation of D-Dimerlevels, thrombin anti-thrombin complex (TAT), and soluble CD-40 (activated platelets) towards a hypercoagulable state. TAT was significantly higher in patients with than without retinopathy. TAT was lower in patients with than without Hydroxyurea therapy; The Elevated D-Dimer and stroke were not significantly

associated, and CD-40 and pain episodes (<3 episodes,> 3 episodes) weresignificantly associated. (P=0.058).[13,14]

5. Clinical, laboratory triggers of Blood Transfusions, common complicationsSCD

patients present with the following complaints as listed below.

I. Acute febrile illness, infectious causes include Staph aureus, Gram-negative.bacteremia.

II. Acute painful events (referred to as Vaso-occlusive crisis) are classified as follows:

   a. Acute flare-up of chronic pain or nociceptive pain.

      i. Classical back extremity pain[15]: Transfusions not indicatedwithout additional complications.[16]

ii. Acute chest syndrome: Simple transfusion (ST), Exchange transfusion (ET) non-acute SCD (ASFA; Cat-II, Grade 1C)[17] ET for symptomatic anemia/ Hb>9g/dl (Hb SC patients) increasing tachypnea, decreased platelet counts and Hb, multi-lobar chest radiograph, neurological sequelae.[16]

b. Visceral complications with multiorgan involvement.[18]
   i. CNS; Acute Stroke:

      Presentation: HbSS/HbSß$_o$, (2-16 years) Silent cerebral infarction,headache, cognitive dysfunction. Therapy Goal: HbS<30%; Hb>9.0g/dl; Chronic ST; ET acute SCD (ASFA; CAT-I, Grade- 1C) initiated < 2 hours of neurological symptoms.[17,19]

      Secondary stroke prevention: Same goals until next bloodtransfusion.[17,19,20]

   ii. Stroke prevention, non-acute SCD; HbSS/HbSß$_o$; ST; ET (ASFA;CAT-I, Grade- 1A)[17] for primary prevention of first stroke for at least one year. Goal: HbS<30%; Hb>9.0g/dl [17,20]
   iii. Sickle cell retinopathy: Chronic ST if progressive.
   iv. Nephropathy
   v. Pulmonary hypertension: Chronic ST, ET, Bone marrowtransplantation (BMT).

III. Anemia with multisystem involvement:
   a. Acute anemia: Defined as a decrease in Hb by 2.0 g/dl below the baseline(steady state) Hb levels. ST, ET depends on feasibility and affordability.[16]
   b. Acute Hepatopathy: ST, ET (better-outcomes),[16,20]
   c. Acute Splenic sequestration: ST, ET (better outcomes),[16,20]
   d. Transient Aplastic crisis: Parvovirus B-19 implicated, Reticulocytopenia,ST indicated in symptomatic anemia, Goal Baseline Hb levels.

IV. Transfusion reactions
   a. Acute febrile reaction: Premedication, Leuco-reduced packed RBC,transfusions.
   b. Acute hemolytic transfusion reaction: rule-out non-immune hemolysis.
   c. Alloimmunization to transfused RBCs: Delayed hemolytic transfusion reaction (DHTR) Preformed antibodies against low-frequency antigens.Antigen negative; antigen matched units at least for Rh subgroups and Kell (if previous transfusion > 3 months); antibody screening and identification before transfusion; extended matched RBCs (Duffy, Kidd,MNSs).
   d. Bystander Hemolysis: DHTR, Defined as posttransfusion Hb lower than pre-transfusion Hb. Destruction of patient's RBCs due to complement- mediated hemolysis (Bb, sC5b-9), autoantibody production.[20,21]

V. Pregnancy: Chronic ST before conception, consider prophylactic ET.[16]

VI. Preoperative Transfusions: TAPS Trial Preoperative packed RBC transfusions arebeneficial. HbSS/HbSß$_0$ Medium – high-risk surgical procedure, anesthesia time >1hr, Hb<9g/dl, post-operative Hb not to exceed 11.0 g/dl.[20, 22]

6. Blood Transfusion Alternatives in SCD

I. Hydroxycarbamide: Cytoreductive agent inhibits ribonucleotide reductase.
   a. Increases in HbF indicated with >3 painful crises in the past year.
   b. Indicated in ≧2 years of age to prevent recurrent painful veno-occlusive crisis, acute chest syndrome.[23]
   c. Hydroxyurea 500 mg, included in National list of essential drugs-2022.

II. L. Glutamine: An essential amino acid that produces NAD+ from NADH.
   a. Food and Drug Administration (FDA) approved for children >5years.[23]

III. Voxelotor: Inhibits polymerization of HbS.
   a. FDA and European Medical Agency (EMA) approved.
   b. SCD in patients ≧ 12 years who are resistant to Hydroxyurea.

IV. Crinzanlizumab: Monoclonal antibody directed against P selectin.
   a. FDA, EMA approved,
   b. Indicated ≧16-year-old.

7. BMT Protocol in SCD

I. HLA identical, matched sibling donor (MSD), Haploidentical or matched unrelated Allogenic stem cell transplantation, widely available curative option.

II. Indications are recurrent veno-occlusive crisis (≧2 hospitalizations for pain) despite Hydroxyurea; Overt stroke; silent stroke with cognitive impairment; acute chest syndrome ≧1 episode while on therapeutic Hydroxyurea; recurrentsplenic sequestration.[24–27]

III. Protection from progressive CNS damage, stroke events, painful episodes,worsening of nephropathy. Complications include CNS, cognitive, and reproductive (infertility).

8. Summary of recommendations

I. Premarital counseling is necessary to predict the chances of inheriting thecondition.

II. Newborn RBC antigen screening before initiating transfusion regimen, within first year of life.

III. SCD patient's OPD records must include antigen phenotyping of RBC antigens,screening of alloantibodies, transfusion-transmitted infections, transfusion reactions, and transfusion history. Hepatitis B and Pneumococcal vaccines, inclusive in National/ State level screening programs.

IV. Complications are identified and evaluated in context to thrombogenicprofile of the patient.

V. Transfusion therapy is individualized based on requirements and affordability.

VI. Include L. Glutamine and Voxelotor in the list of essential drugs.

VII. Patients must be counseled about the risks and benefits of BMT as a curativeoption.

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Serological Dilemmas in Patients Receiving Immunotherapy

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Introduction:

The use of monoclonal immunotherapy has emerged as a promising treatment modality for various malignancies, revolutionizing the landscape of cancer therapy. While this form of therapy holds immense promise, it introduces a unique set of serological dilemmas that transfusion medicine specialists must grapple with. Interference with pre-transfusion testing can lead to compromised transfusion safety, extensive blood bank work-ups and delays in the provision of compatible RBC units. Understanding these challenges is crucial for optimizing transfusion therapy in patients receiving immunotherapy. This write-up discusses the serological dilemmas encountered in patients undergoing immunotherapy and explores potential solutions to address these issues [1-5].

Mechanism of Action of Immunotherapy:

Targets of monoclonal immunotherapy typically include plasma-soluble substances like proteins or medications or cell surface antigens. Variable region/complementarity determining region (CDR) controls target and affinity for antigen. The Fc (fragment crystallizable) component aids in attracting additional immune cells and complement factors to the site of the attack [1].

Monoclonal Immunotherapy most relevant to transfusion medicine:

- **Anti-CD20 (Rituximab):**

CD 20 is present on B cell lineage. Anti-CD 20 target B cells, thereby resulting in downregulation of B cell receptor activity, decreased serum immunoglobulin production and increased apoptosis. The Anti CD 20 monoclonal antibody therapy is more effectively used in the treatment of conditions like Warm Auto Immune Haemolytic Anaemia (WAIHA), pure red cell aplasia, thrombotic thrombocytopenic purpura (TTP), idiopathic thrombocytopenic purpura (ITP) and Evans syndrome in conjunction with plasmapheresis [2].

- **Anti-CD38 (Daratumumab and Isatuximab):**

Human CD38 antigen is a 46 kDa, type II transmembrane glycoprotein which functions as an ADP-ribosyl cyclase. In addition to its expression on plasma cells and malignant myeloma cells, CD38 is also expressed at low levels on other hematopoietic cells, including RBCs and epithelial cells. Anti-CD 38 is a humanized IgG1κ monoclonal antibody targeting CD38, a surface protein highly expressed in multiple myeloma (MM) cells. Daratumumab effectively induces antibody dependent cellular toxicity (ADCC), complement dependent cytotoxicity, antibody dependent cellular phagocytosis (ADCP), and apoptosis in MM cells and has become one of the most effective drugs for treatment of myeloma [3].

- **Anti-CD47 (Magrolimab - Hu5F9-G4):**

➢ CD47 is a cell surface glycoprotein expressed on all cell types, including RBCs and platelets. As CD 47 are highly expressed on RBCs as a member of Rh complex in the membrane, expression levels of CD47 differ accordingly to the Rh phenotype and correlate with levels of RhCE protein. D– (ce/ce) RBCs have the highest expression of CD47 whereas D+ (DcE/DcE), rare cells that lack RhCE (D – –) have significantly reduced CD47 and Rh null have nearly undetectable CD47.

- It is a desirable therapeutic target as it is involved in regulation of cell survival and cell death by acting as a ligand for signal-regulatory protein alpha (SIRPα) expressed on macrophages. binding of anti-CD47 to tumor cells would mask CD47 and disrupt the CD47-SIRPα "do not eat me" signal, resulting in tumor cell phagocytosis.
- Phase 1 trials using Hu5F9-G4 monotherapy are ongoing in relapsed/refractory acute myeloid leukemia (AML)/high-risk myelodysplasia (NCT02678338) and advanced solid tumor malignancies (NCT02216409). Three further trials are looking into Hu5F9-G4 as a combination therapy for patients with solid tumors and advanced colorectal cancer (NCT02953782), ovarian cancer (NCT03558139), and AML/myelodysplasia (NCT03558139) [4,5].

- **Anti C5 (Eculizumab and Ravulizumab):**

The monoclonal anti C5 antibody inhibit the terminal complement activation by binding to C5 which C5a, an anaphylatoxin and proinflammatory molecule, and C5b, which forms the C5b-9 Membrane Attack Complex (MAC). FDA approved Eculizumab for paroxysmal nocturnal hemoglobinuria (PNH), complement mediated thrombotic microangiopathy (referred to as atypical hemolytic uremic syndrome [aHUS], refractory generalized myasthenia gravis and antiaquaporin 4+ neuromyelitis optica [6].

Interference of Immunotherapy in Serologic Testing in Transfusion Medicine

- **Anti-CD 38:**
- Anti CD38 does not interfere with ABO/RhD typing or with immediate-spin crossmatches.
- However, it is is known to cause interference with serological testing, including red cell antibody screening, antibody identification and cross-matching based on indirect antiglobulin testing (IATs) giving incompatible results. It can also cause false positive Direct antiglobulin test (DAT).
- A reactive test in the AHG phase can be observed up to 6 months after the drug is discontinued [3].
- **Anti-CD 47:**
- Owing to the high expression of CD47 on RBCs, anti-CD47 can cause interference with blood bank testing, causing false reactivity in ABO reverse grouping.
- Antibody screening by the IAT method may exhibit moderate to strong pan agglutination of 3+ or 4+ (0 to 4+ scoring scale) when using routine anti-human globulin (AHG) reagents. Pan agglutination may also be seen in all phases, including saline immediate spin, room temperature and 37degree C with or without enhancer (low ionic- strength saline or polyethene glycol).
- The DAT in patients receiving anti-CD47 is usually negative or weakly positive, but when eluates are performed, they are typically reactive. These results could suggest a false-negative DAT result caused by antibody blocking by the drug, preventing the binding of the anti-IgG molecule (prozone phenomenon) [4,5].

Methodologies Utilized for mitigation of Interferences

A. **Anti CD38**

- Using donor RBCs with lacking, diminished or destroyed CD38 antigens by using 0.2 Molar Dithiothreitol (DTT) or Trypsin/Papain or Cord Blood Cells or In (Lu) RBCs or Panels from RBC of Daratumumab treated patients.
- Blocking the CD 38 antigens on reagent and donor cells by treating Pre-Adsorbed RBCs with Daratumumab blocked monospecific anti human IgG competing out AHG.
- Soluble CD38 protein may also be used to neutralize anti-CD38 in patient plasma but it is not licensed for routine testing and difficult to acquire

- Novel F(ab')2 fragments have been shown to directly block CD38 antigens on RBCs and overcome daratumumab interference but are not yet licensed or widely available [3].

B. **Anti-CD 47:**

- Adsorption studies with papain treated RBCs can be utilized for satisfactory antibody screening in cases with interference.
- Use of antihuman globulin (AHG) reagents that do not bind to IgG4 molecules has also demonstrated reduced interference as magrolimab is an IgG4 antibody.
- Four times adsorption of plasma using pooled platelets also resulted resolving of interference.
- As most forms of humanized Anti CD 47 are IgG4, use of commercial reagents that do not detect IgG4, such as monoclonal γ-clone IgG, also represents a reasonable strategy to resolve interference due to anti-CD47[4,5].

Resolve the Delay in Transfusion:

- Baseline ABO / Rh typing and antibody screen should be performed prior to initiating therapy
- Baseline RBC phenotype / genotype to assess Rh, Kell, Jk, Fy and MNS antigen expression also recommended
- Provide Kk compatible units due to DTT destruction of Kell antigens on reagent RBCs and inability to detect Kell alloantibodies.
- Use type O RBCs if baseline ABO not determined or anomalous results encountered after initiating Anti CD 47 therapy [3-5].

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Evidence Based Guidelines for Red Cell Transfusion in Adults

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Anaemia is common among hospitalised patients. The causes of anaemia include blood loss from surgery, bleeding, excessive blood sampling for laboratory tests and secondary to the underlying disease or treatment. Anaemia causes decreased oxygen supply to tissues. The symptoms of anaemia are varied. Anaemia is usually well tolerated, therefore, the benefits of administering potentially corrective therapy such as red cell transfusion need to be weighed against the risks.

Red cell transfusions are life saving for patients with severe anemia secondary to major blood loss. Blood transfusion is associated with risks. The decision to transfuse should be based on the potential benefit vs risk assessment.

Many RCTs have compared the outcome of 'restrictive' triggers where, participants are transfused only when their Hb falls below 7.0 g/dL to 8.0 g/dL or 'liberal' triggers, where participants are transfused at a higher Hb of 9.0 g/dL to 10.0 g/dL. Patients who are ill and experiencing multiple co-morbidities are less likely to tolerate a restrictive strategy for RBC transfusion.

Many studies focus on relevant and specific clinical contexts, for which previous levels of evidence for supporting best practice are very limited. This has led to development of transfusion practice guidelines in relevant subpopulations of patients. The use of strict application of guidelines derived from RCT that used Hb as the only threshold for transfusion. Instead, several clinical indicators need to be taken into consideration when weighing the merits of transfusion as a treatment modality.

There is a consensus that one threshold does not fit all patients. Clinical measures that reveal compensatory mechanisms are heart rate, blood pressure, urine output and respiratory rate. Hb and Hct do not measure oxygen delivery or metabolic demand. Trials that explore physiologic measures to guide RBC transfusion decision making are necessary.

The proportions of patients receiving RBC transfusion and the volumes of RBC administered per transfused patient is highly variable and therefore, scientific societies have developed evidence-based guidelines and recommendations on the indications for RBC transfusion. The final objective of these guidelines is a more rational, tailored and "restrictive" use of RBC in patients for whom pharmacological options are not available eg. acute severe anaemia.

Several societies, including the American Society of Anesthesiologists, the Society of Thoracic Surgeons, the American College of Physicians and others, have developed RBC transfusion guidelines.

Despite the dissemination and publication of clinical guidelines, non-beneficial RBC transfusions continue to occur.

Patient blood management: In accordance with the principles of PBM, we must shift toward a patient-centred RBC indication, aimed at meeting a single individual's needs (i.e., "customised" indication). This will facilitate "optimal or appropriate use", with transfusion of the minimum volume of RBC needed to revert symptoms and signs of hypoxia or to attain a "safe" Hb level, based on the patient's clinical characteristics. Single RBC unit transfusions may be a valid option in many cases.

RBC transfusion be administered using a restrictive transfusion strategy of 7 g/dL for most hemodynamically stable adults (strong recommendation, high certainty evidence)

The rationale for recommending a universal threshold of 7 g/dL is that many trials used this threshold, and there is no strong clinical or biological basis for expecting different effects between 7 and 8 g/dL except

for cardiovascular disease and hematology or oncology. The effects on mortality were consistent across all subgroups, and there were no apparent differences in outcomes between trials that used a threshold of 7 and 8 g/dL Recommending a Hb threshold of 7 g/dL would conserve more blood

Most of the trials in orthopedic surgery used a threshold of 8 g/dL, and the largest trial conducted in cardiac surgery used threshold of 7.5 g/dL.It is thought that that higher Hb thresholds might improve outcomes other than mortality, including improved function and recovery after surgery or acute illness

Among patients with acute myocardial infarction and anemia, a restrictive compared with a liberal transfusion strategy resulted in a noninferior rate of major adverse cardiovascular events after 30 days

In the setting of hematology and oncology inpatients, transfusion is suggested at 7 g/dL (conditional, low certainty evidence)

Many of the RCTs tested different protocols including thresholds for RBC transfusion that varied by clinical setting. Although a threshold of 7 g/dL for all hemodynamically stable adults or a higher threshold in select clinical subgroups (cardiac surgery, 7.5 g/dL; orthopedic surgery and chronic cardiovascular disease, 8 g/dL is suggested, it is evident that each approach has its merits.

Minimizing unnecessary complications of transfusion and responding to the ongoing global challenges of having a safe and secure blood supply will require effective strategies, including blood management programs, for implementation of these guidelines

Good transfusion practice should rely not only on Hb concentration thresholds but also incorporation of patients' symptoms, signs, comorbid conditions and rate of bleeding.. This guidance is particularly important because clinicians commonly use only Hb value to decide when to transfuse.

The concepts of patient-centered blood management (PBM) , with the focus of ensuring the right product for the right patient at the right dose and time require that the medical team agree to a set of practice guidelines for ordering and administering blood components.

Practice guidelines now can be grounded in well-designed clinical trials that clearly establish the safety, and in some cases superiority, of restrictive red cell transfusion practices. However, variability in patient and laboratory parameters defining transfusion triggers between and within hospitals is still common, often reflecting hospital tradition as well as local and community practice.

The importance of optimum transfusion practice is now under the purview of accrediting and regulatory agencies, such as The Joint Commission and AABB. Blood transfusion is acknowledged to be a therapy that involves risks, so that each organization's performance monitoring and improvement program must address the use of blood and blood components.

Many factors besides blood Hb level must be considered, such as pulmonary oxygenation, blood flow, Hgb O2 affinity and tissue demands for O2. The Hb level and clinical status of the patient should both be considered in assessing the need for RBC transfusion.

The decision to transfuse should be based on any indication of organ ischemia, potential bleeding or the rate and magnitude of actual ongoing bleeding, the patient's intravascular volume status, and the risk factors for complications of inadequate oxygenation.

Preoperative assessment and efforts to reduce RBC transfusion requirements in the perioperative period include the evaluation and treatment of anemia prior to surgery. A consensus conference on patient blood management recommended that screening for anemia be done well in advance of major elective surgery so that there is enough time to potentially manage it medically, thereby possibly reducing the need for perioperative transfusions. The use of alternative measures to reduce allogeneic red blood cell use should also be considered. These include acute normovolemic hemodilution, intraoperative and postoperative autologous blood recovery, along with operative and pharmacologic measures that reduce blood loss.

Steps in optimising clinical transfusion practices:

1. An assessment of the value of transfusion based on well-designed and appropriately powered randomized, controlled trials.
2. Systematic reviews by building the knowledge base necessary to assess the impact of transfusion practice on patient outcomes.
3. The development of clinical practice guidelines which occurs when systematic reviews are interpreted by individuals with expertise in transfusion medicine. Such guidelines are typically supported by professional organizations and/or health authorities.

Implementation of clinical practice guidelines can be challenging, especially in an area as heterogeneous as transfusion medicine. However, clinical practice guidelines are necessary for the practice of evidence-based medicine, which optimizes patient care and improves patient outcomes.

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Transfusion Reactions Unique to Nneonates: There's more to it than Meets the Eye

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Transfusion reactions in neonates can be more complex and difficult to diagnose than in adults and older children. This is because neonates have a developing immune system, and they may not be able to produce antibodies against foreign blood cells.Transfusion reactions reported from India show a lower incidence in the neonatal and paediatric age group, as low as 10%–20% of the reported rate in adults.Transfusion reactions are generally classified based on pathogenesis into immunologically mediated reactions and those that are not. Transfusion reactions that are unique to neonates, include metabolic, immunologic,infectious, transfusion-related adverse outcomes.

1. Metabolic complications

Hypoglycemia:

- Result from decreased glucose infusion rates during transfusion in combination with impaired glycogenolysis and gluconeogenesis in preterm infants.

Hyperkalemia:

- Is entirely associated with the amount of K+ load delivered with RBC transfusion. Irradiation may damage the RBC membranes, also causing hyperkalemia.

Hypocalcemia:

- Transfusion of citrate-enriched blood products can cause hypocalcemia from citrate toxicity due to the immaturity of neonatal hepatic and renal function.
- Hyperkalemia and hypocalcemia are particularly of concern in neonates receiving exchange or massive (>20 mL/kg of RBCs) transfusions.

2. Immunologic complications

- In neonates, immunologic complications include hemolytic transfusion reactions, allergic reactions, febrile nonhemolytic reactions, immune-mediated platelet destruction, transfusion related acute lung injury (TRALI), T-antigen activation, and TA-GVHD.
- TA-GVHD occurs in immunosuppressed or immunodeficient recipients whose immune system is unable to recognize transfused immunocompetent T lymphocytes
- TA-GVHD may be present in neonates for a longer duration before the onset of clinical manifestations and death compared to that in adults.
- A-GVHD is a rare but life-threatening condition that can occur when immunocompetent T lymphocytes in the transfused blood attack the recipient's immune system.
- Neonates at high risk for TA-GVHD include extremely premature neonates, those receiving intrauterine or exchange transfusions, and those receiving cellular blood products from a blood relative

3. Infectious complication

- Premature, seronegative neonates weighing less than 1,250 g at birth and foetuses receiving intrauterine transfusions are at high risk for TT-CMV-associated morbidity and mortality.

4. Other unique transfusion reactions in neonates

Necrotizing Enterocolitis (NEC):

- While the exact cause of NEC is unknown, there is an established correlation between NEC and recent blood transfusions in neonates, especially in preterm infants.

Volume Overload:

- This is a significant concern in neonates due to their small size.
- Even a small amount of transfused blood can lead to circulatory overload, manifesting as tachycardia, hypertension, and respiratory distress.

Hypocalcemia:

- Citrate, used as an anticoagulant in stored blood, can lead to hypocalcemia in neonates due to their limited hepatic metabolism.

Iron Overload:

- Repeated transfusions can lead to iron overload, which neonates are particularly vulnerable to due to their limited ability to excrete iron.

Reasons of neonates have unique reactions?

Unique transfusion reactions in neonates are largely due to their distinct physiological characteristics and. immature organ systems.

Immature Immune System:

- Neonates, especially preterm infants, have an undeveloped immune system.
- This can make them more susceptible to certain complications such as Transfusion-Associated Graft-versus-Host Disease (TA-GvHD).

Small Size and Volume:

- Due to their small size and blood volume, neonates are at a higher risk for volume overload from transfusions.
- Even a small amount of blood can significantly alter their circulatory dynamics.

Underdeveloped Organ Function:

- Neonates have immature kidneys and liver, affecting their ability to metabolise and excrete substances.
- For instance, they may struggle to handle the increased potassium load from a transfusion, leading to hyperkalemia.

- Similarly, their limited hepatic metabolism can make them more susceptible to hypocalcemia caused by the citrate in stored blood.

Increased Iron Absorption:

- Neonates absorb iron from transfusions more efficiently than adults, which can lead to iron overload when they receive repeated transfusions.

Correlation with Necrotizing Enterocolitis (NEC):

- While the exact cause of NEC is unknown, there's an established correlation between NEC and recent blood transfusions in neonates.
- It's hypothesised that the transfusion may alter gut blood flow or immune response, leading to NEC.

Preventive strategies

- **Restrictive Transfusion Thresholds**:
- Use of restrictive transfusion thresholds can reduce exposure to donor blood
- Therefore decrease the risk of iron overload and other transfusion-related complications.
- **Minimise Transfusion Volume:**
- Transfuse the smallest volume possible to achieve the desired effect.
- This can help prevent volume overload.
- **Use of Leukoreduced Blood Products:**
- Using leukoreduced blood products can reduce the risk of Transfusion-Associated Graft-versus-Host Disease (TA-GvHD).
- **Slow Rate of Transfusion:**
- Administering the blood slowly, especially in the case of preterm infants, can help prevent volume overload and hyperkalemia.
- **Monitoring and Management of Electrolytes**:
- Regular monitoring of potassium and calcium levels can help prevent hyperkalemia and hypocalcemia, respectively.
- **Careful Donor Selection**:
- Choose donors carefully to reduce the risk of TA-GvHD.
- Ideally, donors should be CMV-negative and irradiated blood products should be used.
- **Consider Erythropoiesis-Stimulating Agents**:
- In some cases, erythropoiesis-stimulating agents can be used to reduce the need for transfusions, thereby reducing the risk of associated complications.
- **Gut Rest after Transfusion:**
- Some institutions use a protocol of gut rest (temporary cessation of feeds) after transfusion to reduce the risk of NEC.

- **Iron Chelation Therapy**:
- In cases of repeated transfusions, iron chelation therapy can be used to prevent iron overload.
- **Aliquoting** :
- This reduces their exposure to different donor blood types, thereby decreasing the risk of alloimmunization and transfusion-transmitted infections.

Management

- **Immediate Action:**
- As with adults, the first step is to stop the transfusion immediately if a reaction is suspected.
- **Supportive Care**:
- Depending on the type of reaction and symptoms, neonates might require oxygen, fluid management, or medications like antihistamines or steroids.
- **Investigation:**
- Transfusion reaction workup at BLOOD CENTER.
- **Monitoring:**
- Neonates should be closely monitored for changes in heart rate, blood pressure, oxygen saturation, and other vital signs.
- **Maintain Temperature**:
- Due to their inability to regulate body temperature, neonates are at risk of hypothermia during transfusion.
- The blood should be warmed to body temperature before transfusion, and the neonate's temperature should be monitored closely.
- **Fluid Overload**:
- If transfusion-associated circulatory overload (TACO) occurs, diuretics may be used under medical supervision.
- **Hyperkalemia**:
- Calcium gluconate may be administered to protect the heart muscles from the effects of hyperkalemia.
- Insulin and glucose can help to shift potassium from the bloodstream into the cells. Supportive care, like maintaining hydration, will also be important.

Recent advances

- Irradiation of blood products is a process that destroys T lymphocytes, a type of white blood cell.
- This is done to prevent transfusion-related graft-versus-host disease (GVHD)
- The use of blood products that are matched for HLA type – reduce the risk of transfusion reactions, including transfusion-related GVHD
- Blood warmers can help to reduce the risk of complications from cold blood transfusions in neonates

Recommendations

- Since neonates can encounter a number of transfusion reactions,certain measures should be adopted for minimising the reactions.
- When transfusing neonates, particularly preterm infants, efforts should be made to reduce donor exposure, TT-CMV infection, and TA-GVHD.
- Such efforts include:
- (1) reduce the number of blood transfusions as much as possible,
- (2) use special equipment such as small bags (satellite packs) and sterile connecting devices for small-volume transfusion, and
- (3) use leukoreduced and irradiated cellular blood products.
- Moreover, transfusion of RBCs or platelet in neonates should be carefully determined by comparing the anticipated effects and risks according to the clinical condition, as well as the hematocrit or platelet levels

Advancements in Blood Screening Techniques: Ensuring Safe Transfusions

Dr Sonu Bhatnagar

The safety and efficacy of blood transfusions have been paramount in modern healthcare. Transfusion-Transmissible Infections (TTIs) pose a significant risk to recipients of blood transfusions. These infections, caused by various pathogens including viruses, bacteria, and parasites, can lead to severe health complications or even fatalities. Over the years, significant advancements in blood screening techniques have played a pivotal role in minimizing the risks associated with transfusions. This talk explores some of the key innovations in blood screening, highlighting their critical contributions to ensuring safe transfusions.

1. Serological Testing: It has emerged as a critical tool in identifying and mitigating the risks associated with TTIs. Serological testing offers a comprehensive approach to TTI screening. By detecting specific antibodies or antigens associated with infectious agents such as HIV, hepatitis B and C, syphilis, and other pathogens, serology provides a reliable means of confirming the absence or presence of infections in donated blood. This thorough evaluation is indispensable for safeguarding the health of transfusion recipients. One of the key advantages of serological testing is its ability to significantly reduce the window period – the period between infection and detectability. Unlike direct detection methods, serology identifies the body's immune response to the presence of pathogens, allowing detection even when the infectious agent may not be directly detectable for various causes. This crucial advancement has revolutionized blood safety.

In cases where donors have previously been infected and recovered from certain diseases, serological testing can provide valuable information about their immune status. This knowledge is crucial for recipients who may have specific health conditions or require specialized transfusion preparations.

Serology offers a cost-effective approach to TTI screening. Compared to nucleic acid testing (NAT) or other molecular methods, serological assays are generally more widely available and cost-efficient. This accessibility ensures that blood banks, especially those in resource-constrained settings, can still implement robust screening protocols.

2. Nucleic Acid Testing: One of the most significant breakthroughs in blood screening is the introduction of Nucleic Acid Testing (NAT). NAT allows for the direct detection of viral nucleic acids (such as HIV, HCV, HBV) in blood samples. Unlike traditional serological methods, NAT significantly reduces the window period during which an infection might be undetectable. This has revolutionized blood safety by enabling the early detection of viral infections, thereby preventing their transmission through transfusions.

3. Pathogen Reduction Technologies (PRTs): PRTs represent another crucial advancement in blood safety. These technologies employ various methods, including ultraviolet (UV) light and chemical agents, to inactivate pathogens in donated blood components. PRTs provide an additional layer of safety by targeting a broad spectrum of pathogens, including bacteria, viruses, and parasites. By mitigating the risk of transfusion-transmitted infections, PRTs have significantly enhanced the safety profile of blood products.

4. Real-time Data Monitoring and Reporting: Digitalization and integration of blood bank information systems have enabled real-time monitoring of blood inventory, testing results, and adverse reactions. This allows for rapid response in case of any discrepancies or emergent situations. Additionally, it facilitates traceability, making it easier to track and recall specific blood products if necessary.

Conclusion:

From the introduction of Serology and NAT for early viral detection to the implementation of PRTs for pathogen inactivation, each advancement has significantly reduced the risks associated with blood transfusions. However, Serological testing has become a linchpin in the effort to ensure the safety of blood transfusions. Through its comprehensive approach to infection detection, reduction of the window period, adaptability to emerging pathogens, cost-effectiveness, and support for global health initiatives, serology plays a pivotal role in safeguarding the health of transfusion recipients. The continuous evolution of blood screening techniques stands as a testament to the unwavering commitment of the healthcare community to ensure the safety of transfusions. With these innovations, the landscape of transfusion medicine has been transformed, providing patients with a higher level of confidence in the safety and efficacy of this life-saving procedure. As technology continues to progress, we can anticipate even more sophisticated and precise methods to emerge, further bolstering the safety of blood transfusions in the years to come.

Changing paradigm of Autoimmune Hemolytic Anemia

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Introduction

Autoimmune hemolytic anemia (AIHA) is characterized by hemolysis, i.e. the breakdown of red blood cells (RBCs) which occurs with autoantibodies and/or complement, together with activated macrophages, T-lymphocytes and cytokines all contributing to the process. All these immune parameters change with age, and immunosenescence is one of the pathomechanisms that has been associated with autoimmunity [1]. A positive direct antiglobulin test (DAT) confirms the presence of immunoglobulins and/or complement attached to erythrocytes [2,3]. The serological types include warm AIHA (WAIHA), cold AIHA (cold agglutinin syndrome –CAD, & paroxysmal cold hemoglobinuria –PCH), mixed AIHA (MAIHA), DAT negative AIHA and drug induced AIHA (DIAIHA) [4,5].

Epidemiology and risk factors for AIHA development

The last two decades witnessed significant works on AIHA with regards to its underlying etiologies, immunobiology, immunopathology, immunohematological characteristics, genetics, molecular evaluation and management including blood transfusion. It is currently estimated that the incidence of AIHA is 1.77 cases per 100,000 per year, of which WAIHA the commonest (2/3 of cases) is followed by CAIHA (15–20%) [6]. PCH is a rare disease which mostly affects children [6,7]. The risk of AIHA increases with age which may be due to immunosenescence or epigenetic abnormalities accumulated in hematopoietic cells with aging. Genetic, immunodeficiency, comorbidities, underlying autoimmune disease, infections, medication, neoplasia and transplants have all been suggested as important risk factors for AIHA development. The clinical course of AIHA can vary from mild to severe and life-threatening forms. The course of AIHA may be chronic or recurrent, and, very rarely can be episodic. It is estimated that the mortality in AIHA is about 10% [7-9].

Secondary AIHA on the rise

With regards to lymphoproliferative disorders, CLL patients show the highest risk with up to 5–10% developing AIHA, with an onset that may precede the diagnosis of lymphoproliferative disease [10]. The presence of unmutated immunoglobulin heavy chain gene (IGHV) status, sterotyped IGHV frames, and unfavorable cytogenetics (chromosome 17p and/or 11q deletions) represent a risk factor for the development of AIHA [11,12]. Other recently identified risk factors were several down-regulated microRNAs (miRNAs), some of them known to be involved in autoimmune phenomena. Currently AIHA prevalence in NHL has been estimated to be 2–3%, with higher frequencies in some subtypes (50% in marginal zone lymphoma) . Researches on CAD found association of the disease with indolent clonal lymphoid infiltrate and recurrent mutations of KMT2D and CARD11 [13].

Furthermore, infectious agents are known triggers of AIHA onset and relapse particularly in children. Although being risk factors for mortality, infections are an underestimated issue in AIHA. Infectious agents can trigger AIHA through various mechanisms, including modification of erythrocyte membrane antigens, polyclonal B cell activation, innocent bystander and molecular mimicry [14-16]. Several infections have been associated with AIHA (parvovirus B19, hepatotropic virus, HIV, mycoplasma pneumonia, mycobacterium tuberculosis, brucella, syphilis) including, more recently, COVID-19 pneumonia. [17-19]

Risk Factors for Relapse and Mortality: The current outlook

The last decade has given tremendous effort to identify predictors of outcome, including complications, response to therapy and death. Barcellini et al. identified that the severity of anemia at onset is the strongest predictor of relapse, with hazard ratios of 1.61, 1.74, and 1.98, for Hb levels of 8.1–10, 6.1–8, <6 g/dL, respectively [20,21]. Complement involvement and thermal characteristics of the autoantibody were also important, with complement associated WAIHA, MAIHA, CAD and atypical forms more frequently needing second or further therapy lines. Moreover, the concomitant presence of immune thrombocytopenia (Evans syndrome) is associated with a higher risk of relapse and refractoriness to treatment. The bone marrow features also impact the disease severity since the presence of reticular fibrosis, dyserythropoiesis, and hypercellularity were correlated with shorter relapse-free survival and lower response rate to immunosuppressive therapies. Regarding fatal outcome, Hb <6 g/dL at onset, Evans' syndrome, multi-treatment, acute renal failure, and infections have been associated with 5-8 fold risk of increased mortality [21]. More recently, mortality was 30% in a series of 44 AIHA admitted to intensive care unit for severe anemia [22].

The recent concept of cytokine dysregulation in AIHA

There is also evidence of cytokine dysregulation in AIHA. Among the numerous and sometimes conflicting findings, interleukin (IL)-4, IL-6, and IL-10 have been found elevated in patients versus healthy controls [23,24]. This is consistent with a prevalent T-helper (Th) 2 humoral response and an antibody-mediated mechanism of RBC destruction in AIHA. Interferon (IFN)-γ has been reported to be reduced in AIHA patients compared with controls, resulting in decreased inhibition of Th 2 response, and consequently in an amplification of the autoantibody-mediated autoimmune disease. Cellular immunity is also involved with increased activity of cytotoxic CD8+T lymphocytes, natural killer cells, and activated macrophages. Moreover, IL-2 and IL-12, which induce the differentiation of CD4+ naïve T cells into the Th 1 subset, have been found elevated, further boosting cellular immunity [23]. In line with this over-activation, transforming growth factor (TGF)-β has been reported as elevated. This pleiotropic cytokine favours the differentiation of the Th 17 subset, which amplifies the pro-inflammatory and autoimmune responses [25]. Finally, lymphocyte subsets able to down regulate autoimmune response such as peripheral CD4+ T-regulatory cells have been reported as reduced in AIHA patients compared with the controls, again favouring autoimmune responses

New Drugs in AIHA

Among the new drugs, B cell directed therapies and complement inhibitors are the most advanced in clinical trials. The former are based on the close association and the several common pathogenetic mechanisms between lymphoproliferative and autoimmune diseases [26,27]. Monoclonal antibodies include ofatumumab, alemtuzumab (alone or in association with cyclosporine) and daratumumab, which have been mainly used in secondary AIHA. The BTK inhibitor Ibrutinib (currently used/under investigation in several lymphoproliferative disorders) has been shown to be effective in a case of AIHA associated with CLL and mantle cell lymphoma. The BCL2 inhibitor venetoclax, indicated for second-line treatment of CLL with a 17p deletion, has a potential role for refractory AIHA. Other BCR inhibitors directed against PI3K signalling (parsaclisib, NCT03538041) are under investigation in AIHA and CAD [27,28]. Complement modulation is the most promising therapeutic tool for CAD. Some effect with the anti-C5 monoclonal antibody, eculizumab, has been reported in the past, mainly on transfusion avoidance. However, terminal complement inhibition has no effect on C-mediated extravascular hemolysis, prompting investigation on proximal inhibition of the complement cascade. The monoclonal antibody anti-C1s sutimlimab (formerly TNT003/BIVV009) has been proven to have a meaningful effect on hemoglobin levels, hemolysis, and fatigue, both in a pilot study mostly in secondary CAD [28,29] and in a prospective trial in primary CAD. Other ongoing

studies are exploring the safety/efficacy of the C3 inhibitor pegcetacoplan (formerly APL-2) in CAD and in WAIHA. Sirolimus has been used in secondary AIHAs and Evans syndrome, particularly in the paediatric setting [27-30]. An innovative strategy is inhibiting the spleen tyrosine kinases; one of these new drugs, fostamatinib, which also inhibits the B-cell receptor downstream pathway, has proven effective in various autoimmune diseases and is now in Phase 3 studies in WAIHA. Finally, the safety/efficacy of several inhibitors of the neonatal Fc receptor (FcRn) such as orilanolimab (formerly SYNT001) is under investigation. The FcRn is structurally homologous to the MHC Class I receptor family, is expressed by several cells, and is responsible for the salvage of IgG from catabolism. Blocking FcRn is a fascinating new strategy, which induces an increased clearance of IgG including that of pathogenic IgG autoantibodies [29-30].

AIHA in Solid Organ and Hematopoietic Stem Cells Transplant

Immune-mediated hemolysis may be a complication of solid organ transplantation in about 10–15% of cases, mainly when the donor is group 'O' and the recipient group 'A'. The phenomenon is named "passenger lymphocyte syndrome" and is due to the production of antibodies by the donor's lymphocytes passively transferred to the recipient [31]. Hemolysis usually begins two weeks after transplant, may be severe, but is generally temporary since autoantibody production stops with the disappearance of the donor lymphocytes. The risk and extent of hemolysis are proportional to the lymphocyte mass contained in the transplanted organ: minor in kidney transplantation, intermediate in liver, and high in heart and lung transplantation [32]. An emerging and more severe clinical entity is AIHA after hematopoietic stem cell transplant (HSCT), which may complicate up to 2–4% after a median of 3–10 months, with a high mortality and poor response to therapies. Risk factors include use of unrelated donor and HLA-mismatch, occurrence of graft-versus-host-disease, use of cord blood, age < 15 years, cytomegalovirus reactivation, alemtuzumab use, and non-malignant condition pre-HSCT [33].

AIHAs Associated with New Biological Anti-Cancer Therapies

Tumour cells activate immune checkpoints such as molecular programmed death receptor-1 (PD-1) and cytotoxic T lymphocyte-associated antigen 4 (CTLA-4) pathways. Checkpoint inhibitors (CPIs) reactivate T lymphocytes to recognize cancer cells by blocking CTLA-4 or PD-1, and are therefore effective in numerous types of cancer, but have several immune-related adverse effects. A recent revision of the database of the Food and Drug Administration reported a total of 68 cases: AIHA is the most commonly reported hematologic adverse event, mostly WAIHA, and frequently with a fulminant course (80% fatal mainly due to multi-organ failure and delayed diagnosis). Forty-three cases developed after nivolumab, 13 after pembrolizumab, seven after ipilimumab, and five after atezolizumab. The risk appeared higher for PD-1 or PD-L1 targeting agents than CTLA-4 inhibitors. The underlying diseases were mainly melanoma (41%), non-small cell lung cancer (26%), and others including kidney cancer, Hodgkin's lymphoma, or skin cancers. The median time to AIHA onset was 50 days, with some patients developing concurrent thrombocytopenia, endocrine abnormalities, and gastrointestinal adverse events (colitis or hepatitis) [34]. In another recent analysis of 14 cases of AIHA after CPIs, a high proportion of DAT negativity (38%) and of severe anemia (median Hb 6.3 g/dL) was found. Moreover, 50% of cases relapsed after the first line and 14% became chronic [34,35].

Conclusion

AIHA is a greatly heterogeneous disease due to the several immunologic mechanisms involved in its pathogenesis (cellular and humoral immune effectors, complement, cytokines, bone marrow compensation), possibly causing a clinically complex and severe disease. Moreover, the type and extent of the immune dysregulation may be different in each patient and also change over time, often determining an

unpredictable clinical course. Diagnosis is usually easy, but difficult cases may challenge the physicians, particularly if negative to common immune-hematologic tests or associated with lymphoproliferative neoplasms, autoimmune diseases, immunodeficiencies, drugs, solid tumors, or transplants. Bone marrow evaluation is increasingly advised, particularly in relapsed/refractory WAIHA and in CAD, to better define its pivotal role in pathogenesis and consequently harness therapy. The definition of the AIHA type (warm or cold) is fundamental as therapy is quite different and is further becoming targeted with the understanding of the peculiar pathogenetic mechanisms of these two forms. New therapies, directed against antibody-producing B-lymphocytes/plasma cells, complement components, or several kinases are under active development and will offer increased therapeutic opportunities to treat (and hopefully cure) the disease.

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Advancements in Ex-vivo Mesenchymal Stem Cells expansion

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Mesenchymal Stem Cells (MSCs) have emerged as a cornerstone in regenerative medicine due to their remarkable ability to differentiate into various cell types and their immunomodulatory properties. However, one of the key challenges in harnessing their therapeutic potential lies in expanding these cells ex-vivo to obtain clinically relevant quantities. This study provides an overview of recent advancements in ex-vivo MSC expansion techniques, shedding light on innovative strategies that have the potential to transform regenerative medicine.

Traditional methods for MSC expansion relied on monolayer culture techniques, such as adherent culture on tissue culture plastic. Improved cell attachment surfaces, such as advanced coatings and biomimetic substrates, have been developed to enhance cell adhesion, proliferation, and viability. These methods have limitations, including senescence induction, a decline in stemness, and a limited proliferation capacity. In contrast, contemporary approaches have introduced sophisticated culture systems that mimic the in vivo microenvironments. Three-dimensional (3D) culture systems, such as scaffolds, provide a more physiologically relevant setting for MSC growth, leading to significantly improved proliferation rates and the preservation of stem cell properties.

Furthermore, advancements in the formulation of culture media, including the use of chemically defined, serum-free media and specific growth factors, have contributed to more efficient MSC expansion while preserving their multilineage differentiation potential and immunomodulatory properties. These tailored media compositions minimize the risk of xenogeneic contamination and ensure consistency in culture conditions.
In addition to optimizing culture conditions, genetic modification strategies have emerged to enhance MSC expansion efficiency. Recent advancements have shown that regulating oxygen tension during culture specifically through the induction of hypoxia, has demonstrated promising results in boosting cell yields and improving the therapeutic potential of expanded MSCs. Traditional MSC expansion methods often rely on normoxic (ambient oxygen) culture conditions. However, these conditions can lead to oxidative stress, and replicative senescence, limiting the scalability and therapeutic efficacy of the expanded cells. Hypoxia culture, with oxygen levels reduced below atmospheric levels (typically 2-5% oxygen tension), enhanced proliferation rates, increased self-renewal capacity, and improved maintenance of stemness markers. The regulatory mechanism underlying these changes involves the hypoxia-inducible factor (HIF) pathway, which orchestrates adaptations to low-oxygen environments, ultimately promoting MSC survival and growth.

In conclusion, recent advancements in ex-vivo MSC expansion techniques have the potential to revolutionize regenerative medicine. By embracing 3D culture systems, refining culture media, and incorporating genetic modifications, the fiel is poised to meet the increasing demand for MSC-based therapies. These innovations hold great promise for addressing a wide range of debilitating medical conditions and ushering in a new era of regenerative medicine.

Development of RhD Genotyping Strategy through Molecular Analysis of RHD Gene in Indian Population

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Alloantibodies against the Rh blood group antigens are known to be a major cause of HDFN and HTR. Among Rh antigens, the D antigen is the most immunogenic. The high degree of homology, opposite orientation and proximity shared by RH genes (RHD and RHCE) promotes the formation of numerous variants. Depending on the reagents and the techniques used, D variants give varied results in RhD typing in different laboratories and create confusion. Knowing the correct RhD status is clinically important, as the D variant individual is considered RhD positive as a donor and RhD negative as a patient/recipient of blood transfusion. Hence, to overcome the limitations of serology, D negative samples should be screened using a DNA-based approach to exclude RhD variants to prevent alloimmunization.

Genotyping requires knowledge about the molecular mechanism causing D negativity in a given population. The RHD gene deletion, RHD pseudogene (RHDΨ) and the RHDCED hybrid formation are the main cause of D negativity. The percentage distribution of these different mechanisms varies with the population. RHD genotyping strategies based on molecular methods have to be developed by few countries to determine the correct RhD status.

About 5-7% of Indians have a D-negative phenotype. However, knowledge of the molecular mechanisms responsible for RhD negativity in Indians is not known. Knowledge of Molecular basis of D would help to the development of a suitable DNA-based diagnostic strategy for correct RhD typing.

Over 3023 apparently RhD negative individuals were screened with a panel of anti-D reagents and typed for presence of C, c, E & e antigens. In 1.2% cases D variants were identified. All the samples were primarily screened for RHD exon 5, 10 and weak D type 150 using indigenous Multiplex PCR to identify D variants. All samples were further screened for all RHD exons by RHD-QMPSF. Samples missing one or more RHD exons were further screened by RHCE-QMPSF to identify RHD-CE-D hybrids. All samples were further screened for all RHD and RHCE exons by the quantitative multiplex polymerase chain reaction (QMPSF) assay for copy number analysis mainly to identify presence of RHD-CE-D hybrids.

All RhD negative samples with rr phenotype showed homozygous deletion of the *RHD* gene as the mechanism of D negativity. Out of 253 RhD negative samples positive for 'C' and/ or 'E' antigens, 23% showed presence of one or more *RHD* exons. RHD-CE(3-9)-D hybrid was the most frequent hybrid allele identified followed by *RHD-CE(3-8)-D* and *RHD-CE(4-9)-D*. For uncharacterized samples, sequencing was performed for any point mutations, short insertion or deletion of nucleotides.

As the frequency of RHD positive exons in overall RhD negative samples were less, incorporating pooling into the RhD genotyping strategy can be cost-effective. Based on the data generated, we developed a diagnostic genotyping strategy for correct RhD typing in Indians, which will facilitate decision making for blood transfusion and application of this strategy for fetal RhD typing.

Statistical Tools for Data Analysis- What, When, and Where

Dr Tanvi Kiran

Introduction:

In our era of unprecedented data abundance, the ability to extract actionable insights from raw information has become a cornerstone of modern decision-making. To achieve this, one must navigate a vast array of statistical tools. In this talk, we will explore the "What, When, and Where" of statistical tools, guiding you through the essential aspects of their selection and application.

What Are Statistical Tools?

Statistical tools, in their myriad forms, constitute a sophisticated array of methods, techniques, processes and software applications to empower academicians, analysts, researchers, and data scientists in extracting profound insights from complex datasets. These tools serve as the bedrock for the data collection, organization, visualization, summarization, and derivation of consequential inferences from data, thus facilitating prudent decision-making and intricate problem-solving. This expansive toolkit spans a continuum of statistical methods, from fundamental descriptive statistics, which offer insights into dataset characteristics such as mean, median, and standard deviation, to the cutting-edge domains of machine learning, enabling predictive modeling and the discovery of latent patterns.

The judicious use of statistical tools necessitates a discerning approach to their application. Different tools are employed for specific analytical contexts, and choosing the right one at the right time is crucial. Here's a closer look:

- **Descriptive Statistics:** These foundational tools come into play when the objective is to provide a comprehensive overview and summarization of essential dataset attributes, offering statistical measures that encapsulate the dataset's central tendencies and dispersion. Descriptive statistics can be visualized using data visualization tools. Employ this powerful arsenal when the intention is to convey data visually, aiding in identifying intricate patterns, evolving trends, and anomalies that might elude conventional tabular presentations.
- **Inferential Statistics:** Engage in this domain when the need arises to draw substantive conclusions or forecasts regarding populations based on sample data. This often entails sophisticated techniques like hypothesis testing and regression analysis, enabling us to extrapolate findings beyond the sampled data.

When to Use Statistical Tools:

The selection of an appropriate statistical test represents a pivotal stage in the process of data analysis, necessitating meticulous consideration of various pivotal factors. At the outset, a comprehensive comprehension of the inherent characteristics of the data assumes paramount importance. It is imperative to discern whether the Predictor Variable under scrutiny exhibits categorical or quantitative attributes. In scenarios where the Predictor Variable aligns with a categorical nature and the Outcome variable shares the same categorical attributes, the inclination leans towards the adoption of non-parametric tests. Conversely, if the Predictor Variable is categorical in nature and outcome variable demonstrates quantitative characteristics, the ensuing analytical approach typically entails the utilization of parametric test for example, means comparison tests such as the t-test, suited for comparisons involving two groups, or ANOVA, specifically designed for scenarios encompassing more than two groups. In instances where the Predictor Variable embodies quantitative properties and the Outcome variable retains categorical attributes, the preferred methodology invariably involves the application of Logistic Regression. Moreover, when dealing with quantitative Predictor Variables, a prudent examination of the number of predictor variables is warranted; if the count is one, simple regression serves as the analytical tool of choice, whereas the presence of multiple predictor variables necessitates the employment of multiple regression analyses. This systematic approach ensures the judicious selection of statistical tests, thereby facilitating rigorous and meaningful data analysis.

Where to Find:

Statistical tools are widely available and accessible to anyone with a computer and an internet connection. Here are some common sources:

- **Software Packages:** Prominent programming languages and software platforms such as R, Python, SAS, and SPSS offer expansive suites of statistical tools, catering to a myriad of analytical needs. They provide a robust and flexible data manipulation, analysis, and visualization environment.
- **Online Platforms:** Cloud-based environments, exemplified by Google Colab, Jupyter Notebook, and RStudio Cloud, grant convenient access to a plethora of statistical tools and resources, irrespective of geographical constraints. They also facilitate collaborative data analysis and sharing.
- **Libraries and Packages:** The open-source ecosystem is teeming with specialized libraries and packages, including NumPy, Pandas, SciPy, and sci-kit-learn in Python, meticulously designed to address advanced data analysis and machine learning requisites. These libraries provide pre-built functions and methods that expedite complex analytical tasks.
- **Educational Resources:** For those seeking structured learning pathways, online courses, academic literature, and instructional tutorials available on platforms such as Coursera, edX, and YouTube offer comprehensive knowledge repositories to elevate one's proficiency in statistical tools. These resources are essential for both beginners and seasoned professionals looking to enhance their analytical skills.

Therapeutic Plasma Exchange in Demyelinating Disorders: A Good Therapeutic Companion

Dr Vijay Kumawat

The nervous system is traditionally divided into central nervous system (CNS) and peripheral nervous system (PNS). The CNS is comprised of the brain, spinal cord, olfactory and optic nerves, and is myelinated by oligodendrocytes. The PNS is comprised of nerves outside of the CNS–the remaining ten pairs of cranial nerves, spinal nerve roots, and peripheral nerves, and is myelinated by a different type of glial cell—the Schwann cell.

The myelin sheath represents a plasma membrane extension that is present in regularly spaced segments along axons of the nervous system. The term 'myelin' was first coined by Rudolf Virchow in 1864 and was named after the Greek word 'marrow' (myelos), because it is particularly abundant in the core, or marrow, of the brain. Myelin is a key evolutionary acquisition, promoting rapid, efficient nerve conduction. myelination also made possible the development of the large body size of vertebrates. Myelination has emerged as a source of plasticity in neural circuits that is crucial for proper timing and function. Demyelinating diseases represent a spectrum of disorders that impose significant burden on global economy and society.

Peripheral demyelinating diseases (PDD) refer to a spectrum of disorders that involves substantial damage to axons and glial cells, particularly Schwann cells in the PNS. Demyelination causes neurological disability due to conduction block and axonal degeneration. Diagnosis of PDD depends on electrophysiological and cerebrospinal fluid (CSF) analysis.

Acquired Demyelinating Disease

Guillain-Barre Syndrome:

Acute idiopathic autoimmune demyelinating disease of the PNS that is characterized by acute flaccid ascending neuromuscular paralysis. Most cases of GBS are preceded by antecedent infections of several microbes of the gastrointestinal and upper respiratory tracts. Among those, 60% of GBS cases were related to autoantibodies, anti-mono sialo tetra hexosyl ganglioside- 1 (anti-GM1) and anti-ganglioside GD1a (anti-GD1a) associated with C. jejuni infection. Some GBS cases are results of trauma, surgical interventions, treatment with monoclonal antibodies and vaccination (rare). Acute inflammatory demyelinating polyradiculoneuropathy (AIDP) which comprises up to 90% of GBS cases, is an acute progressive paralyzing illness affecting both motor and sensory peripheral nerves. The remainder of GBS cases are defined by presenting pathogenic and clinical features and classified as acute motor axonal neuropathy (AMAN), acute motor-sensory axonal neuropathy (AMSAN), Miller Fisher syndrome, and acute autonomic neuropathy.

Therapeutic plasma exchange (TPE) can accelerate motor recovery, decrease time on the ventilator, and decrease time to attainment of other clinical milestones. TPE was the first therapeutic modality to impact the disease favourably. Corticosteroids are not beneficial in the disorder.

Chronic Inflammatory Demyelinating Polyradiculoneuropathy:

An acquired immune mediated demyelinating disease of the PNS characterized by progressive loss of motor and sensory functions. It is distinct from GBS that its clinical course is chronic with relapses. The

onset is insidious and occurs more commonly in older age individuals. Demyelination is indicated by the slow nerve conduction velocity suggestive of conduction block. Recently evidence of autoimmunity toward neurofascin-155 (NF155) and contactin-1 (CNTN1) in some patients have been reported. Typical symptoms are tingling/numbness of the extremities due to the association of large nerve fibres, symmetrical weakness and paraesthesia of legs and arms, loss of reflex, fatigue, ataxia and limb incoordination.

There are 3 first-line initial treatment options with similar efficacy: steroids, IVIG, or TPE. The initial treatment is often based on ease of administration, cost, availability, and/or side effects. TPE or IA can remove antibodies, immunoglobulins, cytokines, and complement. TPE or IA is safe and effective in providing short-term benefit, but rapid deterioration may occur afterwards. This may necessitate maintenance treatment, with repeated TPE, IA and/or other immunomodulating therapies.

Chronic acquired demyelinating polyneuropathies:

This include a variety of neuromuscular disorders resulting from immune-mediated demyelination including CIDP and atypical or less common variants of CIDP, multifocal motor neuropathy (MMN), IgG/IgA/IgM paraproteinemic polyneuropathy, neuropathy associated with IgM antibodies to myelin-associated glycoprotein (anti-MAG), POEMS syndrome (polyneuropathy, organomegaly, endocrinopathy, monoclonal gammopathy,and skin changes syndrome), chronic ataxic neuropathies due to disialosyl antibodies, and other neuropathic syndromes associated with monoclonal gammopathy.

The rationale for using TPE is to remove anti-MAG or other antibodies; however, not all patients respond, and the response may be short lived. TPE may be more effective for IgA and IgG MGUS-associated polyneuropathy, than for IgM-MGUS

Demyelinating disorders of the central nervous system (CNS) affect the brain and spine. MRI is the imaging modality of choice to assess demyelinating disorders of the brain and the cord and, together with the clinical and laboratory findings.

Idiopathic Inflammatory-Demyelinating Diseases (IIDDs) of the CNS

Multiple Sclerosis

MS is a progressive inflammatory, demyelinating and neurodegenerative autoimmune disease characterized pathologically by perivascular infiltrates of mononuclear inflammatory cells, demyelination, and axonal loss and gliosis, with the formation of focal and diffuse abnormalities in the brain and spinal cord, mainly affecting the optic nerves, brainstem, spinal cord, and cerebellar and periventricular white matter, although cortical and subcortical gray matter damage is also prominent, resulting in chronic progressive disability for the majority of people with the disorder.

Standard treatment for CIS or acute MS attacks or relapses is high dose glucocorticoids. In 20% to 25% of patients who do not respond to steroids after an interval of 10 to 14 days, treatment with therapeutic apheresis should be considered. TPE or IA may benefit patients with MS by the immediate removal of plasma-based antibodies and immune complexes, induction of a redistribution of antibodies from the extravascular space, and subsequent immunomodulatory changes.

Neuromyelitis Optica Spectrum Disorders

Neuromyelitis Optica (NMO) is an autoimmune inflammatory disorder of the CNS with a predilection for the optic nerves and spinal cord. It is characterized by severe unilateral or bilateral optic neuritis and complete transverse myelitis, which occur simultaneously or sequentially over a varying period (weeks or years). Approximately 85% of patients have a relapsing course with severe acute exacerbations and poor

recovery, which leads to increasing neurologic impairment and a high risk of respiratory failure and death due to cervical myelitis. The presence of IgG autoantibodies to aquaporin 4 (AQP4), the most abundant water channel in the CNS is the diagnostic hallmark.

High-dose intravenous corticosteroids (e.g., methylprednisolone, 1g daily for 3-5 days) followed by oral taper, and TPE or IA are the therapeutic mainstay for acute attacks of NMOSD. TPE can also be administered as first line therapy or simultaneously with steroids in severe cases, when previous attacks have responded well to apheresis therapies.

Acute Disseminated Encephalomyelitis

ADEM is a severe, immune-mediated inflammatory disorder of the CNS that predominantly affects the white matter of the brain and spinal cord. It typically occurs after a fever or a viral/bacterial infection, and numerous pathogens, including SARS-CoV-2, have been implicated.

the therapeutic aim is to stop the CNS inflammatory reaction as quickly as possible to aid in clinical recovery. The widely

accepted first-line therapy is the use of high-dose intravenous corticosteroids. TPE can also be used as second line therapy. TPE can quickly remove the presumed pathogenic autoantibodies in ADEM, such as anti-MOG antibodies.

Plasma exchange has a therapy response of 76.6% in relapsing-remitting multiple sclerosis (RRMS) and clinically isolated syndrome (CIS), 53.9% in progressive multiple sclerosis (PMS), 71.5% in isolated optic neuritis, and 72.5% in neuromyelitis Optica (NMO).

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Adverse Reaction in Therapeutic

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1. Introduction:

Adverse reactions or Adverse Events (AE) in Therapeutic Apheresis are any untoward events occurring to the patients during the apheresis procedure. The incidence of adverse reactions is around 5-12 percent.

2. Factors affecting AE

Major variable factors of AE are anticoagulant, replacement fluid, vascular access, disease indication, and procedure type and patient characteristics. Females have an increased predisposition compared to males. The chance of developing a reaction is increased in the first procedure. AE in Cytapheresis is found to be less than Plasmapheresis. AE is more in intermittent type than continuous type apheresis machine.

3. Grade of adverse reaction: World Apheresis Association (WAA) graded adverse events based on the patient experience and outcome as follows

- Grade 1 (Mild): Tolerated without medication
- Grade 2 (Moderate): Need of medication due to AE
- Grade 3 (Severe): Interruption due to AE
- Grade 4 (Fatal): Death due to AE

As per the WAA apheresis registry, the most common manifestations in mild, moderate, and severe AE were local site hematoma, tingling due to citrate toxicity and hypotension respectively. The occurrence of AE is in the order moderate>mild>severe>death.

4. Classification:

Adverse events can be divided into Common AE and Rare AE. Common AE are related to citrate toxicity, hypotension, allergic and anaphylactic reactions, and vascular access issues. Rare AE includes Cardiac, Pulmonary, Hematology, Neurology, Infectious, and Pyrogenic complications.

4.1 Citrate toxicity

Incidence of citrate toxicity is ranging from 1.5-9%. Citrate toxicity mainly leads to Hypocalcemia and Hypomagnesemia. It may rarely lead to Metabolic Alkalosis and Hypokalemia. Utilisation of Plasma as replacement fluid will increase the load of citrate and its toxicity.

4.1.1 Hypocalcemia

Major symptoms of hypocalcemia in the order of appearance are perioral numbness, shivering, lightheadedness, twitching, tremors, nausea, vomiting, hypotension, carpo-pedal spasm, tetany and seizure. Rarely it can lead to arrhythmias and QT prolongation. Treatment includes slow reinfusion to promote metabolism of citrate, decrease citrate to blood ratio, and administration of oral or intravenous Calcium. Preventive strategies include pre-procedural calcium prophylaxis and correction of Serum Calcium before initiation of the procedure.

4.1.2 Hypomagnesemia

Features of Hypomagnesemia are similar to hypocalcemia. Hypomagnesemia is often misdiagnosed as hypocalcemia and often identified after non-respondence to Calcium administration. The mainstay of treatment is magnesium supplementation and other measures similar to hypocalcemia correction.

4.1.3 Metabolic Alkalosis

The generation of bicarbonate during citrate metabolism may lead to metabolic alkalosis. This is usually non-significant, but when there is a pre-existing renal impairment and excessive citrate load, there can be the development of non-specific symptoms and may even lead to decreased respiratory drive. Management is mainly supportive measures but even dialysis may be required in severe cases.

4.1.4 Hypokalaemia

Metabolic alkalosis may result in the development of Hypokalaemia as a result of the Potassium influx to maintain neutrality. Presentation is usually asymptomatic. Symptoms that can occur are weakness, hypotonia, and, cardiac arrhythmia. Treatment consists of oral or intravenous replacement of Potassium.

4. 2 Hypotension

It is a common complication and is commonly associated with hypovolemia. Hypotension is considered when there is a drop in systolic blood pressure more than 40 mm Hg or below 90 mm Hg. It is associated with tachycardia. Incidence is more when the extracorporeal volume of the circuit is more than that the patient can tolerate. Other reasons for hypotension are vaso-vagal reaction, allergic reaction, citrate toxicity, and the presence of Angiotensin Converting Enzyme Inhibitors (ACEIs). Patients who are having low blood volume especially children are prone to hypotension. Incidence is also more with intermittent-type apheresis machines compared to continuous type. Hypotension as AE is more common when albumin is used as replacement fluid compared to Plasma. The mainstay of management is temporarily pausing the procedure, placing the patient in the Trendelenburg position, and infusion of crystalloids/colloids. Hypotension due to bradykinin release among patients with hypotension may be severe and often lead to termination of procedure. Cessation of ACEIs 2 days prior the procedure can prevent this complication.

4.3 Allergic and anaphylactic reaction

This common AE is mostly associated with replacement fluid like Plasma, Hydroxy Ethyl Starch (HES), and Albumin. Incidence is high with Plasma compared to albumin. Rarely it can be due to the Ethylene Oxide residues used for sterilisation in the disposable apheresis kit. The clinical manifestation can be a mild allergic reaction to a severe life-threatening reaction. Common clinical features are fever, pruritis, wheezing, hypotension, and laryngeal edema. Mild reactions can be managed with oral or intravenous Antihistamines after pausing. Procedure can be resumed after the symptoms are subsiding or not progressing. Procedure should be discontinued in severe reactions while maintaining the patent vascular access. Mainstay management is with Adrenaline, Intravenous fluids, and Aminophylline. Intubation may be required to maintain the airway open.

4.4 AE related to vascular access

This is the most common mild AE. Mild AE is common with peripheral venous access and severe AE is associated with central venous access.

4.5 Coagulopathy

This complication is observed when albumin or other colloid is used as replacement fluid rather than Plasma in Therapeutic Plasmapheresis. There will be increase in PT and PTT by 30% and 100% after each procedure. It is usually recovered with in a day. But fibrinogen and Anti thrombin III may take 3 days to recover. Usage of Plasma as replacement fluid can prevent this AE. Previous monitoring of PT/aPTT also helps in detection and management.

4.5 Rare complications

Cardiac complications are Myocardial Ischemia, Infarction and Arrythmias. Respiratory complications are Pulmonary Edema, Pulmonary Embolism, and Respiratory arrest. Hematological complications are haemorrhage and thrombosis. Other rare AE are infection, Cerebro-vascular Ischemia, and Hyperthermia.

Conclusion

AE can be minimised, detected, and managed effectively with proper monitoring of vitals, cardiac monitoring, and the availability of emergency management equipment.

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H partially-deficient non-secretor phenotype- A rare entity once known to a remote island in the early 80's

Dr Yashaswi Dhiman

Abstract: Bombay blood group is the most commonly known H-deficient phenotype that was first reported from Bombay, India in 1952 and attained global recognition. Next was the para-Bombay that came into light. Since then H-deficient phenotypes are on a look out by many researchers. Moreover, the notations used to describe these phenotypes especially for the para-Bombay phenotype have been wrongly used in literature by many low middle income countries (LMIC) and low income countries (LIC) like our own.

In this talk we will be discussing an H-deficient phenotype, a first of its kind from India last reported only in 1982 on a mysterious island in the Indian Ocean. We will take you on a journey of relentless efforts to provide blood transfusion to a patient that led to this rare find and then progressed into forming an algorithm for all LMIC and LIC to follow in order to not misidentify such phenotypes, assign correct notations and designate blood groups as these blood phenotypes have more propensity to be found in the Indian territory.

MCQ

1. Which of the following is **NOT** true regarding H-deficient phenotype?
    a. They are a result of mutations in H gene
    b. The first H-deficient phenotype was found in India
    c. Bombay blood can be given to any H-deficient phenotype
    d. Para- Bombay is not a variant of H-deficient phenotype

2. Which of the following blood group system is the most likely indirect indicator of secretor status?
    a. Lewis
    b. Kell
    c. Duffy
    d. Kidd

3. A Bombay phenotype, even without prior exposure to transfusion or pregnancy will have naturally occurring?
    a. Anti Rh
    b. Anti U
    c. Anti K
    d. Anti H

4. The enzyme responsible for H antigen on RBC is?
    a. Galactosyl transferase
    b. N acetylgalactosaminyl transferase
    c. L-fucosyl transferase
    d. N-acetylglucosiminyltransferase

5. Para- Bombay phenotypes are?
    a. Non-secretors for H and ABO substances
    b. Secretors for H and ABO substances
    c. Both
    d. None

6. Saliva of A blood group secretor individual will have which of the following substances?
    a. A substance only
    b. O substance only
    c. A and H substance
    d. B and H substance

7. Which blood type will have the maximum amount of H antigen on RBC or react most strongly with *Ulex europaeus* **lectin?**
    a. O blood type
    b. AB blood type
    c. A blood type
    d. B blood type

8. Which of the following statement is **INCORRECT** for IH workup of an H deficient phenotype?
    a. Direct agglutination with Anti H antisera in cell grouping plays significant role
    b. Saliva testing is important to differentiate between different type of H deficient phenotypes
    c. O cell testing in serum/ reverse grouping is not required.
    d. Adsorption elution is required in eluting A,B and H antigens from red cells

9. Which gene is responsible for Secretor status of an individual?
    a. S gene
    b. FUT 2 gene
    c. FUT 1 gene
    d. B gene

10. Immunodominant sugar for H-antigen is
    a. D- galactose
    b. N acetyl galactosamine
    c. Fucose
    d. N acetyl glucosamine

11. Which of the following statement is false regarding antibodies in H-deficient phenotypes?
    a. Para- bombay phenotypes develop Anti IH antibody that may or may not be clinically significant
    b. Bombay phenotypes have clinically significant Anti H antibody
    c. The reunion like phenotype have clinically significant Anti H antibody
    d. Para Bombay phenotype can develop Anti H antibody

12. A_h, B_h and AB_h notations correctly identify which phenotype?
    a. Bombay
    b. Para-Bombay
    c. Reunion type
    d. None of the above

Answers: 1 (d) , 2(a), 3 (d), 4 (c), 5(b), 6(c), 7 (a), 8 (c), 9 (b), 10 (c) 11(d), 12(c)

Abstracts

Theme

Apheresis & Cellular Therapies

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COMPARISON OF THERAPEUTIC EFFICACY OF ABO IDENTICAL AND NON-IDENTICAL SINGLE DONOR PLATELET (SDP) TRANSFUSION - A STUDY FROM TERTIARY CARE HOSPITAL IN SOUTH INDIA

Dr. Lakshmi N. Nair, DR KRISHNAMOORTHY R, DR ASHWIN A, DR NIRANJ RATHAN R

INTRODUCTION

The significance of ABO identical single donor platelet transfusion (SDP) over non-identical in platelet increment has not been defined clearly.

AIM & OBJECTIVE

To compare the therapeutic efficacy of ABO identical and non-identical single donor platelet transfusion.

MATERIALS & METHODS

A retrospective study conducted from 1 December 2022 to 28 February 2023 (3 months) at Department of Transfusion Medicine in a tertiary care hospital of south India by reviewing the ABO and Rh type, age, gender, diagnosis, pre and post-transfusion platelet count of all SDP recipients and ABO and Rh type of all SDP transfused .

RESULTS

A total of 131 SDP transfusions (65 ABO identical and 66 Non-identical) in 66 patients (35 males, 31 females) were included in this study. In cases of thrombocytopenia (acute febrile illness, DCLD, sepsis, splenomegaly and malignancies) with ABO identical SDP transfusions 73.84% transfusions showed significant increase in post transfusion platelet count and 26.15% showed no increment . Whereas with ABO non-identical SDP transfusions 71.21% showed significant increment and 28.78% showed no Increment. Two allergic transfusion reactions were reported with ABO Non-identical SDP transfusions.

CONCLUSION

ABO identical and non-identical SDP transfusions showed nearly similar increment in post transfusion platelet count though ABO identical SDP has a marginal benefit over non-identical in terms of platelet count increment .

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Role of Therapeutic Plasma Exchange in Hypertriglyceridemia-Induced Pancreatitis - A Case Report

Dr. Debadutta Behera, Dr. R S Mallhi, Dr. J Philip, Dr. R Basnotra

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BACKGROUND:

Hypertriglyceridemia is thought to be the underlying etiology of 1-4% of cases of Acute Pancreatitis. It is explained that pancreatic toxicity is caused by fatty acid metabolites of triglycerides. Most commonly utilized therapies for the management of Hypertriglyceridemia induced Pancreatitis(HTGP) include Intravenous Insulin, Intravenous Heparin and Therapeutic Plasma Exchange(TPE). Though as per the categorization by American Society For Apheresis(ASFA), indication of TPE for HTGP falls under the Category III, TPE has been shown to rapidly lower Serum Triglyceride levels and has been retrospectively analyzed as having a potential treatment role in HTGP.

CASE REPORT:

A 35 year old female presented with abdominal pain for past 15-20 days and vomiting 5-6 episodes since 1 day. On laboratory evaluation, the pancreatic enzymes were markedly elevated and Serum Triglyceride level > 5680 mg/dl. The patient had no previous history of any hyperlipidemic disorder or any other predisposition. She was diagnosed as Acute Pancreatitis clinically and treated accordingly. After discussion with the concerned Physician, 2 sessions of TPE were performed on alternate days, taking all aseptic precautions. 1.5 plasma volumes were exchanged in the first session and 1 plasma volume was exchanged in the second session. Replacement fluids were Normal Saline and Fresh Frozen Plasma.

RESULTS:

After 2 sessions of TPE, a remarkable 92% reduction of Serum Triglycerides from 3953 mg/dl to 291 mg/dl was noted. Clinical improvement was also seen in the patient. Subsequent Serum Triglyceride levels remained below 650 mg/dl throughout with last known value of 295 mg/dl under supportive treatment.

CONCLUSION:

Hypertriglyceridemia is one of the causes of Acute Pancreatitis. TPE is a reliable method to rapidly lower the Serum Triglyceride level in HTGP and should be considered in any patient with Acute Pancreatitis with elevated triglyceride levels.

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A Retrospective Study on Patterns of Donor Deferral in Plateletpheresis

Dr. Sahil Gorka, Dr. Meena Sidhu, Dr. Mitali Sharma, Dr. Naveen Akhtar, Dr. Mohsin Farooque, Dr. Rashmi Kumari

Introduction:

Single donor plateletpheresis offers significant benefits with decreased infection risks, contamination, and alloimmunization threats. Careful donor selection is vital for safety and quality assurance but stringent criteria of donor selection and resulting deferrals limit the availability of SDP products.

Aims & objectives :

The aim of this study is to evaluate the various reasons for deferral of plateletpheresis donors.

Materials & Methods:

This retrospective analysis was conducted from February 2022 to June 2023. The selection and deferral of donors for plateletpheresis was done as per “Donor Selection Criteria-D&C Act-Recent Amendments-2020”. The ABO identical donors completed the blood donor questionnaire forms and were screened on the basis of medical history, physical examination, lab tests and screening tests for transfusion transmissible infections. Appropriate data was collected and analysed.

Results:

During the period of study from February 2022 till June 2023, a total of 156 donors were screened for plateletpheresis, out of which 108 donors (69.23%) were accepted and 48 donors (30.76%) were deferred for various reasons. Out of the 48 deferred donors, 87.5% (n=42) were temporary deferrals, while 12.5% (n=6) were permanent deferrals. The most common reason for donor deferral was inappropriate vascular access in 33.3% cases (n=16), low platelet count accounted for 18.7% cases (n=9) followed by low haemoglobin level (Hb < 12.5 g/dl) in 14.5% cases (n=7). Donors were deferred for being underweight in 10.4% cases (n=5) and for drug use (most commonly aspirin) in 8.3% cases (n=4). Recent tattoos, infections, antibiotic intake and cardiovascular diseases accounted for 8.3% of deferrals(n=4), while 3 cases (6.2%) turned out to be seropositive.

Conclusion:

This study suggests adjusting plateletpheresis donor selection criteria for broader eligibility, reducing deferral rate while maintaining donor well-being.

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THE THERAPEUTIC EFFICACY OF ADJUNCT THERAPEUTIC PLASMA EXCHANGE - A RETROSPECTIVE ANALYSIS"

DR. Prabhakaran Porchezhian, Dr. Shweta Dhote, Dr. Sonal Gupta, Dr. Damayanti Dey, Dr. Snigdha Vartak, Dr. Shubhangi Lad

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Introduction:

Therapeutic Plasma exchange(TPE) is a therapeutic interventional procedure in which a large volume of plasma usually 1-1.5L is removed. It's an extracorporeal technique in which removed plasma is replaced with a replacement fluid (Albumin, Fresh frozen Plasma, crystalloid, NS). TPE eliminates pathologic substances such as pathologic Abs, immune complexes, cytokines, and toxins through bulk removal of plasma. TPE is an effective and beneficial therapy which shows improvement and better outcome in most of the susceptible clinical diseases and hence to be considered.

Aim:

To study the effects of therapeutic plasma exchange on patients with different diagnosis.

Objectives :

- To assess the indication of TPE.
- To determine the category of patient diagnosis in TPE.
- To describe the complications during the procedure and post procedure.
- To analyze effect of TPE.

Materials and Methods:

The retrospective study conducted in department of Immunohematology and Blood Transfusion from the period of January 2022 – December 2022.

Results:

During the study period total of 42 cycle of TPE were performed on 12 patients, out of which 8(66.67%) were male and 4 (33.3 3%)were female. Mean age group was 31-40 years with most common indication being Rapidly progressive glomerular nephritis -category I (American Society for Apheresis (ASFA) guidelines), and the most common complication were Tingling sensation and hypertension (33.37%) respectively. 58.33% of the patient responds well to TPE.

Conclusion:

Plasma exchange is a therapeutic procedure used to treat a wide range of diseases through the bulk removal of plasma. The procedure is safe, with the majority of reactions and complications being mild, easily treated, and of limited duration. We aim to determine early and appropriate use of plasma exchange to aid improvement of various diseases as per ASFA guidelines.

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Automated RBC Exchange Transfusion in a 10-Year-Old Female Child with Sickle Cell Beta Thalassemia: A Case Report

Dr. Melvin Mathew

INTRODUCTION:

A complicated hemoglobinopathy known as sickle cell beta thalassemia is caused by the interaction of sickle cell trait and beta thalassemia gene mutations. From mild to severe anemia, hemolysis, and vaso-occlusive consequences, this illness can present with a wide range of clinical symptoms. RBC exchange transfusions have been the treatment for sickle cell crisis in this case. Treatment strategy that offers precise control over hematocrit and hemoglobin levels while limiting iron overload is automated RBC exchange transfusion.

OBJECTIVES:

To present the successful application of therapeutic apheresis in a case of ischemic stroke due to sickle cell crisis.

METHOD:

We present a case study of a 10-year-old female child diagnosed with Ischemic stroke due to sickle cell crisis in known case of sickle cell beta thalassemia, who underwent automated RBC exchange transfusion . The procedure involved simultaneous removal of a calculated volume of sickle-affected RBCs and the replacement with healthy donor RBCs. Close monitoring of vital signs, hematocrit, and hemoglobin levels was performed throughout the procedure to ensure patient safety.

RESULT:

The automated RBC exchange transfusion procedure went successfully. We were able to lower the proportion of sickle hemoglobin and lower the risk of vaso-occlusive events by maintaining the patient's hematocrit and hemoglobin levels within the desired target range through multiple transfusion sessions. The patient tolerated the procedure well with no complications

CONCLUTION:

To manage sickle cell beta thalassemia in pediatric patients, automated RBC exchange transfusion offers a secure and efficient therapeutic option. Reducing level of sickle hemoglobin and lowering the risk of vaso-occlusive complications are two benefits of being able to precisely control hematocrit and hemoglobin levels. The patient with sickle cell beta thalassemia responded well to the automated RBC exchange transfusion, demonstrating the procedure's potential as a beneficial therapeutic option.

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EXPERIENCES OF THERAPEUTIC PLASMA EXCHANGE IN GERIATRIC PATIENTS AT A TERTIARY CARE HOSPITAL IN WESTERN MAHARAHTRA

Dr. Anurag Gairola, Dr Ujjwal Dimri, Dr Rajat Jagani, Dr Amit Pawar, Dr Sudeep Kumar

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Introduction:

With increased longevity, a large number of geriatric patients are undergoing Therapeutic Plasma Exchange (TPE) for variety of indications that poses its unique challenges and complications. We present our experience with TPE in geriatric patients in terms of diseases encountered and complications observed during the procedure.

Aim& Objective:

To determine and assess the complications witnessed with TPE procedure among geriatric patients for various neurologic and non neurologic indications at a tertiary care hospital.

Material & Method:

A prospective analysis of TPE procedures was done for a period of 01 years, from June 2022 to June 2023 in a tertiary care hospital. Patients above 60 years of age with maximum of 02 and minimum of 01 volume exchange per procedure were enrolled. Baseline laboratory investigations like CBC, Serum electrolytes, Coagulation profile, TTI screening were carried out before the TPE procedure. All TPE procedures were performed via continuous flow cell separator. All these patients were followed up and finding including complications related to them and procedures were documented.

Result:

A total of 21 eligible patients that underwent 85 procedures were enrolled in the present study. Neurological disorders (80.9%, n=17) were the most common indications with Guillain-Barre Syndrome (GBS) (42.8%, n=9) being the most common, followed by Myasthenia Gravis (MG)(23.8%, n=5). Barring 01, all other patients showed significant clinical response. Overall incidence of complications during the procedure was 80.9% (n=17), among which majority were patient related (94.11%, n=16). However, these complications did not necessitate terminating procedure, barring 01 which happened due to interphase error in machine. There was no death due to procedure related complications.

Conclusion:

The current study showed that TPE in geriatric patients gives excellent results in terms of clinical improvement but is fraught with multiple complications. However, in trained and expert hands, these complications can be managed effectively.

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EFFECT OF PROCESS VARIABLES ON COLLECTION EFFICIENCY OF AUTOLOGOUS PERIPHERAL BLOOD STEM CELL COLLECTION IN MULTIPLE MYELOMA PATIENTS: AN EXPERIENCE OF A TERTIARY CARE CENTRE IN WESTERN INDIA

Dr. Anoop Sharma, Dr Ujjwal Dimri, Dr Rajat Jagani

Introduction:

The collection and transplantation of hematopoietic progenitor cells (HPC) are increasingly used in treating Multiple Myeloma (MM). The adequacy of the collection is determined by the number of CD34+ cells per kilogram of the recipient's body weight. Successful engraftment is observed with specific CD34+ cell counts, and a minimum threshold of circulating CD34+ cells per microliter is necessary. Collection efficiency (CE) is a crucial factor, yet limited data exists on CE, especially for CD34+ cell collection.

Aims & Objective:

Effect of process variables on CE of autologous PBSC collection in MM patients.

Materials & Methods:

A retrospective observational study was conducted on PBSC harvest procedures involving autologous donors suffering from MM at a tertiary care hospital in western India. We conducted a comprehensive analysis to investigate the impact of Peripheral blood mononuclear cells (MNC) which were the sum of lymphocytes and monocytes on apheresis CE.

Results:

A total of 52 patients underwent 67 PBSC harvest in which male were 41 (78%), and female were 11 (21%). Median pre procedure WBC count was 42.4 x 103/µl (19.1 - 91.2) and total whole-blood processed was 11.8L (5.6 - 16). Median product volume collected was 290 ml (134 - 407). Median CD34+ harvest collected 3.7 x 106 per kg body wt (0.4 – 29.1). Harvested CD34+ count in the product showed negative correlation with pre procedure WBC & MNC count. Out of 67 procedures, 70% (47) procedures reached the desired CD34+ count.

Conclusion:

CE has been extensively utilized in studies on peripheral blood progenitor cell (PBPC) collection. The factors influencing CE also have the potential to impact the overall yield of the collection process, albeit not always to a noticeable degree. Pre procedure MNC count despite being a cheaper test can not undermine the importance of peripheral blood CD34+ estimation by flowcytometry.

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Autologous stem cell transplantation in Central institute in Multiple Myeloma: Single center experience with minimal constraint setting in Central India

Dr. Rishiraj Sinha, Dr Aakriti Puri, Dr Romesh Jain

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presenting the Autologous stem cell transplantation in Central institute in Multiple Myeloma which is single center experience with minimal constraint setting in Central India. Peripheral stem cell transplantation needs a very well-established setting, but in this case, we have done peripheral stem cell transplantation within limited resources availability or with minimal constraints in setting. We have done this procedure on Haemonetics MCS plus machine, which is not much perfect for Allogenic stem cell transplantation, however, we proceeded with this machine and successfully did it without any reaction intra procedure. This same machine is used for other apheresis procedure like Plateletpheresis (SDP), Plasma exchange also. We had a 52 years male with height around 176 cm, weight 100.6kg was admitted in Hematology private ward with known case of multiple myeloma with Autoimmune hemolytic anemia (AIHA) with Obstructive sleep apnea (OSA). His bone marrow aspirate report revealed plasmacytosis which was advised for IHC on bone marrow biopsy for clonality of plasma cells. The free lambda (light chain) was 4602.83. There was overproduction and secretion of free light chain by plasma cells. Kappa lambda ratio helps to detect diagnose and monitor conditions associated with an increased production of free light chain. Increased production seen with all plasma cell disorder with multiple myeloma. M band also seen in serum protein electrophoresis. Patient is already on immunosorbent medicine so the patient is on a high chance for susceptible infection. To avoid these infections, we had cut down the entry of people in the hospital room and strictly maintain sterile conditions in patient room and surrounding area of the patient.

We successfully did it without any reaction intra procedure. 3.7 * 106 cells/kg was the calculated dose of stem cells obtained after this

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Therapeutic apheresis : A Retrospective Overview of Procedures from tertiary care center.

Dr. Swastik kumar Patel, Dr. Jitendra H vachhani

INTRODUCTION:

The therapeutic apheresis is removal of pathogenic substances from a patient using apheresis technology either in the form of infected or dysfunctional cells or depleting a disease mediators like immunoglobulin causing hyper viscosity, auto-allo-antibodies , protein bound toxins, immune complexes, lipoprotein etc and replace with suitable replacement fluid .The replacement fluids may be the donor's plasma, albumin, saline or a combination of albumin and saline.

AIMS AND OBJECTIVE:

This retrospective study aiming to look at therapeutic plasmapheresis procedures conducted in our Guru Gobindsingh Government hospital Jamnagar over a fixed time period.

MATERIALS & METHODS:

Retrospective analysis of TPE procedures from May 2021 to May 2023 was conducted in IHBT/transfusion medicine department of Guru Gobindsingh government hospital Jamnagar. The goal was to achieve a total removal of 150-200 ml plasma per kg body weight with suitable replacement fluids as per American Society For Apheresis (AFSA)-2019 guidelines.

RESULTS:

A total 98 procedures performed on 23 patients (13 males and 10 females) age range from 14 years to 70 years with a mean age 32 years. Guillain –Barre syndrome accounted for 82% cases. Mild hypotension occurred in 8 procedures (8.1%). And allergic reaction such as rashes chills occurred in 3 procedures (3%). A total 19 patients showed significant improvement and 3 did not show any change and 1 worsened.

CONCLUSION:

Our small series of TPE data showed safety and efficacy of therapeutic plasmapheresis in tertiary care center. It is imperative that accurate procedural data need to be sent to the national authorities so that the benefit of therapy can be extended to other potential disorders.

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ROLE OF THERAPEUTIC PLASMA EXCHANGE IN AMLODIPINE POISONING- A CASE REPORT

Dr. Vineeth Pynadath, Dr. Joseph Philip, Dr. Rajeev Mallhi

BACKGROUND:

Amlodipine is an oral dihydropyridine calcium channel blocker, used as an anti-hypertensive agent. Most commonly used therapies for amlodipine poisoning include gastric lavage, intravenous fluids, vasopressors, calcium salt and insulin infusion. Other treatment modalities include therapeutic plasma exchange (TPE). As per the categorization by American Society of Apheresis (ASFA), indication for TPE for amlodipine poisoning falls under category III. Amlodipine is plasma protein bound, and therefore TPE has been shown to improve the clinical condition of the patient.

CASE REPORT:

A 25-year-old male patient with known history of depressive disorder on medications, with previous history of suicide attempt by consuming significant amount of unknown drug, presented with history of consuming 90 tablets of amlodipine(5mg) in an apparent suicide attempt. He was conscious with a BP of 70/34 mm Hg, Heart rate 110/min, Respiratory rate 28/min. He was given conventional treatment, but in spite of the treatment there was no clinical improvement. So, after discussion with the concerned physician it was decided to perform TPE for the patient on alternate days. 1.5 plasma volume were exchanged in two sessions with Normal Saline and Fresh Frozen Plasma.

RESULT:

After 2 sessions of TPE, patient showed significant clinical improvement. The patient became more hemodynamically stable and vitals returned to normal. The patient continued the recovery phase and was discharged in a stable state with BP:110/80 mm Hg, Heart rate:70/min, Respiratory rate 18/min.

CONCLUSION:

In our experience, in this patient of severe amlodipine poisoning, we have seen that TPE administered urgently, after the relative non-responsiveness of conventional therapy, showed remarkable efficacy in rapidly stabilizing the vital parameters of the patient.

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THE ROLE OF THERAPEUTIC PLASMA EXCHANGE IN PATIENTS WITH NEUROLOGICAL DISORDERS

Dr. Pooja Awachar, Dr. Jayashree Sharma

Introduction:

Therapeutic plasma exchange (TPE) is commonly used in many neurological disorders of autoimmune aetiology. The advantageous effect of the TPE occur through the removal of pathognomonic inflammatory mediators such as autoantibodies, complement component and cytokines from the blood.

Aims and objective:

To determine the effect of Therapeutic plasma exchange (TPE) in patients with neurological disorders.

Materials and Methods:

TPE were done in 25 patients KEM Hospital MICU,175 procedures were done in total. TPE was done through a central venous access HD line for all patients. Normal saline and albumin is used as the replacement fluid1- 1.5 plasma volume were exchanged per cycle by centrifugal cell separation method using intermittent cell separator machine Haemonetics MCS. ACD was used as an Anticoagulant. Calcium gluconate during TPE (300cc Ca- gluconate in 300ml NS) was given through peripheral IV line during each cycle. Modified Rankin Scale (MRS) was used to see the patient improvement.

Result:

25 patients were included to this study and a total 175 TPE sessions were done. The median age was 30.5 (range:14-60) years. ASFA categories of the patients who underwent TPE were category I in 88% (CIDP 5, GBS 14, Myasthenia gravis 3), category II in 12% (Neuromyelitis Optica 3). Median number of TPE sessions per patient was 7. On the basis of MRS score, 22 patients (88%) showed clinical improvement. GBS 14(100%), CIDP 3(60%), Myasthenia gravis 3(100%), Neuromyelitis Optica 2(66.6%).

Conclusion:

Effectiveness of TPE in the treatment of GBS, Neuromyelitis Optica, CIDP, Myasthenia gravis is reflected by improvement seen in MRS score.

Keywords:

Therapeutic plasma exchange (TPE), GBS, Myasthenia gravis

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EFFECT OF THERAPEUTIC PLASMA EXCHANGE IN FULMINANT WILSON'S DISEASE – CASE REPORT

Dr. Pooja Awachar, Dr. Charusmita Modi

Introduction:

Wilson's disease (WD) is a rare genetic condition that affects copper metabolism, resulting in tissue copper accumulation and resultant organ damage. Copper is also toxic to red blood cells resulting in haemolysis. Wilson's disease can lead to hepatic encephalopathy, Therapeutic Plasma Exchange (TPE) involves the removal of copper and other toxic metabolites like ammonia from the bloodstream. TPE in fulminant WD is a category 1 indication in the American Society for Apheresis (ASFA) guideline.New Wilson's Index (NWI) > 11 is used as a predictor of death without transplantation in fulminant WD.

Aims & Objective:

To study the role of TPE as a bridge to liver transplant & improvement in the clinical condition of the patient after the procedure.

Materials & Methods:

We present a patient with fulminant WD treated with TPE and the role of TPE in the management of WD to act as a bridge therapy for liver transplantation. Literature reviews was also done.

Result:

(Case History and Management): A 6-year-old girl, weight 20 kg reported in February 2022 came with acute phase of WD with Jaundice, Ascites, haematuria, Melena, altered sensorium grade 2 drowsy unconscious, KF ring present. TPE was started as a bridge therapy.Complete Remission was achieved with TPE and later chelation therapy with D-Penicillamine. A total of 7 procedures were done on daily basis and Patient showed clinical improvement as well as in biochemical parameters. Literature review Identified 37 patients presenting with fulminant WD and NWI > 11 who were treated with TPE. 17 of these patients recovered without Liver transplantation.

Conclusion:

Multiple case reports demonstrate without transplant survival after TPE and subsequent chelation therapy, despite a NWI >11. TPE improve clinical course and is a therapeutic option in children and young adults comes with fulminant WD.

Keywords:

Wilson's disease, Therapeutic plasma exchange, Apheresis

MID APHERESIS VIABLE CD34+ CELL COUNT IN OPTIMIZING PEDIATRIC PERIPHERAL BLOOD HEMATOPOEITIC STEM CELL HARVEST BY APHERESIS

Dr. Divya Setya, Dr. Satyendra Katewa, Dr. Ankit Malhotra, Dr. Rahul Sharma, Dr. Ravi Dara

Background:

Pre apheresis CD34+ can be used to optimize peripheral blood hematopoietic stem cell (PBSC) collections. However, pre apheresis counts might not correctly predict collection times. A strategy to overcome this uncertainty is performing a mid-apheresis CD34+ cell count to guide collection.

Aims:

To assess utility of performing mid-apheresis CD34+ cell count in optimizing pediatric PBSC harvest.

Material and methods:

A prospective observational study was performed in the department of Transfusion Medicine from 2019 to 2023 at a tertiary level healthcare setup. Pre apheresis CD34 counts performed on the morning of harvest were entered in the cell separator. Number of cycles were adjusted depending on target dose. All odd numbered procedures were included in category I where a mid apheresis sample was collected from the product at half the number of cycles and sent for a viable CD34+ cell count was estimated by flowcytometry (BD Facs Canto, BD Biosciences, USA). Based on the result, total number of cycles were modified. All even numbered procedures were included in category II where procedure was performed based on the pre apheresis CD34 count.

Results:

A total of 50 allogeneic transplants were included and split into two categories, included transplants for benign as well as malignant hematological indications. On comparing category I and II, there were 3 donors in category II who required multi day collection whereas none of the donors required multi day collection in category I. Almost half (12 out of 25, 48%) collections required reduction in the final volume of the product before infusion in category II whereas none in category II required reduction in the volume of the product.

Conclusion:

Collectively, data demonstrated that mid apheresis CD34 count is a useful tool to guide PBSC collections and can be used wherever possible to optimize pediatric PBSC harvests.

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ANALYSIS OF PROCEDURE PARAMETERS AND ITS ASSOCIATION WITH PLATELET YIELD IN PLATELETPHERESIS

Dr. Gunasekaran G, Co-author Ravishankar J

Introduction:

Plateletpheresis is the procedure of collecting platelets from the donors using automated apheresis machines known as single donor platelets (SDPs). SDP increases the overall yield of platelet collected and decreased risk of alloimmunisation, platelet refractoriness and transfusion transmitted infections (TTI). However, yield of SDP is known to be influenced by various donor variables.

Aim & Objectives:

To study the effect of various donor parameters and their association with single donor platelet yield.

Materials & Methods:

This was a retrospective study conducted at the Department of Immunohematology and Blood transfusion, Tirunelveli Medical college hospital, Tirunelveli, Tamilnadu, India. Data from plateletpheresis procedures collected over the last one year was entered in Microsoft excel and analyzed in the month of June 2023. Descriptive data was given in summary statistics. Relation between variables and platelet yield was analyzed using Pearson correlation coefficient. $p<0.05$ was statistically significant.

Results:

Out of 10 procedures during the study period, mean age of donors was 28.6±7.51, mean haemoglobin was 13.9±0.72 g/dL, mean predonation platelet count was 3.46±0.45 lakhs/mm3 and mean platelet yield was 4.82±1.17×1011 per unit. Positive correlation was observed between platelet yield and predonation platelet count of donor ($r=0.792$, $p=0.006$). There was no correlation between platelet yield and haemoglobin ($r=0.606$, $p=0.063$), age of Donor ($r=-0.276$, $p=0.439$) or blood volume processed ($r=-0.492$, $p=0.148$).

Conclusion:

Assessing factors affecting platelet yield helps in appropriate selection of donors with better yield products. A donor with a high predonation platelet count can provide a good platelet yield. Age is not a limiting factor for SDP donation.

A STUDY ON BENEFICIAL IMPACT OF USE OF MEDIUM MOLECULAR WEIGHT HYDROXYETHYL STARCH IN GRANULOCYTE APHERESIS USING CONTINUOUS FLOW CELL SEPARATOR SPECTRA OPTIA: RETROSPECTIVE SINGLE CENTRE STUDY AT A TERTIARY CARE ONCOLOGY CENTRE

Dr. Amardeep Pathak

Introduction:

Granulocyte transfusion (GTX) is one of the best therapeutic modalities in prolonged neutropenic patients with severe bacterial/fungal infections. Granulocytes harvest using conventional Acid Citrate Dextrose (ACD-A) anticoagulant by apheresis is not satisfactory in comparison to use of hydroxyethyl starch (HES) but latter is associated with various adverse events, especially with high-molecular-weight (HMW) HES.

Aims & Objective:

To assess the beneficial impact of the use of MMW-HES & tri sodium citrate combination over ACD anticoagulant in granulocyte apheresis when using Spectra Optia.

Methodology:

This was a retrospective study comparing granulocyte harvest results with use of ACD or HES & tri sodium citrate combination. All the donors in both the groups received single 600µg of G-CSF subcutaneous injection followed by 08 mg of dexamethasone tablet 10 to 12 hrs and Omnacortil 60 mg orally 03 hrs prior to harvest. Numbers of adverse incidents, if any, were observed and noted. Donor/procedure parameters were compared using Mann–Whitney U test/unpaired t test.

Results:

Granulocyte yield (mean 3.29×1010/unit-ACD vs 4.5×1010/unit-HES, p value=<0.0001), was significantly better in HES group. The collection efficiency was also better in HES group (mean 15.86%-ACD vs 26.70%-HES; p value=<0.0001) in ACD and HES groups respectively. There was no significant adverse event noted in any of these two groups.

Conclusion:

In our study, granulocytes with optimum yield can be easily harvested with Spectra Optia cell separator by using 6% HES (MMW) and tri-sodium citrate combination with standard 12 hrs interval gap between mobilization to harvest. This strategy can also have no or minimal extra cost burden to patients.

Keywords:

Granulocyte apheresis, Leukapheresis, Hydroxyethyl starch (HES), Acid citrate dextrose (ACD), Adverse events (ADRs)

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ADVERSE EVENTS DURING PLATELETPHERESIS

Dr. K Mahesh Kumar, Dr Sudhir Kumar, Dr Shanthi Bonagiri, Dr. Murali Krishna Bogi

Introduction:

Platelet transfusions play a major role in preventing major haemorrhage and improve survival in severe thrombocytopenic patients. Generally, apheresis procedures are well tolerated. Systemic reactions are mainly vasovagal reactions and citrate toxicity is also one of the common reaction.

Aim:

To identify the profile of platelet donors associated with adverse events resulting from plateletpheresis donation.

Materials and Methods:

This retrospective study was carried out for a period of one year. A total of 246 Single Donor Platelet (SDP) apheresis procedures were performed during study period. Intermittent flow centrifugation cell separators (Hemonetics MCS+ 9000) were used for performing procedures. All donations were collected from peripheral venous access in the cubital fossa using 16 gauze needle, with required aseptic precautions. Donors were selected as per the SOP criteria for SDP procedure in accordance to our hospital protocol such as weight 60 kg or more, age between 18 to 60 years, Hb 12.5 g/dL and platelet count >2 lacs/dL.

Results:

Included vasovagal reactions . citrate toxicity , hematomas etc which will be discussed.

Conclusion:

The overall rate of acute adverse events, among healthy SDP donors in our study was very low. Citrate toxicity was reduced significantly in the donors with high platelet count . All the adverse events were managed very well. None required hospitalisation of the SDP donor. Vasovagal reactions could be managed easily similar to those occurring during whole blood donations. Vein puncture related local reactions can further be minimised to some extent by allowing only an experienced professional to perform the procedure. This low rate of mild adverse events in our study underlies safety of donors of plateletpheresis

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SINGLE DONOR PLATETET CONCENTRATES SUSPENDED IN PLATELET ADDITIVE SOLUTIONS (P.A.S): IMPACT ON ABO ISOHEMAGGLUTININS

Dr. Lekshmi G Y

INTRODUCTION

Platelet additive solutions (PAS) serve as crystalloid nutrient media for platelet storage, effectively replacing 60%-70% of plasma in platelet components and thereby reducing the required amount of storage plasma. The addition of Platelet Additive Solutions (PAS) in Single Donor Platelets (SDP) has resulted in a notable reduction in ABO antibody titres. Platelets in PAS have lower risk for allergic transfusion reactions with equivalent clinical efficacy for controlling bleeding.

AIMS AND OBJECTIVES

The objective is to explore the feasibility of utilizing PAS to produce low titre SDP units that can be safely used for a wide range of patients across ABO barriers in case of unavailability of ABO specific donors.

MATERIALS AND METHODS

This study was conducted in Department of Transfusion medicine in a Tertiary care hospital in Odisha. All SDP procedures from February 2017 to July 2023 were included. Donor selection and procedures adhered to standard operating procedures and guidelines, with platelet recipients covering various age groups. The Trima Accel system was used for all procedures. The parameters analysed were antibody titre of anti-A and anti-B of same donor and platelet concentrates suspended in PAS and adverse reactions reporting post SDP transfusion. Antibody titres were checked by conventional test tube method using double dilution technique.

RESULT

The study included 35 male donors aged 20 years to 49 years with various blood groups: O+ve (22), A+ve (5), B+ve (5), O-ve (2), and B-ve (1). All SDP suspended in PAS exhibited ABO titres at 1:16 or lower. Post SDP transfusions, no adverse reactions were reported.

CONCLUSION

Incorporating PAS into SDP resulted in reduced ABO antibody titres, enabling SDP availability and transfusion across ABO barriers at the time of need. Less plasma in SDP units reduces post transfusion adverse reactions. Using PAS-SDP also improves the inventory management for platelets.

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ABO ISOAGGLUTININ TITER IN “O” BLOOD GROUP PLATELET ADDITIVE SOLUTION STOTRED APHERESIS DERIVED PLATELET CONCENTRATES

Dr. Shaheen Khan Bhati, Dr Ujjwal Dimri, Dr Rajat Jagani, Dr Sudeep Kumar, Dr Amit Ajay Pawar

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INTRODUCTION

Single Donor Platelets containing ABO incompatible plasma is associated with increased risk of allergic and acute hemolytic transfusion reactions. Such events can be avoided by examining titers or performing plasma reduction which may be inconvenient and time-consuming procedure. Platelet additive solutions (PAS) are crystalloid nutrient media used in place of plasma for platelet storage.

AIMS & OBJECTIVE

Our aim was to study antibody titers (anti A, anti B) in “O” Blood Group Single donor platelets (SDP) by adding PAS at source and comparing the titer in PAS suspended apheresis platelet concentrates and donor plasma.

MATERIALS AND METHODS

It was a prospective study performed at a tertiary care hospital in Maharashtra. Group “O” Single Donor Platelets (n = 20) were prepared on a cell separator (Hemonetics MCS+). PAS in a ratio of 70:30 (PAS: plasma) was added at source under sterile conditions. The parameters analyzed were antibody titers of anti-A and anti-B in PAS suspended apheresis derived platelets and compared subsequently with the titer in donor plasma.

RESULTS

In the study group, the median antibody titers (anti A, anti B) reduced from 128 to 32, post PAS addition. The median anti-A, anti-B titer in PAS suspended apheresis derived platelets reduced significantly compared to the baseline levels of titer in donor plasma. Antibody reduction was more in anti A as compared to anti B.

CONCLUSION

As it could be computed by the results that the median anti-A and anti-B antibody titers were lower in O group apheresis derived platelets suspended in PAS than in O blood group donor plasma. This can be implemented to upgrade the inventory of Single Donor Platelets available at blood Centre. The beneficial effect of the reduced antibody titer can also be enforced in achieving reduced allergic and acute hemolytic transfusion reaction.

RETROSPECTIVE ANALYSIS OF AUTOMATED RED CELL EXCHANGE TRANSFUSION IN PATIENTS WITH SICKLE CELL DISEASES IN A TERTIARY CARE CENTRE IN ODISHA:

Dr. Meghali Frank

Introduction-

Red Cell Exchange (RCE) Transfusion involves removing abnormal red blood cells and replacing them with compatible donor red blood cells, either manually or using an automated cell separator. Automated exchange is faster than Manual Exchange, allowing a longer interval between procedures and reducing the net iron load by adjusting the post-exchange target haematocrit (Hct)..

In SCD, automated RCE prevents new vaso-occlusive events,and provide immediate relief by rapid decrease in sickle HbS concentration, and also provides added oxygen carrying capacity without increasing viscosity of blood.

Aim-

To study the effectiveness and clinical outcome of automated RCE transfusion in known cases of sickle cell diseases.

Materials and Methods

This retrospective study was conducted for 22 known cases of SCD with each one cycle in a teaching hospital in Odisha. All procedures were performed using Spectra Optia® Apheresis System - Terumo BCT. RCE was done with prophylactic patial phenotype-matched /corresponding antigen-negative, fresh, leucodepleted, ABO AHG compatible PRBCs.

Patient's vitals monitored throughout the procedure. Continuous intravenous calcium gluconate infusion was given to the patient during the procedure to prevent citrate effect.

Result-

Twenty-two patients who underwent automated RCE had the procedure done for SCD, among which two were females and twenty were males, the ratio being 1 to 10, aged between 19-42 yrs, mean age being 26 yrs. Out of the 22 cases, Automated RCE was done preoperatively for 12 cases. And the most common blood group was O Rh D-positive (8 in 22 cases). The average initial HbS levels were between 58.7-78.9% and post procedure it was brought down to 17.4-32.8%. Target Hb% was achieved in a single sitting in all the cases.

Conclusion-

Automated RCE is a safe and effective therapeutic modality with minimal side effects which can be utilized in SCD patients under ASFA Category I, II and III.

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COMPARISON OF EFFICACY OF PLASMA EXCHANGE VS INTRAVENOUS IMMUNOGLOBULIN AS AN ADD ON THERAPY IN ACUTE ATTACKS OF NEUROMYELITIS OPTICA SPECTRUM DISORDER

Dr. Rekha HANS, Dr. Garima Siwach, Prof. Ratti Ram Sharma, Dr. Divjot Singh Lamba, Dr. Aastha Kapila, Prof. Vivek Lal, Dr. Chirag Ahuja

Introduction:

Plasma exchange (PE) is considered a Category II option for the treatment of acute attacks and relapse cases of Neuromyelitis Optica Spectrum Disorder (NMOSD). However, neurologists are also considering Intravenous Immunoglobins (IVIg) as add-on therapy for this disorder.

Aims: To evaluate the efficacy of PE in acute attacks of NMOSD as compared to IVIg, in terms of improvement in the Expanded disability status scale (EDSS) and Activities of daily living (ADL) scale score and levels of anti-Aquaporin P4 (AQP4)-antibody in seropositive patients.

Methods:

The study was conducted in the Departments of Transfusion Medicine and Neurology at a tertiary care center in north India. We enrolled 43 NMOSD patients in two groups: Group 1 (n=29) received steroids and PE, and Group 2 (n=14) received steroids with IVIg. The baseline EDSS and ADL scores were noted and compared with scores at the end of therapy, 4 weeks, and 12 weeks. Also, change in anti-Aquaporin P4 antibody was determined post-therapy in seropositive patients of both groups.

Results:

We observed significant difference in EDSS (P=0.00) and ADL score (P=0.00) at day 10 and 3 months) in group1 as well as in group-2 (P=0.00 and P=0.05). However, no significant difference in EDSS as well as ADL score from baseline (P=0.83; P=0.25) to 3 months (P=0.85; P=0.19) was observed when delta change of score at 3 months was compared across the two groups (P=0.39; P=0.52). We observed significant decline in AQP4 antibody concentration (at day 10) in group-1 seropositive patients (P=0.013) as compared to patients in group-2 (P=0.715). Also, EDSS and ADL scores of seropositive patients in group-1, improved significantly at day 10 (P=0.027; P=0.026).

Conclusion:

PE is more effective as an add-on therapy in anti-AQP4 antibody positive NMOSD patients compared to IVIg.

THERAPEUTIC PLAMA EXCHANGE IN MANAGEMENT OF A PATIENT WITH MULTIPLE MYELOMA IN ACUTE KIDNEY INJURY

Dr. Jannet Mary John

Introduction:

Acute kidney injury (AKI) caused by light chain cast nephropathy (LCCN) is one of the major complications from multiple myeloma (MM). It is most commonly seen at initial MM diagnosis. Extracorporeal free light chain (FLC) removal with plasma exchange (PLEX) should be started as soon as possible to help reduce the serum FLC concentration more rapidly.

Aims & Objectives:

To study the effects of sequential plasma exchange in a patient diagnosed with Multiple Myeloma with acute kidney injury.

Case material and method:

A 56 year old lady newly diagnosed with multiple myeloma along with acute kidney injury, had presented with acute febrile illness. The bone marrow biopsy and serum protein electrophoresis findings were consistent with plasma cell neoplasia. Isovolemic therapeutic plasma exchange sessions were performed using Haemonitics apheresis machine. 100% replacement was done with 5% isotonic albumin solution and normal saline. Blood investigations were sent after each session.

Result:

One volume therapeutic plasma exchange of total 5 sessions was performed on every alternate day. This was done in addition to Daratumumab based chemotherapy. Renal response was observed as baseline serum creatinine progressively decreased from 6.04 to <1.2 mg/dl. A rapid reduction was also seen in free kappa and lambda light chain. Free kappa-lambda light chain ratio fell from 395.6 to <1.6. There was an overall improvement in the patient on discharge. The patient was later planned for an autologous stem cell transplant.

Conclusion:

Given the importance of renal recovery and the requirement for rapid serum FLC reduction, an aggressive therapeutic approach is justified in patients MM patients with AKI. The goal should be to reduce circulating serum FLCs as quickly as possible, including the use of PLEX.

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A COMPARATIVE STUDY OF FIVE PLATELETPHERESIS MACHINES IN A TERTIARY CARE CENTER OF INDIA: AMICORE VS COM.TEC VS HAEMONETICS MCS+ VS SPECTRA OPTIA VS TRIMA ACCEL

Dr. Priyadarsini Jayachandran Arcot, Dr. Karan Kumar, Dr. Poonam Coshic, Mr. Vijay Andriyas, Mr. Vikas Mehta

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Introduction:

Single donor apheresis platelets are superior in quality, but their usage is limited in a developing country due to cost and time constraints. Hence the product obtained must exceed in terms of yield, donor safety and technical convenience. Previous literature available on cell separators is on older versions.

Aims & Objectives:

Prospective comparison of 5 latest cell separators (AmiCORE, COM.TEC, Haemonetics MCS+, SpectraOptia and TrimaAccel) for product yield, performance variables and donor adverse effects.

Material & methods:

From October 2019 - March 2020, 1108 donors were randomly allotted to a cell separator. Post-donation sample was taken from the donor 15-20 minutes after procedure completion. The platelet yield from the product collected was measured twice (day 0 and day 1). Donor demography, pre-and post-procedural donor peripheral blood values, performance and product variables were statistically analyzed.

Results:

AmiCORE had an optimal collection efficacy (44.6%) and collection rate (0.037 x 1011/minute). Haemonetics MCS+ had a better collection efficacy (48.4%) and rate (0.038 x 1011/minute). Spectra Optia achieved least procedural time (59.5 minutes), donor adverse effects (6.3%); highest collection efficacy (52.8%) and rate (0.056 x 1011/minute). Trima Accel achieved highest collection rate (0.056 x 1011/minute) and the least product volume (228 ml).

Conclusion:

Highest collection efficacy was achieved by Trima Accel, highest collection rate by Trima Accel and Spectra Optia, lowest donor adverse effects by Spectra Optia and least number of procedural troubleshooting by COM.TEC. Apart from this, fiscal factors and service availability also need to be considered before choosing a cell separator.

COMPARISON OF TWO DIFFERENT TECHNOLOGIES FOR PLASMA EXCHANGE - CENTRIFUGAL VERSUS MEMBRANE IN KIDNEY DISEASES

Dr. Sindhu Bhargavi Akula, Dr Divjot Singh Lamba, Dr Rekha Hans, Dr Jasmine Sethi, Professor H S Kohli, Professor Shankar Prinja, Professor Ratti Ram Sharma

Introduction:

Therapeutic plasma exchange can be performed by two different technologies: centrifugal TPE (cTPE) based on specific gravity or membrane TPE (mTPE), based on molecular size. A head-to-head comparison between these two technologies was made to find out which technology has more effective plasma removal efficiency (PRE), and is a more cost-effective modality in a developing world with resource-constrained setting like ours.

AIMS and OBJECTIVES:

To compare the plasma removal efficacy between centrifugal and membrane filtration devices for plasma exchange in kidney disease

Material and Method:

A prospective, open-labelled, randomized trial was conducted at the a tertiary care institute of northern India from June 2022 to April 2023. A total of 122 TPE procedures were performed on 18 patients and data was recorded for the TPE procedures. The Spectra Optia device (Terumo, Lakewood, Colorado, USA) was used for cTPE and Octonova device (Diamed, Cologne, Germany) with P2 dry filter (Fresenius Medical Care Deutschland; Germany) was used for the mTPE procedure.

Results:

Although both procedures removed similar amounts of plasma, the total time on mTPE device is mean ± SD (124.3 ± 8.9) came to be less compared to cTPE (147.7 ± 34.1; $p = 0.064$. The difference in PRE between the cTPE (67.2%) and the mTPE (29.6% ; $p < 0.001$) was significant. The cost analysis of cTPE and mTPE was done. Overall single cTPE procedure costs INR 13,489, which is, 55.5% higher than cost in mTPE procedure.

Conclusion:

Our findings suggest that plasma removal efficiency rates were significantly better in cTPE compared to mTPE procedures with lesser blood volumes processed. The overall cost comes out to be similar in both the procedures. Therefore, cTPE may be considered a first choice than mTPE.. However, larger clinical trials would be required with a larger sample size to substantiate these findings.

INVESTIGATING THE CORRELATION BETWEEN BLOOD TYPES IN COVID-19 CONVALESCENT PLASMA DONORS AND ANTI-SARS-COV-2 IGG ANTIBODY LEVELS: A RETROSPECTIVE STUDY

Dr. Bankim Das, Dr. Rakesh Kumar, Dr Shweta Ranjan, Dr. Saurabh Lahare, Dr Neha Singh

INTRODUCTION:

ABO blood groups have been associated with the pathogenesis of various diseases and their association with COVID-19 disease severity and anti-SARS CoV-2 IgG antibody response have been largely studied.

AIMS AND OBJECTIVES:

This study aimed at determining the association between COVID-19 convalescent plasma (CCP) donor ABO blood groups and post-infection anti-SARS CoV-2 IgG antibody levels.

MATERIALS AND METHODS:

A total of 404 CCP donors were included in the study conducted from September 2020 to May 2021. Donor samples were tested for anti-SARS-CoV-2 IgG antibody level (S/CO value) using VITROS Anti-SARS-CoV-2 IgG chemiluminescence immunoassay which is a qualitative assay. Blood groups and number of donations with low (S/CO=1.0-4.42), medium (S/CO=4.62-18.45) and high levels (S/CO >18.45) of the antibody were compared using Chi-square test. Antibody response during three stratified post-infection periods (0-60 days, 61-120 days and >120 days) in different blood groups were compared using Kruskal Wallis ANOVA test, while inter-blood group comparisons of antibody levels were performed by independent t-tests.

RESULT:

Mean antibody level was the lowest in O group (17.22±9.2) followed by A (17.59±11.4), B (18.21±10.7) and AB (19.91±9.7) groups. Analysis of antibody levels according to blood groups was statistically not significant (p value > .05). Antibody response during stratified post-infection periods according to blood groups as well as inter-blood group comparisons of antibody levels were also not significant.

CONCLUSION:

AB blood group had the highest but not significant anti-SARS CoV-2 IgG antibody levels. However, ABO blood groups do not influence antibody levels in CCP donors irrespective of post-infection period.

TRENDS OF INCREASING PLATELET COUNT AS AN INDICATOR OF IMPENDING ANEMIA IN REGULAR PLATELETPHERESIS DONORS: A STUDY FROM TERTIARY CARE ONCOLOGY CENTRE IN INDIA

Dr. Salamma Bodagala, Dr. Anisha Navkudkar, Dr. Priti Desai

Introduction:

Regular plateletpheresis donors are at risk of gradual depletion of iron stores from minimal blood loss during each donation. Impending anemia can cause reactive thrombocytosis, hence monitoring CBC may be helpful, to detect it.

Aim and Objectives:

To demonstrate the potential relationship between reactive thrombocytosis and impending anemia in regular voluntary plateletpheresis donors.

Materials and methods:

A retrospective analysis of CBC data was conducted in 70 regular voluntary plateletpheresis male donors over a two-year period. As a part of routine testing CBC is done once in 30 days. The first CBC measurement was considered as baseline and trends of Hb, Hct and PLT counts were observed. Donors were characterized into subgroups based on donation frequency. Group 1 (40-48 donations in 24 months; n=19); Group 2 (20-39 donations in 12-24 months; n=31) and Group 3 (6-19 donations in 6-12 months; n=20). These subgroups underwent CBC analysis for 25, 12, 6 times respectively.

Results:

The mean age of donors was 40 years; (range: 22-55 years). Group 1 and 2 showed statistically significant correlation between decreasing Hb, Hct and increasing PLT count in relation to the number of donations ($p<0.001$). Among these donors, 21 experienced Hb levels <12.5g/dl on 1-6 occasions (average:3), leading to temporary deferral until the levels rose >12.5g/dl. A significant decrease in Hb and Hct from baseline was observed during third and sixth testing interval for Group 1 and 2 respectively, both coinciding with more six donations.

Conclusion:

The study suggests, monitoring the CBC trends in regular plateletpheresis donors should be done to detect impending anemia. Prolonging inter-donation interval can mitigate the declining Hb levels and periodic iron studies every 6th donation can provide valuable insights. The increasing platelet count thus, emerges as a potential indicator of anemia.

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EFFICACY AND SAFETY OF THERAPEUTIC ERYTHROCYTAPHERESIS PROCEDURE IN PATIENTS WITH SICKLE CELL DISEASE: A CASE SERIES

Mr. Raees Ahmed Shaikh, Dr. Rajesh B. Sawant, Dr. Sameer Tulpule, Dr Santanu Sen

Introduction:

RBC exchange transfusion can, without increasing the whole-blood viscosity, quickly replace abnormal erythrocytes with normal and raise the hematocrit resulting in improved delivery of oxygen to hypoxic tissues.We have reviewed procedural parameters and clinical efficacy of therapeutic erythrocytapheresis procedures carried out in a tertiary care multi-super-speciality hospital.

Methodology:

Therapeutic erythrocytapheresis (TE) procedures carried out in sickle cell disease patients were reviewed for procedural parameters, any adverse effects, clinical efficacy and clinical outcome. Critical factors like type of vascular access (central jugular line), anticoagulant to be used (ACD), volume of red cell to be removed, replacement fluid to be used (Leucodepleted, cross-match compatible and Rh and Kell antigen matched RBC units with HCT of > 60%, negative sickling test) were decided before starting the procedure.The goal was to keep the % of HbS <30% and the total HCT at around 30% to suppress HbS production.

Results:

05 female and 03 male patients, with baseline mean HbS of 59 % and range (44-82%) were treated with TE procedure using an automated continuous flow cell separator. Blood volume processed was mean 3953 ml (2317-5332 ml), mean 1580 ml red cells were removed and the same volume was replaced. Average hematocrit of replacement fluid was 60 %.100% fluid balance was maintained in all eight patients. 334 ml ACD (188-417) was used for anticoagulation and procedure was completed in mean 73 (46-93) minutes. No major or minor procedure related adverse effects were observed. A single volume TE procedure resulted in reduction of the patients HbS level to the desired level of <30% (21% -44%).

Conclusion:

Currently available apheresis equipment calculates the replacement RBC volume to achieve the desired HbS, hematocrit levels and allows performance of RBC exchange in a very reasonable amount of time, with relative ease, safety and efficiency.

PLASMA EXCHANGE IN A CASE OF PARANEOPLASTIC STIFF PERSON SYNDROME

Dr. Ekta Paramjit, Dr. Preeti Paul, Dr. Aarushi Sahni, Dr. Divjot Singh Lamba, Dr. Rekha Hans, Dr. Ratti Ram Sharma, Dr. Sucharita Ray, Dr. Jitupam Baishya, Dr. Vivek Lal

Introduction:

Stiff person syndrome (SPS) is a rare autoimmune disease due to lack of Inhibitory excitatory neurotransmitters in the Central Nervous System leading to inappropriate motor unit firing. Paraneoplastic SPS is seen in about 5% of cases and is a diagnostic challenge, as it is GAD 65 antibody negative and anti Amphiphysin antibody positive. It shares the symptoms of classic SPS; however, it is resistant to immunomodulation.

Aims and Objective:

To present the impact of Plasma Exchange (PE) in this rare condition. Here we present a case of paraneoplastic SPS, improved with PE when Intravenous Immunoglobulin the first line of treatment was ineffective.

Materials and Methods:

Patient was assessed for PE procedures. A Spectra Optia® Apheresis system (Terumo BCT, Lakewood CO.) was used along with PE kit. A total of five procedures were done targeting to exchange 1 plasma volume per procedure on alternate days using 0.9% normal saline and 4% Human saline albumin as replacement fluid. Calcium supplementation was done through continuous infusion.

Result:

Patient showed slow improvement in the pain and spasms until she was pain free within a month post treatment and her daily functioning improved. With regular physiotherapy, she was able to walk with support but was unable to climb stairs. Patient was also prescribed Benzodiazepines and sent home. After 6 months, she relapsed with GAD 65 positive and Anti Amphiphysin negative antibodies, 2nd maintenance cycle of PE was given with her resuming normal life as symptoms were resolved post treatment.

Conclusion:

PE is effective in Paraneoplastic SPS resistant to Immunomodulatory therapy in regaining quality of life and hence can be considered as an alternative if first line drugs fail.

THERAPEUTIC PLASMA EXCHANGE (TPE) IN A CASE OF THROMBOTIC THROMBOCYTOPENIC PURPURA (TTP) IN A TERTIARY CARE CENTRE IN NORTHERN INDIA

Dr. Mohd Anas Sheikh, Dr Mirza Salim Amjad, Dr Shilpi Saxena

Introduction

TTP is a rare and life-threatening disorder which involves formation of microvascular thromboses and subsequent multi-organ failure. Rapid recognition of TTP is crucial to initiate appropriate treatment. The first-line therapy for acute TTP is based on daily Therapeutic Plasma Exchange supplying deficient ADAMTS13 and removing anti-ADAMTS13 antibodies. This was the first case of TTP which was managed with TPE at our centre.

Aims & Objective

-To evaluate the role of TPE in management of TTP at a newly established Apheresis Centre.

-To determine the technical and practical challenges faced while implementing TPE for TTP in a tertiary care centre.

Material and methods

TPE was done for a 25 year old male patient using ComTec platform (Fresenius Kabi, Germany). Target plasma replacement volume was 1-1.5 times. A total of 5 such procedures were done over a period of 07 days (5 Jul 2023 to 11 Jul 2023). Replacement fluid used was 5% albumin in adjunct with CPP/FFP (ratio 50:50 or 30:70). Target parameter was platelet count of more than 150 X 109/L for two consecutive days. Laboratory and clinical evaluation of the patient was done regularly to document progress of the case.

Results

The patient showed remarkable recovery over the course of treatment. Patient's hematological and biochemical profile has normalized with a normal CBC including Reticulocyte count. Renal function is also within normal physiological range. There has been no sequela to the disease. Patient is on a regular follow up at this centre for relapse/remission of the disease.

Conclusion

This study helped appreciate practical difficulties and challenges faced while performing TPE including vascular access, CPP inventory management, need for hands-on training, procedural issues and patient follow-up for remission/relapse. Multidisciplinary approach ensured good outcome in the case.

Keywords

Therapeutic Plasma Exchange, Thrombotic Thrombocytopenic Purpura, Albumin, Cryo-poor Plasma.

COMPARING THE THERAPEUTIC MODALITIES OF GUILLAIN BARRE SYNDROME: THERAPEUTIC PLASMA EXCHANGE VERSUS INTRAVENOUS IMMUNOGLOBULIN

Dr. Nilasish Pani

INTRODUCTION

The burden of Guillain-Barré Syndrome (GBS), its treatment, and complications strains our healthcare and financial systems. This study aims to compare Plasma Exchange (PE) and Intravenous Immunoglobulin (IVIG) as GBS treatments in our resource-constrained setting, focusing on neurological outcomes. Most research originates in developed countries, and functional neurological outcome evaluations post-IVIG or PE are lacking. This study addresses these lacunae.

AIMS AND OBJECTIVES

To determine the following

1. Functional neurological outcomes in patients of GBS treated with either IVIG or PE
2. Duration of Hospital stay in patients of GBS treated with either IVIG or PE
3. Prevalence of complications of patients of GBS treated with either IVIG or PE

METHODOLOGY

This is a randomized controlled trial with two arms. The sample size comprises 30 eligible patients per arm, selected through convenient sampling and randomized in a 1:1 ratio using computerized random number generation. Inclusion criteria involve clinically and electro-physiologically confirmed GBS cases aged above 18 years matched by age and sex. Exclusion criteria encompass patients at GBS plateau, with previous GBS episodes, in pregnancy, severe concurrent medical illnesses, or contraindicated procedures, or patients whose treatment modality has switched from IVIG to TPE or vice versa.

RESULTS

Of the 60 patients included in the study, majority were males (n=42) of age group 18-30 years(n=39). Our study found no significant differences in improvement of mean GBS Disability Score between day 0 and day 28, in either of the treatment modalities(p=1.03). However, the improvement was achieved earlier in TPE as compared to IVIG group. Further in cases with delayed hospital admission, TPE showed better improvement than IVIG.

CONCLUSION

Even though TPE and IVIG showed no difference in curative effect, yet the effect was achieved earlier with TPE. Hence TPE should be preferred over IVIG in cases with delayed hospital presentation.

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THROMBOTIC MICROANGIOPATHY IN A PATIENT WITH DENGUE ENCEPHALITIS MANAGED WITH THERAPEUTIC PLASMA EXCHANGE: A CASE REPORT

Dr. Aarushi Sahni, Dr. Sarthak Wadhera, **Dr. Divjot Singh Lamba**, Dr. Arihant Jain, Dr. Rekha Hans, Prof. Pankaj Malhotra, Prof. Ratti Ram Sharma

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Introduction:

Microangiopathic hemolytic anemia and thrombocytopenia are the hallmark feature of thrombotic microangiopathies (TMA). Tissue ischemia and injury involved in TMA may lead to long-term complications in patients. Identification of acquired TMA resulting from systemic infections has significantly increased and is important in a country like India where Dengue is endemic.

Aims and Objectives:

This publication's objective is to provide evidence for more research on thrombotic microangiopathy related to dengue infection and also on plasma exchange as an effective modality of therapy in dengue related TMA. This entity has been rarely described but is a life-threatening complication if not treated in a timely manner.

Case Description:

A 17-year-old male presented with fever, altered mental sensorium and anuria to the emergency room and was suspected of TMA due to a high PLASMIC score. Treatment was initiated with standard-volume (1.5 plasma volume) therapeutic plasma exchange (TPE) by centrifugation method within a few hours of admission. There was clinical improvement in the sensorium after 3 sessions and his urine output also improved after 5 sessions of plasma exchange. Hemolytic parameters also gradually improved with daily sessions. Two sessions of hemodialysis were also given along with TPE as the patient was in a state of complete anuria. A total of 9 sessions were given and it was stopped after achieving platelet count >100 x 109/ L on two consecutive days and normalizing LDH. Patient is following in outpatient department with no evidence of TMA relapse as of completion of this report.

Conclusion:

This is one of a few cases of Dengue-associated TMA reported in the literature with successful complete remission following therapy with plasma exchange as a beneficial therapeutic intervention. This case highlights the role of early diagnosis and early initiation of TPE as key in management of dengue related thrombotic microangiopathies.

THERAPEUTIC PLASMA EXCHANGE IN PULMONARY RENAL SYNDROME- A CASE REPORT

Dr. Manikandan Natarajan

INTRODUCTION

Therapeutic plasma exchange is first line of management in Anti-glomerular basement membrane disease with diffuse alveolar haemorrhage. ASFA guidelines TPE is CATEGORY 1 GRADE 1C indication. Pulmonary Renal Syndrome is characterized by TYPE 1 RPGN with diffuse alveolar haemorrhage, clinical Presentation:75% lung involvement and 25% kidney Involvement.

CASE SUMMARY

A 32 years male referred from other hospital attended in emergency department with shortness of breath associated with haemoptysis, bilateral Pitting oedema with puffiness of face for 10 days. no other comorbid illness. Investigations: Hb 8.1gm/dl, WBC 13000 cells, urea 158, creatinine 6.85, platelets 280000, serum Electrolytes: Na-135.3, Potassium 3.85, a PTT :30.1 renal Biopsy: interstitial fibrosis and tubular atrophy 15-20%, Anti GBM antibody, ANA, c ANCA -negative, haptoglobin-normal, C3 and C4 are 90 and 18.30 respectively

MATERIALS AND METHODS

Diagnosis of PRS is confirmed and advised for therapeutic plasma exchange urgently. Patient was shifted to intensive care unit, central venous access [HD line] was secured. TPE was started with ABO compatible FFP and NS and 5% albumin as replacement fluid with prompt action. TPE was performed daily and 1.5 volume of plasma was exchanged per cycle by centrifugal cell separation method using intermittent flow cell separator machine Haemonetics MCS. Seven Sessions of TPE was performed. Injection calcium gluconate 2amp in 100ml NS was given through peripheral IV line during Each Cycle.

RESULTS

Patient showed clinical improvement and his lab parameters were monitored daily. Urea and Creatinine level decreased from 158 and 6.85 to 80 and 2.3 after 5cycles of TPE. No fatal complications were observed

CONCLUSION

TPE should be initiated immediately once the diagnosis is confirmed to prevent the progression of renal failure. Availability of resources and awareness about TPE as treatment modality in clinical field can prevent fatal outcome

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SUCCESSFUL MANAGEMENT OF A CASE OF ACUTE COPPER SULPHATE POISONING: REDEFINING THE ROLE OF THERAPEUTIC PLASMA EXCHANGE AS A SALVAGE THERAPY IN POISONING- A CASE REPORT

Dr. Joyisa Deb, Dr Gita Negi, Dr Aswin K Mohan, Dr Pradip Banerjee, Dr Takshak Shankar, Dr Nidhi Kaeley, Dr Daljit Kaur, Dr Ashish Jain

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INTRODUCTION

Copper sulphate (CuSO4) poisoning albeit rare, can be lethal if not managed promptly. Management options include supportive care, chelation therapy, Therapeutic Plasma Exchange (TPE) among others.

AIMS & OBJECTIVES-

We report a case of CuSO4 poisoning where rapid clinical progress was seen after TPE sessions.

CASE SUMMARY-

A 36-year-old male presented at a local hospital after suicidal consumption of CuSO4. He complained of vomiting, passage of dark coloured urine and decreased output. In spite of receiving symptomatic management, his condition worsened and he was referred to tertiary care centre.

He presented at the emergency department in our centre with the complaints of abdominal pain, tachypnea, fall in SPO2, dark coloured urine, bluish extremities and yellowish sclera.

Specific therapies related to clinical condition like D-penicillamine and methylene blue were initiated in addition to supportive care. He received two units of Packed Red Blood Cells transfusion (Hb-4.5 g/dl). Direct agglutination test was negative and Methhemoglobin (Met-Hb) fraction in Arterial Blood Gas was 26.5%.

TPE was planned for the patient, which is a category III indication in case of poisoning (ASFA guidelines 2023).

RESULTS-

The Meth-Hb fraction reduced after each TPE session and he was off oxygen support. A total of 4 TPE procedures were done for this patient in which 1.6, 1.5, 1.2 and 1.2 plasma volumes were exchanged respectively, using FFP & 5% Albumin. He received three cycles of hemodialysis for impaired renal parameters. He was discharged with advice to follow up in the outpatient department.

On follow-up visits, his kidney function parameters became normal and he didn't have any further complaints.

CONCLUSION

Various case reports have established that TPE is beneficial in CuSO4 poisoning. Prompt initiation of TPE in this case aided in the removal of plasma protein bound copper, resolution of associated complications and prevented further organ damage.

THERAPEUTIC PLASMA EXCHANGE IN TREATMENT OF PAEDIATRIC PATIENTS WITH HAEMOLYTIC UREMIC SYNDROME: AN EXPERIENCE FROM A TERTIARY CARE TEACHING HOSPITAL

Dr. Aakarsh Marthati, Dr. Archana Bajpayee, Dr. Muthu Kumaravel

Introduction:

Hemolytic Uremic syndrome is a rare disorder in pediatric population with a prevalence of ~1% in India. It leads to acute renal failure and death if untreated. Difficulty in diagnosis, unavailability of Eculizumab and delay in plasma exchange can affect the patient outcome.

Aims:

This study discusses the clinical indications, efficacy, and safety of TPE in paediatric population with HUS.

Materials & Methods:

We retrospectively reviewed data of children (up to 18 years) undergoing TPE between January 2020 and April 2023 at our Hospital. Daily plasma exchanges done until hematological parameters normalized according to paediatric nephrology consensus guidelines. Main features of the TPE procedures i.e., frequency, type of replacement fluid used, plasma volume processed, adverse events if any, outcome of the patients and telephonic follow-up were analysed.

Results:

Total 156 procedures were performed on 15 patients (9 Males, 8 Females) during the study period. The mean number of sessions per patient was 9.75 ± 5.59. Age ranged between 2 to 17 years with a mean age of 8.06 years. Replacement fluid used was fresh frozen plasma. Atypical Hemolytic Uremic Syndrome (56.00%, n=9) was the main indication followed by Secondary HUS (37.25%, n=6), Thrombotic Thrombocytopenic Purpura(6.25%, n=1). Out of 15 cases, 10 were Category I (aHUS & TTP), 6 were Category III (secondary causes of HUS) indication for TPE according to ASFA guidelines. Most common adverse effects encountered were hypothermia and hypocalcemia. Mortality rate is 20%; n=3 patients couldn't be followed up because of telephonic unavailability. n=10 children are alive and non-dependant on dialysis after 6 months of follow-up.

Conclusion:

Our case series from nephrology perspective has shown safety and efficacy of TPE. TPE is effective modality of treatment in atypical HUS according to the evidence-based guidelines. There is need of further evaluation in paediatric population for proper evidence-based practice.

FACTORS AFFECTING THE EFFICACY OF COLLECTION OF AUTOLOGOUS PERIPHERAL BLOOD STEM CELLS IN CHILDREN WITH NEUROBLASTOMA

Mr. Deepak Pahwa, Dr. ReKha Hans, Dr Deepak Bansal, Dr. Richa Jain, Dr. Ratti Ram Sharma

Introduction:

Peripheral Blood Stem Cell collection (PBSC) procedure is very challenging and not easily feasible in small children as compared to adults to ensure collection of sufficient number of HSCs in a single procedure.

Aim & Objectives:

To analyze the factors affecting the collection efficacy of PBSC harvesting in small children and calculate the cut-off value of pre-apheresis whole blood CD34+cell count for adequate yield.

Materials & Methods:

In this study, 10 neuroblastoma stage-IV patients were enrolled from January 2019 to December 2019, who was admitted to the Department of Paediatrics Medicine, PGIMER Chandigarh for Autologous Bone Marrow Transplant (ABMT) as a part of their treatment. Granulocyte Colony stimulating factor (G-CSF) was administered subcutaneously (dose: 10µg/kg/day) for three days prior to apheresis procedure. PBSC harvesting was done using COBE-SpectraTM (Terumo BCT, Lakewood CO.) Apheresis System to achieve the target TNC dose as 2-6 x 108 cells/kg and CD34+cell dose as 2-6 x 106 Cells/kg/body weight.

Results:

Our study revealed a significant positive correlation of pre-apheresis whole blood CD34+cells (r=0.803) and total blood volume processed (r=0.456), with CD34+cells in a harvested bag. Patient's age, body-weight, total blood volume, and BMI did not show significant effect on CD34+cell dose in harvest bag. In addition to this, a cut-off value of pre apheresis whole blood CD34+ cell count>14.5 cells/µl and TNC count >44.1 x 103 /µl were associated with product yield of >2 x106 CD34+ cells per kg of body weight of the patient.

Conclusion:

Stem cell yield of PBSC harvesting can be predicted by the quantification of pre-apheresis whole blood CD34+ cells. These results may serve as a guide to improve the PBSC harvesting procedure in our institute and shed new light on the safety and efficacy of PBSCs harvesting procedures in pediatric patients who already have underwent radiotherapy and chemotherapy.

CHARACTERISTICS OF COVID-19 CONVALESCENT PLASMA DONATIONS

Dr. Apoorva Maheshwari, Dr. Meenu Bajpai, Dr. Pratibha Kale, Dr. Ashish Maheshwari

Introduction:

Acute respiratory illness due to SARS-CoV-2 emerged as a pandemic in early 2020. Convalescent plasma (CP) from the recovered patients was thought to neutralize viral particles in newly infected patients and can benefit patients in the early course of the disease. In CP donors, we analyzed different clinic-demographic variables, their blood group, and disease severity affecting antibody titres against SARS-CoV-2.

Aims and Objectives:

To assess the characteristics of antibody response to COVID-19 in convalescent plasma donors and to identify factors positively associated with higher neutralizing antibody titers at the time of donation.

Materials and Methods:

A retrospective observational study was done at a tertiary care hospital on CP donors who donated from July 2020 to May 2021. Donor's characteristics, including age, gender, weight, BMI, blood group history of disease severity, hospitalization and interval between diagnosis and donation, were assessed. SARS-CoV-2 IgG antibodies with chemiluminescence method and titers for Neutralization antibody using ELISA method were conducted.

Results:

A total of 6219 CP donors were included in this study. Increasing age was significantly correlated with higher titres ($p<0.001$). Both IgG and Neutralizing titres were significantly associated with higher weight and BMI. Donors requiring hospitalization and longer stay had significantly high IgG titres ($p<0.001$). Among all donors, A blood group donors had higher IgG titres levels, while RhD status had no impact. A cut-off value of 5.95 S/Co and above for the IgG titre was associated with positive for neutralizing antibody titres.

Conclusion:

High titre was associated with increasing age, weight, BMI, disease severity and 'A' blood group. Understanding factors affecting antibody titers can be a practical approach in CP donation for utilizing resources judiciously.

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ANALYSIS OF CHANGES IN SERUM CATIONS (CA++ AND MG++) LEVEL DURING PLATELETPHERESIS ON DIFFERENT APHERESIS MACHINES IN HEALTHY DONORS: A CROSS-SECTIONAL STUDY

Dr Ankit Gupta, Dr Sunita Bundas, Dr Sarita Sharma, **Dr Ajay Kumar**

Background:

During plateletpheresis, acid citrate dextrose is used as an anticoagulant, which can lead to hypocalcemia due to calcium chelation. This study assesses how plateletpheresis affects total calcium and total magnesium levels in donors at various intervals, including 30 minutes post-procedure.

Material and Methods:

This was a hospital-based cross-sectional study. Laboratory and clinical changes were assessed in 137 healthy plateletpheresis donors. Samples were collected in a 3 ml plain vial at 0 min (baseline), 30 min, and 60 min, at the end of the procedure and 30 min after completion of the procedure. Total serum calcium and total serum magnesium levels were measured. The pattern of changes in these serum cation levels with respect to different apheresis machines was also studied.

Results:

Total Serum calcium (Ca++) and total serum magnesium (Mg++) levels were decreased continuously from baseline to the end of the procedure and again they started reaching baseline values after 0 min of the completion of the procedure. The changes in mean serum Ca++ and mean serum Mg++ levels were highly significant (P-value 0.0001). 20 donors (14.60%) experienced adverse reactions such as perioral tingling. A decline in mean serum Ca++ and mean serum Mg++ from baseline was observed maximum for Hemonetics MCS+ at the end of the procedure. Difference from baseline values 30 minutes after procedure was lowest in Amicus in case of serum Ca++ and COM. TEC in case of serum Mg++.

Conclusion:

During plateletpheresis, serum calcium and magnesium levels decreased but returned to near baseline levels 30 minutes after the procedure. Donor safety is crucial due to rising demand for Single Donor Platelets (SDP). Plateletpheresis is generally safe because donor symptoms are promptly managed before harmful citrate levels accumulate.

EFFECTIVENESS OF CONVENTIONAL TPE IN REDUCING TOTAL CHOLESTEROL LEVEL OWING TO UNAVAILABILITY OF LIPID APHERESIS COLUMN IN FAMILIAL HYPERCHOLESTEROLEMIA: A CASE REPORT

Dr. Satya Prakash, Dr. Namrata Datta, Dr. Ansuman Sahu, Dr. Debasish Mishra, Dr. Saroj Kumar Sahoo, Dr. Somnath Mukherjee

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Introduction:

Familial hypercholesterolemia (FH) is an inherited disorder that results in a very high level of cholesterol and predisposes to an increased risk of premature atherosclerotic cardiovascular disease.

Aims & Objective: This case report aims to unveil the efficacy of conventional Therapeutic Plasma Exchange (TPE) in the unavailability of lipid apheresis columns.

Materials & Methods:

A 15-year-old male patient presented with severe disability due to associated severe mitral stenosis and mitral regurgitation with an ejection fraction of only 45%. The cholesterol-lowering medications failed to reduce the total cholesterol level. The conventional TPE on the Cobe Spectra apheresis system (Terumo BCT Inc., Colorado, USA) was planned to remove the excess lipid in view of a very high cholesterol level of 484 mg/dl. There is an obvious deposit of lipid material in joints and the heart valves. The liver function tests SGOT and SGPT are slightly deranged with a level of 134IU/ml and 128IU/ml, respectively. The other investigations of patients like complete blood count, coagulation test, bilirubin, serum electrolytes, and kidney function tests were normal.

Results:

A total of 1819 ml of patient plasma equivalent to 1.0 plasma volume was exchanged with 4% albumin, FFP, and normal saline. The central line was used for the procedure in view of the inaccessibility of cubital veins due to fat deposition over the elbow joint. The intravenous calcium gluconate was used throughout the procedure to counteract the citrate effect. The procedure went smoothly without any adverse events. Post-procedure, the patient's cholesterol was lowered to 286 mg/dl. In follow-up after 6 months, the patient is alive on PCSK9 inhibitor with a total cholesterol level of 190mg/dl.

Conclusion:

Conventional TPE is also helpful in effectively reducing cholesterol levels and can be used safely if a lipid apheresis column is not available.

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RARER THERAPEUTIC APHERESIS PROCEDURES- A CASE SERIES

Dr. Ambuja K, Dr Shivaram c, Dr Keerthi c

Background:

Therapeutic apheresis is still an evolving concept in India.

Aim:

This presentation aims to bring to the fore a case- series of rarer therapeutic apheresis procedures that can be adopted by more centers with confidence.

Material and Methods:

These therapeutic procedures were done using Hemonetics MCS+ for single needle access TPE, Cobe Optia or Fresenius Comtec for TPE , coupled with Evaflux 5A20 and 2A20 cascade filters for lipoprotein apheresis and HLA antibody reduction respectively and Cobe Optia for RBC Exchange procedures.

Results:

- Reduction in creatinine levels and clinical recovery seen following TPE in a 1 year old child with HUS stage 3 AKI weighing 10.3kg with red cell priming.
- Reversal of ischemic changes saving the limb and life of a 3 year old child on ECMO with viral pneumonia and sepsis following TPE
- Lipoprotein apheresis in a 12 year old patient with HoFH weighing 24 kg patient achieved 61% reduction in LPa2 levels and 54% in LDL cholesterol levels.
- Lipoprotein apheresis in a patient with hypertriglyceridemia reducing the trigylcerides from 2576 mg/dl to 870 mg/dl(66% reduction) in one sitting.
- Reduction in Methaemoglobin levels from 10% to 3.5% and increase in PaO2 from 70 to 98% following RBC exchange in an adult with CuSo4 poisoning .
- TPE as an alternative to Lipid apheresis was demonstrated in a child with HoFH weighing 30 Kg using single needle access on Haemonetics MCS+ and achieved a 74% reduction in Lpa and 65% reduction in LDL-C.
- Pre-BMT HLA antibody reduction to an acceptable MFI value of 1582 was achieved using cascade filters .

Conclusion:

Therapeutic apheresis procedures have numerous indications and cuts across multiple disciplines like Neurology, Haematology, Oncology, Cardiology and Nephrology.

LIPOPROTEIN APHERESIS IN PREGNANCY IN A PATIENT WITH HOMOZYGOUS FAMILIAL HYPERCHOLESTEROLEMIA-FIRST IN INDIA

Dr. Ambuja K, Dr Shivaram C, Dr Keerthi C

Background:

Homozygous Familial Hypercholesterolemia (HoFH) is an autosomal dominant disease with abnormal LDL gene inherited from each parent resulting in high LDL Cholesterol & LP(a) levels. Pregnancy in HoFH is associated with higher levels of lipids leading to adverse outcomes. Lipid lowering agents are contraindicated in pregnancy leaving Lipoprotein apheresis as the only option. Our case is a 32 year old pregnant lady with HoFH managed with lipoprotein apheresis which probably is the first in the country. She was on Ecospirin and Ezetimibe. Despite counselling regarding the risks ,patient chose to continue the pregnancy. Hence Lipoprotein apheresis was considered. Her baseline lipid levels were markedly deranged. ECG, ECHO, Cardiac and obstetrician consultation were obtained prior to all procedures.

Material and Methods:

Lipoprotein apheresis was done under continuous cardiac and fetal monitoring using Comtec (Fresenius Kabi, Germany)cell separator. Plasma Exchange kit was assembled with Evaflux 5A20(Kawasumi.Inc, Japan) cascade filter. A double lumen femoral catheter was placed for access and return. Target was to process at least 1.5 times the plasma volume during each sitting.

Results:

A total of 5 procedures were done at 20, 24, 28, 32 and 36 weeks gestation. Total plasma volumes processed varied with weight, haematocrit, patient tolerance and ranged from 3666ml to 5982 ml. A 52-68% reduction in the total Cholesterol, Lpa and LDL levels was seen during each procedure. The reduction in ApoA1 and Apo B ranged from 30-44% and 51-69 % respectively. No serious adverse events were seen and no plasma transfusions were required. The pregnancy was uneventful. Baby was delivered at 37 weeks gestation by LSCS with a birth weight of 1.75 kg. Post-partum period was uneventful.

Conclusion:

Lipoprotein apheresis is an effective and safe therapeutic option during pregnancy with HoFH as it can stabilize progressively increasing lipoprotein levels and prevent severe complications.

ROLE OF THERAPEUTIC PLASMA EXCHANGE IN RATOL (3% YELLOW PHOSPHOROUS) POISONING - A SINGLE CENTERED STUDY FROM SOUTH INDIA

Dr. Vaidesh G

INTRODUCTION:

Yellow phosphorus 3% is a rodenticide which is a protoplasmic poison that causes hepatotoxicity and acute liver failure (ALF) with increased mortality. The only definitive management is liver transplantation. Therapeutic plasma exchange (TPE) alleviate the symptoms of ratol by removing the poison and its metabolite from the body.

AIM AND OBJECTIVES:

To determine the role and effectiveness of Therapeutic Plasma Exchange in Ratol poisoning cases.

MATERIALS AND METHODS:

This is a Prospective Cross sectional study conducted from July 2022 to June 2023.The study included patients who developed ALF due to ratol poisoning requiring TPE. Patient demographic details, clinical features, quantity of consumption, and laboratory values before and after TPE were noted and statistical analysis was done.

RESULTS:

The study includes 9 patients (M: F=2:1) who developed ALF due to ratol poisoning. A total of 23 TPE sessions were performed (Mean=2.5 sessions). Mean age group was 27.5 years. Six patients consumed ≤10 gm of Ratol. Six patients (66.7 %, M: F– 5:1) had recovery from ALF, out of which five had consumed <10 gm of ratol. Among patients who recovered, mean day of admission was 2.8 days and initiation of TPE was 3.5 days. Total bilirubin decreased from 6.5 to1.5mg/dL(p-0.002),SGOT decreased from 285.5 to59.3IU/L(p-0.005), SGPT decreased from 156.7 to 41.8IU/L(p-0.007), PT declined from 26.7 to 15.5sec(p- 0.004), and APTT declined from 35.8 to 27.1sec(p-0.003),INR showed decreasing trend from 2.6 to 1.5(p-0.006) post TPE. Three patients failed to show recovery and expired.

CONCLUSION:

This study revealed that the patient outcomes were better with earlier initiation of TPE but was also dependent on other factors such as the quantity of poison consumed and time of hospitalization. Thus TPE could potentially bridge the gap between medical management and liver transplantation in cases of ratol poisoning.

KEYWORDS:

Acute liver failure, Plasma exchange, Yellow phosphorus.

PERIPHERAL BLOOD PRE CD34+ CELLS AS A PREDICTOR OF EFFECTIVENESS IN HARVESTING STEM CELLS IN PATIENTS AT TERTIARY CARE CANCER CENTRE

Dr. Deepa Devi G

Introduction:

The objective of the predictive CD34 stem cell count is to provide an indication of the best timing for apheresis stem cell collection. The collection of a sufficient number of CD34+ hematopoietic progenitor cells (HPCs) is vital for ensuring successful engraftment and cure.

Aims & Objective:

To study the effectiveness of the pre CD34+ cells count in getting the predicted yield in bone marrow transplant patients.

Materials & Methods:

This retrospective analysis was conducted from August 2021 to August 2023 at Cancer Institute(WIA), Adyar. Peripheral blood stem cell were collected using Spectra Optia and MCS+. The CD34+ cells count was done using flow cytometry Becton Dickinson reagents.

Results:

The Peripheral Blood Stem cell collection procedures were done is 120 out of which donors were 34(28.3%) and patient 86(71.7%). Male donors were 23(19.2%) and patients 53(44.2%). Female donors were 11(9.1) and patients were 33(27.5%). The total collection procedures were 136. The number of patients with single day collection were 72(60%) and donors were 32(26.7%). The number of patients with consecutive 2 days collection were 14(11.7%) and donors were 2(1.6%). Based on diagnosis multiple myeloma patients were 46(38.4%), Hodgkins Lymphoma were 27(22.5%), Non Hodgkins 12(10%), AML were 12(10%), ALL were 12(10%), CML 4(3.4%), Germ cell tumor 3(2.5%), Myelodysplastic syndrome 2(1.6%) and neuroblastoma 2(1.6%) patients. The median pre CD34 on day 4 was 18.5 cells/µl. and median post CD 34 was 1005 cells/µl. There was a positive correlation between the pre CD 34+ cell count and the post collection product CD 34+ yield in the patients studied.

Conclusion:

The pre CD 34 cell count helps in planning the stem cell collection and guides in using Inj. Plerixifor in addition to the Inj. G-CSF for mobilizing the cell more efficiently if pre CD34 cells are below 20 cells/µl.

Theme

Blood Components

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RESTROSPECTIVE STUDY ON DISCARD RATES IN A TERTIARY BLOOD CENTRE OF NORTH INDIA

Dr. Mohsin Farooque, Dr. Meena Sidhu, Dr. Mitali Sharma, Dr. Naveen Akhter, Dr. Sahil Gorka, Dr. Rashmi Kumari

Introduction:

Several factors contribute to the wastage of blood and its components including unscreened transfusion-transmitted diseases, sterility issues, insufficient bleeding during collection, expiration of blood units and hemolysis. Key strategies to reduce wastage of blood include rigorous donor screening, advanced testing methods, optimized inventory management, demand forecasting, continuous process improvement, and technology adoption.

Aims & Objectives:

The aim of the study was to determine the rate of discarding blood components and to evaluate the reasons for the same at a tertiary care centre.

Materials and Methods:

This retrospective analysis spanned from January 2023 to June 2023, focusing on data extracted from the Blood Centre's records. The collected data included information on the number of units collected, the number of units discarded and the specific reasons for discarding those units.

Results:

During the study period, 7236 units were collected and components were prepared. Out of these blood components, 809 units (11.1%) were discarded on various grounds. Among these, most commonly discarded components were Platelets amounting to 47.83% (n= 387) of total discarded units, followed by FFP's which were 32.7% (n=265). Whole blood amounted to 13.9%(n=113) while 3.9% (n=32) of PRBC's and 0.6%(n=5) of SDP products were discarded.

Expiry of Platelets was the most common reason of discard (45%) followed by Non utilisation of thawed FFP's (28%). The remaining components were discarded because of Under collection, hemolysis and seropositivity.

Conclusion:

In this time period, approximately 11.1% of total blood components were discarded, with platelets being the most frequently discarded component and expiry being the most common reason. Blood centres must optimize utilization, store and handle units properly and enforce strict donor selection criteria to minimise wastage.

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ACTIVITY OF LABILE COAGULATION FACTORS, FACTOR X AND FIBRINOGEN LEVEL IN FROZEN PLASMA VERSUS FRESH FROZEN PLASMA

Dr Shashank Naik, Dr Swarupa Bhagwat

Introduction:

Fresh Frozen Plasma (FFP) is a blood component separated from whole blood and frozen below -30°C within 8 hours of donation for optimum preservation of coagulation factors. However, logistic and geographical reasons may hamper separation of plasma within 8 hours and the separation may have to be delayed to between 8 and 24 hours and then frozen below – 30°C which is called Frozen Plasma (FP). FP is a licensed blood component in (USA) for therapeutic use similar to FFP. It is not licensed in India leading to frequent shortage of Plasma.

Aim:

To compare the activity of factor V . VIII and X and the level of fibrinogen between FFP and FP, so as to assess the therapeutic use of FP.

Materials and Methods:

A prospective observational study was conducted in the Department of Transfusion Medicine .50 units each of FFP and FP matched for confounding-factors were selected. There were 44 males and 6 females in each of FFP and FP groups. They were compared for the activity of labile coagulation factors, stable factors and fibrinogen level . It was done within 30 days of preparation. The mean values of each of the four parameters for FFP and FP were calculated and compared for statistical significance (p) by using unpaired Students t-test.

Results:

The level of all the tested coagulation factors was lower in FP as compared to FFP .The difference was statistically significant for factor VIII. It was not significant for factor V , X and fibrinogen . The level/activity of coagulation factors in FP, though lower than that in FFP, fell within normal reference range of 90-95%.

Conclusion:

FP may be used as a therapeutic alternative to FFP excluding patients of hemophiliaA in whom factor VIII concentrate and cryoprecipitate are considered better therapeutic modalities.

A STUDY TO ASSESS THE TRANSFUSION EFFICACY OF LEUKOREDUCED PACKED RED BLOOD CELLS PREPARED BY TWO DIFFERENT METHODS IN THALASSEMIA MAJOR PATIENTS

DR. ARUNKUMARI ADHIKARIMAYUM

Introduction:

Great variations may be observed in the hemoglobin (Hb) content of packed red blood cell (PRBC) units prepared by different methods. Thus, basing transfusions in chronically transfused patients on the Hb content of the unit may help achieving optimal post-transfusion increment.

Aims and Objective:

To assess the Hb increment in thalassemia major patients transfused with leukoreduced packed red blood cells (LPRBC) prepared by two different methods: (i) standard leukoreduced PRBC (SLPRBC) prepared by removal of buffy coat and plasma followed by leukoreduction, and (ii) leukoreduced PRBC prepared by new method where leukoreduction of whole blood is done followed by separation into PRBC (NLPRBC) and plasma.

Materials and Methods:

This randomized controlled trial included 80 adult thalassemia major patients who were randomized into two groups of 40 each. The group I patients received SLPRBC and the group II patients received NLPRBC transfusions for a period of three months.

Results:

SLPRBC had a mean (± SD) volume of 275.50 ±17.07mL, while it was significantly higher ($p<0.001$) for NLPRBC: 316.46 ±1.42mL. The mean Hb content of SLPRBC was 50.60 ±5.12g while that of NLPRBC was 56.98 ±5.92g ($p<0.001$). Post-transfusion, the group I patients had mean Hb increment of 2.11 ± 0.89 g/dL while that of group II patients was 2.48 ±0.88 g/dL ($p < 0.001$). The mean transfusion interval for group I patients was 20.30 ±3.75 days, while it was 21.34 ±5.13 days for group II patients ($p<0.045$). A significant positive correlation was observed between the Hb dose transfused and the Hb increment with both SLPRBC (rho = 0.4, $p<0.001$) and NLPRBC (rho = 0.19, $p=0.011$) transfusions.

Conclusion:

The NLPRBC had significantly higher Hb content than the SLPRBC leading to a better Hb increment post-transfusion. This may prolong the transfusion interval leading to reduction in the number of PRBCs transfused.

HOW POSITIVELY ARE RHD NEGATIVE DONOR RED CELL UNITS UTILISED? : ANALYSIS FROM A TERTIARY CARE TEACHING HOSPITAL BLOOD CENTER

Dr. Prashanth Saddala, Dr Bandi Suresh babu, Dr KV Sreedhar Babu

INTRODUCTION:

Given the low prevalence (approximately 5.87%) of the RHD negative donor Packed Red Blood Cells (PRBCs), understanding their utilization is critical to secure units for the right recipient at the right time.

AIM

To analyse the utilization of RHD negative donor PRBCs at a tertiary care teaching hospital blood center.

MATERIAL & METHODS

Retrospective data regarding the use of every RHD negative donor unit collected by our blood center from 01-07-2021 to 31-12-2022 (for a period of 18 months) was reviewed. For each issued unit, unit age from expiry date, unit ABO group, recipient ABO group and RHD status were retrieved from the records. The units discarded because of sero-reactivity and those subjected to quality control were also included.

RESULTS

There were a total of 972 RHD negative collections during the study period (6.34% of the total 15322 collections). Among them, 15 (1.54%) units were subjected to quality control, 15 (1.54%) units were discarded because of donor sero-reactivity and 1 (0.10%) unit was discarded because of under collection. Out of the remaining 941 (96.81%) units, 33 (3.50%) units were issued to RHD positive recipients and 908 (96.49%) units were issued to RHD negative recipients.

Altogether 5.31% (50/941) of RHD negative units were issued to recipients of different ABO group including 9.1% (41/450) of O RHD Negative units which were issued to non O group recipients. Only 5.42% (51/941) units were issued in the last 7 days from expiry. None of the units were discarded due to date expiry.

CONCLUSION

This analysis of utilization of RHD negative donor PRBC units at our blood center has yielded efficient results. Appropriate inventory management will avoid shortage as well as wastage of these precious PRBC units.

GREEN PLASMA IN A MALE BLOOD DONOR: SHOULD WE BE CONCERNED?

Dr. Rajbir Kaur Cheema, Dr. Purnima Jindal

Introduction:

Green plasma often poses a dilemma to transfusion medicine specialists regarding its usage as no national guidelines exist regarding their use or discard. The suitability of green plasma for transfusion is questioned by many clinicians doubting its safety. So, mostly such plasma units are discarded at the blood centre itself.

Case Report:

We came across a healthy 37-year-old male, a nonremunerated, second-time blood donor who came voluntarily for donating blood for his relative admitted in the hospital. Donor fulfilled all criteria of blood donation eligibility with no medical and surgical issues. On physical examination he was afebrile, pulse 74 beats/minute, blood pressure 122/86 mmHg and weighed 56 Kg. After taking consent for blood donation, whole blood was collected from him in a double bag (350 ml). When the plasma was separated during component preparation, it appeared greenish in colour. So, the plasma unit was quarantined and subjected to investigations such as culture, bilirubin (total, direct, and indirect) , copper and ceruloplasmin assay and coagulogram. Blood culture was found to be negative with normal levels of total, direct, and indirect bilirubin and coagulogram profile. Copper (102 µg/dl) and ceruloplasmin (40 mg/dl) levels were also in normal range. Donor was called telephonically to check for any medical/surgical history which can cause the possible green discolouration of plasma especially history of medication including sulphonamides intake and any illness including joint pains (reumatoid arthritis/ankylosing spondylitis) but donor revealed no significant information. Despite of all normal findings, the plasma unit was discarded according to department policy.

Conclusion:

We recommend that there is need of formultation of national guidelines regarding the fate of collected green/ discolored plasma to avoid unnecessary discard of blood components in resource constraint setups and to maintain uniformity in clinical practices.

TO DETERMINE THE EFFECT OF RED CELL PROCESSING ON HEMOGLOBIN INCREMENT IN ONCOLOGY PATIENTS

Dr. Manuru Shekhar Sameer, Dr Kshitija Mittal, Dr Ravneet Kaur, Dr Paramjit Kaur, Dr Tanvi Sood, Dr Gagandeep Kaur

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INTRODUCTION

Variation in hemoglobin content in packed red blood cells (PRBCs) prepared by different processing methods is well known. We hypothesized that higher red cell loss during buffy coat processing and leukofiltration of PRBCs will lead to less hemoglobin increment.

AIM

To determine the effect of red cell processing on hemoglobin increment in oncology patients on radiotherapy or chemotherapy.

MATERIALANDMETHODS:

The study population in this prospective open label randomized controlled trial (CTRI Regd No: CTRI/2023/03/050955) included healthy blood donors and oncology patients receiving radiotherapy or chemotherapy requiring red cell transfusion. Only male blood donors between age group of 18-30 years with hemoglobin between 12.5-14g/dl donating whole blood for first time were included. Two ml EDTA sample was collected from all eligible blood donors for pre-donation hemoglobin estimation. Whole blood was collected in 450 ml triple blood bags or quintuple blood bags with integral filter and SAGM additive solution. Triple blood bags were processed using platelet rich plasma method and quintuple blood bags were processed using buffy coat method. Sample from each PRBC unit was taken on next day for estimation of total hemoglobin content and hematocrit. Enrolled patients were randomly allocated in two groups. Group I was transfused with triple bags while group II was transfused with quintuple bags. At a time, one unit of PRBC was transfused to patient. Two ml EDTA sample was taken for pre-transfusion hemoglobin estimation. Post-transfusion hemoglobin was done within 24 hours of each transfusion.

RESULTS:

In all, blood was collected from 60 donors who had mean hemoglobin of 14.63±0.61 g/dL. Mean total hemoglobin of a triple bag was 68.02±2.97 gm while that of a quintuple bag was 62.38±3.66 gm. The hemoglobin increment in Group I was 1.91±0.95g/dl while that in group II was 1.38 ±0.92g/dl (p=0.02).

CONCLUSION:

Blood bag processing does have an effect on hemoglobin increment in patients.

COMPARATIVE STUDY FOR MEASUREMENT OF QUALITY PARAMETERS IN LEUKOREDUCED RED BLOOD CELLS PREPARED BY THREE DIFFERENT METHODS

Dr. Sanket Patel, Dr Saroj Rajput, Dr Brig Tathagata Chatterjee, Dr Col M S Bindra

INTRODUCTION:

The removal of leucocytes to < 5 x 10^8 in one unit of PRBCs can minimize risks such as FNHTRs, HLA allo-immunization, platelet refractoriness observed in multiply transfused patients, and transmission of leukotropic viruses like EBV and CMV. Methods for leukoreduction can be classified into three categories namely, low performance (< 90%, 1 log-reduction), intermediate performance (90–99.9%, 1–3 log-reduction), and high performance (> 99.99%, 4 log-reduction). We have compared leukoreduction by buffy coat method and leukodepletion efficacy of two different Leukofilter at our blood center.

AIMS & OBJECTIVES:

1. To match the efficacy of leukoreduction by buffy coat method and leukoreduction during pre-storage whole blood leukofiltration compared to pre-storage PRBC leukofiltration.
2. To evaluate the leukoreduction carried out by different commercially available leucocyte filters and finally to establish the best method to prepare leukodepleted PRBCs.

MATERIAL AND METHODS:

In this Prospective, Observational, Analytical study, 150 units of blood (packed RBCs) were divided into three groups of 50 each. Now, 2 groups were subjected to leucocyte reduction using two types of filtration methods i.e. pre-storage whole blood filtration and pre-storage PRBC filtration. Leukoreduction by buffy coat method was applied to 3rd group.

RESULTS:

Mean post-filtration residual leucocyte count ranged from 0.3 x 10^6 - 0.6 x 10^6 / bag with all Leukofiltered bags showing > log 3 leukoreduction. There was no significant difference ($p > 0.05$) in leukodepletion by whole blood filtration compared to PRBC filtration. We also emphasized that Prestorage leukofiltration achieved was significantly better ($p < 0.05$) than leukoreduction by the buffy coat method i.e. Mean leukoreduction achieved was 78.64%.

CONCLUSION:

This study suggests that leukofilteration is preferable over the buffy coat method since leukodepletion achieved with the former is the gold standard. We recommend selective log 3 leucodepletion using prestorage filters for patients with specific indications.

A Retrospective Study Of Analysis Of Rate And Reasons Of Discarding Blood And Its Components.

Dr. Saadat Nazir Shah, Dr Shazia Handoo, Dr Azad Ahmad Shah

ABSTRACT

Blood transfusion is an essential element in modern healthcare. Blood being an irreplaceable resource needs to be properly utilized with ideally minimal wastage.

Aims and objectives:

This study analyses the causes for discard of blood and its components.

Materials and Methods:

This is a retrospective study of various causes of discard of blood and blood components carried out in blood centre of Government Bone and Joint Hospital, Barzullah, an associated hospital of Government Medical College,Srinagar over a period of one year from January 2022 to December 2022.

Results:

A total of 1657 blood units were collected during the study period of one year.Out of 1657 blood units collected, 1418 units were whole blood (WB) whereas components were prepared from remaining blood units. A total of 239 packed red blood cells (PRBCs), 18 platelet concentrates (PC's), and 239 fresh frozen plasma (FFP'S) were prepared. Average discard rate of the present study was 6.1%. Discard rate for WB, PRBC, PC, FFP was 7.6%, 1.6%, 0% and 1.6%, respectively.

Conclusion:

To minimize wastage of blood, there should be proper implementation of blood transfusion policies and coordination between hospital and blood centre staff. Strict adherence to donor selection and deferral criteria, taking proper predonation history and counseling, software to identify transfusion transmitted infection (TTI) positive donors, and deferring suspected professional donors who have been screened previously may help in reducing discard due to TTI positivity. Process improvements such as technical expertise in phlebotomy, prevent red blood cells (RBC) contamination during platelet and FFP preparation, precaution during thawing of FFP to prevent leakage. Self-regular audits, proper storage and handling of blood units, will help minimise the wastage of blood or its components.

Keywords:

Blood transfusion services, audit, discard rate.

ASSESSMENT OF CHANGES IN PLASMA HEMOGLOBIN VALUE IN LEUCODEPLETED PACKED RED CELL UNITS DURING STORAGE AT A TERITIARY CARE BLOOD CENTRE

Dr. Fathima V J, Dr. Kala V. L., Dr Maya Devi S

INTRODUCTION

Leucoreduced blood components are increasingly in demand due to their clinical benefits, particularly in reducing adverse transfusion reactions. Hemolysis is an important storage lesion that can have deleterious effects on the transfusion recipient. Numerous studies have provided evidence that leucoreduction (LR) can lead to some amount of hemolysis, potentially causing damage to red blood cells (RBCs) when they are pushed through leucoreduction filters. However, at the end of the storage period, the level of hemolysis should not exceed the permissible limit, 0.8% according to European guidelines and 1% according to the FDA.

AIMS AND OBJECTIVES

To determine the changes in plasma hemoglobin (Hb) during the storage period of packed red cell units.

MATERIALS AND METHODS

This was a Prospective study conducted on blood donors attending our center over a period of one year.Twenty units of whole blood were collected in blood bags with an integral inline filter. Twenty LR PRCs obtained after centrifugation and processing of the collected whole blood were used for the study. Bags were sampled on days 0, 14, 28, and 42 of the storage period for plasma hemoglobin, total hemoglobin, hematocrit, and percentage of hemolysis. Statistical analysis was done using statistical software, SPSS version 23.

RESULT

Plasma hemoglobin values in leucodepleted PRC showed progressive increments as the storage days increased, with the highest level observed on day 42.The percentage of hemolysis also showed a statistically significant increase over the days of storage, but hemolysis in any of the units did not exceed the limit.

CONCLUSION:

Plasma hemoglobin and the percentage hemolysis increased with the days of storage in the LR PRC. Apart from storage lesions, mechanical damage to red cells during leucofiltration may be a contributing factor. As it doesn't cross the permissible threshold, LR filters can still be safely used for their clinical benefits.

Theme

Blood Donors and Blood Donation

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A STUDY OF BLOOD DONOR DEFERRAL CAUSES FOR ENSURING BLOOD SAFETY IN A TERTIARY CARE HOSPITAL

Dr. Kavinkumar G, Dr. Krishnamoorthy R, Dr. Ashwin A, Dr. Sampath kumar M

INTRODUCTION:

Safe blood transfusion services require safe blood donors. Donor selection criteria plays a vital role in ensuring blood safety and helps in providing safe blood to recipients.

AIM AND OBJECTIVES:

To evaluate the blood donor deferral causes in a tertiary care hospital.

MATERIALS AND METHODS:

This is a retrospective study of 3 months duration [February 2023 to April 2023]. Data was retrieved from the donor deferral register maintained by the blood bank.

RESULTS:

Out of 3463 walked in donors, 3107 donated and 356 donors were deferred during the study period. Temporary deferrals were high, 83.70 % (n=298) and permanent deferrals were 16.29% (n=58). The most common reason of temporary deferral was anemia. Other causes of deferrals were polycythemia, uncontrolled diabetes and hypertension due to irregular intake of medicines, inadequate sleep, medical history of chronic illness, recent intake of medicines like antibiotics and NSAIDS, intake of complementary and alternative medicines, recent vaccination, history of major surgery within a year, history of minor surgery within 6 months, tattooing, active illness like fever, cold, active skin disease, last blood donation within 3 months, history of donor reaction twice during previous donation, alcohol and anxiety.

CONCLUSION:

Appropriate donor selection is an important tool for blood safety. An adequate and reliable supply of safe blood can be assured by a stable base of regular and voluntary blood donors.

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A STUDY OF ACUTE TRANSFUSION REACTIONS AT A TERTIARY CARE CENTRE: RETROSPECTIVE ANALYSIS

Dr. Damayanti Dey, Dr Shweta Dhote, Dr Shubhangi Lad

Introduction:

Transfusion of blood products is a double-edged sword. Transfusions are lifesaving but with considerable risk to the patient. These risks can be broadly classified as infectious and non-infectious complications. Non-infectious complications are known as adverse transfusion reactions and are further analysed as acute and delayed. This study is conducted with the primary objective of evaluating the types and frequency of acute transfusion reactions at a tertiary care centre, a pilot effort towards hemovigilance from the institution.

Aim:

To determine the frequency and type of Acute Transfusion Reactions (ATRs).

Objectives:

To look into Acute Transfusion reactions (ATRs) across age and gender. To analyse the distribution of types of ATRs. To investigate the division of ATRs according to blood group and clinical diagnosis. To study types of ATRs according to the type of component transfused.

Materials and Methods:

A 3-year retrospective analytical study of all transfusion reactions reported to the Department Of Immunohematology and Blood Transfusion. All reactions were evaluated and classified under standard definitions.

Result:

During the study period a total of 21,888 units of blood components were issued of which 38 (0.174 %) units were reported as acute transfusion reactions.

Of these 38, 25 (65.8 %) males and 13 (34.2 %) females experienced ATRs. 31 (81.58 %) Febrile non-haemolytic transfusion reactions, 6 (15.79%) allergic transfusion reactions and 1 (2.63%) Immunologic hemolytic transfusion reaction due to allo antibody were observed. A maximum number of ATRs were seen in blood group A followed by O, B and AB.

Conclusion:

Most acute transfusion reactions were febrile non-haemolytic transfusion reactions followed by allergic reactions. This underlies the need for constant monitoring and strict implementation of standard protocols for the transfusion of blood and blood products

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NATURALLY OCCURRING ANTI-D IN A MALE BLOOD DONOR UNRESOLVED MYSTERY: A CASE REPORT

Dr. Ritika Basnotra, Dr. Joseph Philip, Dr Rajeev Mallhi, Dr Sreethu Chand, Dr Abhipsha Shrotriya

INTRODUCTION:

Screening donated blood for irregular antibodies against red cell antigens is important for patient safety and has been laid down by many national and international guidelines. These antibodies can be formed by three mechanisms: by immune responses, naturally occurring, or passively acquired.

Rh antibodies are usually produced after exposure of an individual's immune system to non-self Rh antigens through transfusion or pregnancy. However, rare examples of anti-E and anti-Cw were seen without stimulus.

The detection of unexpected antibodies against red cell antigens by performing Indirect Coombs test is of utmost importance, for patient safety as we issue group-specific plasma and platelets without performing any cross-matching.

CASE REPORT:

A 30-year-old male blood donor donated blood at our Blood Centre in May 2023, and as per the departmental policy, along with ABO Rh grouping, ICT was also done on his sample by column agglutination technology. He was found to be A Rh D-negative with a positive ICT (+2). On further evaluation using the antibody screening and identification panel, anti-D was identified in the AHG phase. We called the donor and retested, which showed similar results. He has a history of donation in some other Blood Centre 3 months ago, but was not called by the centre for the similar issue. On taking his history, we could not elicit any source for Rh isoimmunization.

RESULTS:

On further work-up, we found that antibodies reacted only in the anti-globulin phase with no reaction in the saline phase, suggesting an IgG type of antibody. Also, the anti-D titers (IgG) of the donor were up to 1:32.

CONCLUSION:

For a male donor, all causes of Rh isoimmunization have been excluded. We therefore assume, that this donor has naturally occurring anti-D, probably produced by certain environmental agents or micro-organisms sharing cross-reactivity with the D antigen.

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ASSESSMENT OF AWARENESS LEVELS ON VOLUNTARY BLOOD DONATION AMONG REGULAR DONORS AND NON-DONORS- A PILOT STUDY-THE ESSENTIAL TOOL OF RESEARCH PROJECT

Dr. Swapna Yalamanchili

Introduction

A pilot study with fifty respondents was executed in Cancer Institute WIA Chennai blood bank to assess knowledge, awareness and practice levels of voluntary blood donation among regular donors.

Aim

To conduct pilot study for checking the feasibility of questionnaire.

Objective

To test the reliability of questionnaire using Cronbach alpha.

Materials and Methods

A self administered questionnaire was used for assessment of donors during two months duration. The questionnaire had questions on personal profile (10), knowledge and awareness (25),practice (experience and involvement) (10). Respondents were picked by simple random technique.

Results

Age distribution of population was normal. Mean age was 29.9 ±7.13. Range was 19 yrs to 48 yrs . 98% were men. Equal proportion of married and unmarried respondents was observed. 82% of respondents were familiar with blood centre. 72% used public transport to commute to the centre.The education levels- 4% of the population - schooling , 32% - postgraduation and 64% graduates. Government employees - 62%, private employees - 12%, self-employed -10% and students comprised 16%.

A moderate significant correlation between awareness & experience (r=0.325; p=0.021) and awareness & involvement (r=0.632; p <0.001) was observed.

ANOVA test - a significant difference in general awareness based on education (School – least; UG/PG – high) P = 0.001.

Independent sample T-TEST - a significant difference in general awareness based on residence location (> 10 KM group– least ; < 10KM group – high) P = 0.039 (<0.05)

Likert scores - 82% high awareness ,88% good experience , 85% involvement is present.

Multiple Regression Analysis indicated equation for Dependent Variable - Involvement in Blood donation (IBD);IBD Total = 9.497 + 0.183(Gen Awareness) (y=C+mX) ,R2 – 38% ; P 0.000

Conclusion :Content and construct Validity & Reliability of the questionnaire is very good .

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RETROSPECTIVE ANALYSIS OF THE CAUSES OF THERAPEUTIC PHLEBOTOMY IN A TERTIARY CARE BLOOD CENTRE

Dr. Rashmi Kumari, Dr Meena sidhu, Dr Mitali Sharma, Dr Naveen Akhtar, Dr Mohsin Farooque, Dr Sahil Gorka

Introduction:

Therapeutic phlebotomy is a well-established procedure to address conditions like hemochromatosis, polycythemia vera, secondary erythrocytosis and other haematological disorders. Despite its significance, there remains a need to comprehensively analyse the causes that lead to therapeutic phlebotomy to improve treatment strategies and patient outcomes.

Aims and objective:

The aim of this study is to analyse the underlying causes and indications leading to therapeutic phlebotomy in a tertiary care setting.

Materials and Methods:

A retrospective review of health records was conducted for patients who underwent therapeutic phlebotomy at our tertiary care facility from January 2022 to June 2023. Data related to patient age, gender, medical history, laboratory findings, frequency of phlebotomy sessions, and relevant interventions were collected and analysed .

Results:

This retrospective study aimed to analyse 539 cases of therapeutic phlebotomy performed in a tertiary care centre between January 2022 and June 2023.The leading indications were chronic smoking 24.1% (n=130) chronic obstructive pulmonary disease 22.4 (n=121), and high altitude 14.6% (n=79). Primary polycythemia(JAK mutation)12.8% (n=69) congenital heart disease 9%(n=49), and miscellaneous causes 7.9%(n=43) were also significant factors leading to therapeutic phlebotomy. Post tuberculosis 5.9% (n=32) obstructive sleep apnea 1.8%(n=10) and post-renal transplant cases were identified as less common indicationsThe mean hemoglobin (Hb) level observed in the studied population was 18.9 g/dL.. These findings offer valuable insights for optimizing treatment strategies in iron and red blood cell disorders in tertiary care setting.

Conclusion:

Chronic smoking , COPD , High altitude and primary polycythemia (JAK mutations) were identified as the primary indications, emphasising the significance of abnormal red blood cell production in these patients. The study confirms the effectiveness of therapeutic phlebotomy as a valuable treatment option, leading to improved clinical outcomes for the majority of cases.

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ROOT CAUSE ANALYSIS OF BLOOD CLOTS IN BLOOD BAGS AT A TERTIARY HOSPITAL

Dr. Vijit Joon, Dr. A HariHaran, Dr. I Suresh Kumar, Dr. Vinod Kumar Panicker

INTRODUCTION

• The development of clots in blood bags is a critical concern for the efficient functioning of any blood banks.

• Clots can be missed during blood collection , processing , component separation and storage .

• Blood clots formed in the blood bag will be trapped by the standard in-line blood filters of the blood infusion set, hence preventing potential adverse effects in patients but resulting in the wastage of the collected product.

• Root-cause analysis is a methodology that reveals all the influencing and causal factors that have led to an adverse or near-miss event. Following which the corrective actions can be made.

AIMS AND OBJECTIVES

• To find the Root Cause for the development of blood clots

• To determine WHAT led to the event , WHY it occurred and to prevent similar events from occurring again.

MATERIALS AND METHODS

• A retrospective data collection was done of all blood donations from January 2023 to March 2023 in the Department of Transfusion Medicine of our institution, following which blood units found to have clots were identified & Root Cause Analysis was done.

RESULTS

• It was found that there were events of over collections and some staff were observed to have improper blood bag segment stripping techniques.

• Following which the Blood Collection Monitor machine was replaced and calibrated.

• The staff involved in blood collection were re-educated with regard to standard operating procedures for blood collection and the timing limit of collection was strictly re-inforced.

CONCLUSION

The RCA showed the reasons which were responsible for the occurrence of the adverse event. Following which corrective and preventive actions were planned and implemented. No Further incidence of such adverse events were observed.

PREVALENCE AND TRENDS OF VOLUNTARY BLOOD DONATION AMONG POPULATION OF TWIN BORDER DISTRICTS OF NORTHERN INDIA- A GAP TO BE BRIDGED FOR SAFER BLOOD SUPPLY

Dr. Irm Yasmeen

Introduction:

Voluntary non-remunerated regular blood donors are the pillars for safe blood supply as their blood is tested for transfusion transmitted infections every three months . However, level of awareness , attitude and beliefs towards voluntary blood donation may affect the number of blood donations that can hamper the overall blood transfusion services in that region.

Aims and objectives:

To assess the prevalence and trends of voluntary blood donation and factors which can lead to further increase in the same.

Material and methods:

A retrospective, cross-sectional study of records was conducted over a period of three and a half year with effect from April 2020 to July 2023 on general population who had donated blood in outdoor voluntary blood donation camps and indoor as voluntary blood donors. Data was analysed and presented in percentages and tabulated form.

Results:

From April 2020 to July 2023, a total of 6013 blood units were collected. Out of these, 1427(23.73%) were voluntary blood donors. Majority were male donor(99.15%) and belongs to urban areas(83.88%). The maximum donors were in the age group of 31 to 40 years (46.88%). The trend demonstrates an increase in blood donation over these years in such a way that it has increased from 12.59% in 2020 to 27.66% in 2023. The major factors which led to increase in the number of voluntary blood donations were outdoor blood donation camps and awareness through social media. The proportion of regular and repeated donors was increased from 64.66% to 74.18% and was considered as clinically significant (p-value <0.05).

Conclusions:

Majority of our area is hilly and rural area and many people still thought that blood donation hampers one's immunity or only males can donate blood. There should be campaigns to spread awareness about the benefits and need of regular voluntary blood donation.

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WHOLE BLOOD DONOR DEFERRAL AT A TERTIARY CARE CENTRE IN PUNE

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DEPARTMENT OF IMMUNOHEMATOLOGY AND BLOOD TRANSFUSION, BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY) MEDICAL COLLEGE PUNE

Dr. Vineeth Pynadath, Dr Joseph Philip, Dr Rajiv Mallhi, Dr Ritika Basnotra, Dr Sreethu Chand

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INTRODUCTION:

Blood donation is important for any blood centre for their proper functioning. Blood donation criteria is dependent on scientific, medical opinion and regulatory rules. Blood donors are deferred for various reasons. Blood donor deferral varies from region to region. To protect the interest of recipients and donor's health stringent donor deferral criteria are necessary.

AIMS AND OBJECTIVE:

To determine the major causes of donor deferral and also propose a solution to reduce the number of donor deferral.

MATERIALS AND METHODS:

The study involved donors including voluntary and replacement who came to our centre for whole blood donation during the period January 2023 to July 2023.During this period a total of 3012 donors came to donate whole blood. Of 3012 donors 2420 were male donors and 592 were female donors. We collected blood from donors both at the Department involving both voluntary and replacement donors; and outdoor camps involving only voluntary donors. Among the donors 92% were voluntary donors and 8% were replacement donors.

RESULTS:

Donor deferral is broadly classified into permanent and temporary deferrals. The most common cause for deferral was anaemia both in male and female donors, in our study. The next common causes for deferral among donors was hypertension, hypotension, respiratory illness, skin infections, medications for various reasons, menstrual problems and dental extraction. Uncommon causes included donors having undergone major surgeries, minor surgeries, diabetes on insulin, history of recent blood donation, asthma, skin problems like psoriasis, thyroid diseases, epilepsy, tattoo.

CONCLUSION:

In this study conducted at our centre the major cause of donor deferral is anaemia, followed by hypertension. In this study the overall deferral rate was high amongst the female compared to male. Most of the donor deferral came under the category of temporary followed by permanent.

VARIOUS CAUSES OF DONOR DEFERRAL AMONGST PERSONS REPORTED FOR BLOOD DONATION AT A TERTIARY CARE HOSPITAL IN WESTERN PART OF RAJASTHAN, INDIA

Dr. Madiha Anjum

Background:

A blood centre is crucial in assuring the availability of safe blood as and when needed. Blood transfusion require an appropriate supply of blood from a healthy donor.

Numerous factors results in the deferral of blood donors, either temporarily or permanently.

A big portion of the donor population in a developing nation , like as India, is deferred due to a transient but easily correctable cause.

Objective:

To find out various causes of donor deferral among reported blood donors.

Method:- This retrospective study was carried out at Department of Immune-hematology and transfusion medicine, sardar patel medical college Bikaner (Rajasthan) , at blood centre and out-door voluntary blood donation camps during the period of August 2022 to December 2022 (5 month) among reported blood donors.

Result:

Total 22015 pre donation interviews were conducted at our blood centre and at various blood donation camps during the study period ,of which 21643 were male(98.3%) and 372 (1.7%) were females.

Out of 22015 registrations , 20293(93.1%) were found fit for donation.

Total numbers of deferral due to various reasons were 1722 giving an overall incidence of 7.8%.

Out of 1722 deferrals, 1410(81.9%) were males and 312(18.1%) were females.

Among deferred donors, 748(43.4%) were deferred because of Anaemia having Hb<12.5gm/dl, 221(12.8%) due to the donors being underweight or underage, 532(30.89%) included various medical and surgical causes and 221(12.8%) were due to other causes.

Conclusion:

Most common cause for deferral low hemoglobin, second most cause was low body weight.The data of the present study shows that there is a need to understand the problem and to educate donors regarding iron deficiency and iron supplementation.

Health authorities should also implement policies for the preventive measures to decrease the incidence of common deferral causes as this reflects the health status of the society.

DEFERRAL REASONS AMONG VOLUNTARY BLOOD DONORS IN CHENNAI- A RETROSPECTIVE STUDY

Dr. Shanmugasundar Ganesan, Dr. Hamsavardhini Swathandran

Abstract Background:

Prospective blood donors may be unable to donate blood for several reasons that could either compromise their own health or affect the safety of the blood donated. It is of paramount importance that all blood donors are in good health, which ensures safety and efficacy of blood collected. The donors' health is also protected by meticulous screening procedures.

Aim:

This study aims to evaluate the various reasons for Deferral among Voluntary Blood Donors.

Materials and Methods:

A Retrospective study was conducted to analyze the various reasons of Deferral. All voluntary blood donors were counseled and screened as per DGHS guidelines, over a period of 1year, from April 2022 to March 2023, among eligible voluntary blood donors at The Department of Transfusion Medicine, The TN Dr MGR Medical University, Chennai, India.

Results:

A total of 4324 (100%) donors were registered, of which 2621(60.6%) units were collected and 1703 (39.3%) donors were deferred for various reasons. Of the total donors, Deferral was more among female constituted (56.2%) than in male (43.8%). The common causes in females were low hemoglobin levels, menstruation and underweight. In male, the various common reasons were high blood pressure, low hemoglobin level and intake of medicines or alcohol in recent 24 Hrs. The reasons for male deferral range lie between 41.52% and 46.23% with mean proportion of 43.8%. For females the deferral range lie between 53.74% and 58.51% with mean proportion of 56.2%, which is higher than males deferred.

Conclusion:

The deferral being a reason for not donating blood among already motivated voluntary blood donors widens the gap between demand and supply. It is the responsibility of blood centre personnel to analyze the reasons for deferral, the knowledge gained would enable the temporarily deferred donors to re-enter the donor pool for better inventory management.

HAEMATOLOGICAL PARAMETERS IN FIRST TIME AND REPEAT BLOOD DONORS: AN OBSERVATIONAL STUDY IN A TERTIARY CARE CENTRE IN KERALA

Dr. Riya Mathew, Dr. Jasna AM, Dr. Harsha Unni, Dr. Magdelin simon varghese, Dr. Jess Elizabeth Rasalam, Dr. CV Mini

Introduction:

Safe blood transfusion starts from a healthy voluntary blood donor and identifying the changes associated with repeat blood donation is important in maintaining a healthy donor pool.

Aims and objectives:

1) To identify the changes observed in red cell and platelet indices to the number of donations.

Materials and methods:

Cross sectional study done on whole blood donors who were eligible to donate as per the national criteria. Sample was collected from the diversion pouch in EDTA vacutainers and hematological parameters were analysed using the Sysmex xp 300 analyzer.Donors were categorized based on their number of donations and gender. Hb,HCT,Red cell count,red cell distribution width(RDW),mean corpuscular volume(MCV),mean corpuscular Hb concentration(MCHC),platelet count, platelet distribution width(PDW) and mean platelet volume(MPV) were collected and analysed.

Results:

A total of 151blood donors were recruited for this pilot study and all donors were male.Out of all donors,22.5% are first-time donors,50.3% have donated 1 to 5 times,14.6% donated 6-10 times and 7.9% are frequent donors with more than 15 donations.The average hematological parameters were comparable between donors categorized based on number of donations.Further analysis on changes in hematological parameters with number of donations,the MCH,MPV and WBC count had a negative correlation(-0.594, -0.162 and -0.184 respectively,$p<0.05$) and RDW had a significant positive correlation(0.426,$p<0.001$). RDW had a significant difference among first time and repeat donors,WBC and MCH had significant difference among first time and 11-15 times donors(Kruskal Wallis pairwise comparisons,$p<0.001$).

The mean of platelet count, MPV and PDW was 2.6±0.56lacs, 9.02±1.1 fl,10.9±2.04fl respectively.The platelet count showed a significant negative correlation with both MPV and PDW(Spearman's coefficient-0.324, -0.424,$p< 0.001$).

Conclusion:

The pilot study points towards a negative impact on the red cell and platelet indices with increasing number of donations.Strategies need to be adopted to preserve the wellbeing of the donors especially targeting those who had donated >10 times.

RETROSPECTIVE ANALYSIS OF VARIOUS DONOR PARAMETERS TO IMPROVE THE INVENTORY AND TO PROVIDE SAFE BLOOD. A STUDY FROM TERTIARY CARE CENTER, WESTERN INDIA

Mrs. Jyotsna Gaikwad, Dr Mehar Thakwani, Dr Anand Deshpande, Dr Rajeshwari Basavanna

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Introduction:

Voluntary blood donors are the foundation of a safe and sustainable blood supply. The donor parameters can vary from one part of the country to another. With this back ground ,study was undertaken to analyze donors' data to improve the inventory and to provide safe blood.

Aim & Objectives:

To understand and analyze various donor parameters to improve inventory management and provide safe blood.

Materials & Methods:

In this Retrospective analysis, various voluntary donor parameters who had donated in our institute from the year Jan 2019 to August 2023 were analyzed. These parameters are, total number of donations, donor age, gender, blood-group, adverse events in donors, Direct Coombs test (DCT) and antibody screening positivity, common Rh alleles and Transmitted Transfusion Infection (TTI) prevalence among the voluntary donors

Results:

27,194 donors donated in our institution between January 2019 and August 2023. Of this 87.9%(23917) were males compared to 12.1%(3277) females with ratio of 7.2:1 respectively. The maximum number of male-donors were noted to be in the age range of 30-40 years as compared to female-donors who had a maximum donors at the age range of 20-40 years. The most common blood group was O Rh Positive (34.8%) followed by B Rh Positive (28.4%). Of the total donors, 27(0.1%) were noted to be DCT positive with male predominance. RBC antibody Screening was positive in 85 donors (0.31%). Donor phenotyping analysis showed R1R1 was the most common phenotype, followed by R1R0 with prevalence of 25.8% and 18.1 % respectively. Prevalence of TTI among our donors was noted to be 0.4%(109) who were reactive in serology (Chemiluminescence) and also in NAT platform. Of the 347(1.28%) donors who experienced adverse events, 226(65%) donors had dizziness without loss of consciousness

Conclusion:

Understanding and analyzing the donor parameters are crucial to improve inventory as well as to maintain safe blood.

A CROSS-SECTIONAL STUDY ON BARRIERS AND FACILITATORS FOR WHOLE BLOOD DONATION AMONG FEMALES

Mrs. Renjini Panicker, Dr Punkesh Patel, Dr Vinu Rajendran, Dr Amita R, Dr Debasish Gupta

Introduction

Female blood donation attributes only less than 10 percent in our country. In-depth insight is required about the barriers and facilitators of female blood donation in India.

Aims & Objectives

To identify the barriers and facilitators of female blood donation at our district

Materials & Methods

This was a cross-sectional study conducted among the female population of our district over 4 months. Participants include both blood donors and non-donors of various socio-economic profiles. After obtaining consent, participants were interviewed based on the peer-reviewed and validated proforma. Data including demographic details, history of blood donation, and barriers and facilitators of blood donation were collected and analyzed using DATAtab 2023.

Results

Out of the 100 participants in the study, 36 were blood donors with 2.8 average donations. Mean age was 33±10. Participants with higher education had more chances of blood donations. 92 were interested in future blood donations.

The main facilitators for whole blood donations were found to be encouraging family members (15%), peer group encouragement (11%), awareness (11), special day celebration (10%), called for donation (9%), and health benefits (9%). The main barriers for whole blood donation were found to be lack of opportunity (20%), Conveyance issues (9%), anemia (8%), fear of needle prick (8%), and fear of reactions (8%), and medications (7%).

Conclusion

From this study, we observed that around 90 % of the females are interested in blood donations. Support from family members, peer group were the main facilitators, and lack of opportunities and conveyance issues were the main barriers for female whole blood donation. We plan to continue this study on a larger scale with intervention. Strategies may be adopted based on the barriers and facilitators to improve female whole blood donation in our country.

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KNOWLEDGE, ATTITUDE AND PRACTICES AMONG BLOOD DONORS AND NON-DONORS REGARDING IRON DEFICIENCY RELATED LOW HEMOGLOBIN

Dr. Bineeta Awasthi, Dr. Suchet Sachdev, Dr. Sangeeta Kumari, Prof. Dr. Ratti Ram Sharma, Dr. Kamal Kishore, Prof. Dr. Sandeep Grover, Dt. Deepika Puri

Introduction:

Assessment of the knowledge, attitude, and practice regarding iron deficiency low hemoglobin, is the first step towards the formulation of interventions to mitigate donation induced iron deficiency.

Aims and Objective:

To assess the knowledge, attitude and practices among blood donors and non-donors regarding iron deficiency related low hemoglobin.

Materials and Methods:

Cross-sectional study was conducted at the Department of Transfusion Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh from June to October 2022 after the approval by the Institute Ethics Committee. Online study using pilot tested, pre-validated, self-administered structured questionnaire using convenience sampling.

Results:

975 participants, including 72.8% donors and 27.2% non-donors. Overall, 44%, 43% and 46% of the total participants, donors and non-donors had adequate knowledge with mean knowledge score of 16±7.04, 16±7.27 and 17±6.40 respectively. Overall, 56%, 57% and 53% of the total participants, donors and non-donors had positive attitude with mean attitude score of 2±1.6, 3±1.6 and 2±1.5 respectively. Overall, 68%, 84% and 54% of the total donors, counselled donors and non-counselled donors adopted practices to increase iron, protein and vitamin C rich items in diet and decrease tea and coffee in diet with mean practice score of 5±2, 5±2 and 4±1.86 respectively achieving statistical significance. The mean hemoglobin values in non-vegetarians, non-donors and counselled donors were higher as compared to vegetarians, donors and non-counselled donors respectively achieving statistical significance.

Conclusion:

Trained blood centre counsellors appear to be the key human resource in the activities to inform, educate and motivate (counsel) donors on donation induced iron deficiency, tailor made to suit the local socio-economy and demography. Prevention is better than cure appears the most suitable strategy as the first step towards the “donor blood management” because regular blood donors are predisposed towards donation induced iron deficiency related low hemoglobin.

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FACTORS INFLUENCING DONOR MOTIVATION AND INTENTION TO RETURN AMONG BLOOD DONORS IN A TERTIARY CARE HOSPITAL

Dr. Neema Vijay, Dr. Sankalp Sharma

Introduction:

Blood transfusion is an essential service of the healthcare system, but ensuring sufficient availability of blood poses a global challenge. Understanding the motivations and barriers influencing potential blood donors can facilitate effective strategies to improve donor experience and retention.

Aims and Objectives:

To assess motivating and deterring factors for blood donation and factors influencing donors' return to the blood centre.

Materials and Methods:

A cross-sectional study was conducted among eligible donors in blood centre using a self-administered online questionnaire with variables about donor demography, motivation and deterring factors, and intention for future donations.

Results:

Among the 270 blood donors who participated in the survey, the majority were males (96.7%), with the most common age group being between 25 and 35 years (54%). Of the total participants, 41.9% were graduates, and 22.2% were professional workers. 73.3% of the donors were from urban areas. 32.6% were first-time donors, while the remaining donors were repeat donors. Most were replacement donors (82.6%), with voluntary donors comprising 17.4%. Altruism, donation for replacement, and peer influence were the most common motivating factors. The predominant deterring factors were lack of time and concerns about potential adverse health impacts. Notifications through personal phone calls (73.7%) were perceived as beneficial in motivating for future blood donations. The majority of donors, constituting 71.4%, indicated their willingness to repeat blood donation and expressed motivation to encourage their friends and relatives for blood donation.

Conclusion:

The study showed a substantial correlation between demographic factors and willingness to donate blood. Altruism and time constraints were the major motivating and deterring factors respectively. Recognizing positive and negative motivating factors and addressing misconceptions will enhance donor recruitment and retention. Effective donor retention strategies are vital for blood centres to ensure safe blood supply, given that donor satisfaction plays a pivotal role in this endeavor.

A STUDY OF IRON STATUS AMONG REGULAR VOLUNTARY BLOOD DONORS AT A TERTIARY CARE CENTRE IN WESTERN RAJASTHAN, INDIA

Dr. Aishwarya Singh, Dr. Arun Bharti, Dr. Manoj Saini

Background:

Regular blood donation can lead to pre-clinical iron deficiency as well as iron deficiency anemia. Estimation of hemoglobin and hematocrit alone in voluntary blood donors may not be adequate. This study was done using a combination of hematological and iron status parameters. The minimum cut-off was set at hemoglobin =12.5g%.

Aim & Objective:

To study iron status among regular voluntary blood donors at a tertiary care hospital in Western Rajasthan, India.

Material & Method:

This cross-sectional study was carried out at Blood Centre, consisting of 500 donors who donated for the first time (control group n=100) and regular blood donors (test group n=400). Regular donors were divided into 4 subgroups.

Results:

First time donors (n=100) had a higher mean serum ferritin level than those in regular blood donors (n=100). 9.4% (47) of regular blood donors had depleted iron stores (serum ferritin 15-20 microgram/L) and 27% (135) had deficient iron stores (serum ferritin<15 microgram/L). Serum ferritin levels were markedly reduced in donors who donated multiple times and within 3-5 months of last donation.

Conclusion

This study shows a significant correlation between the frequency of donation and decreased iron stores (ferritin). It is concluded that a higher prevalence of iron deficiency is present among regular blood donors. Iron supplementation needs to be considered in such iron deficient donors.

Keywords:

Iron status, Regular Blood donors, Serum Ferritin

SCREENING OF VOLUNTARY BLOOD DONORS FOR BETA THALASSEMIA TRAIT IN AN ENDEMIC AREA IN NORTH-WEST INDIA FOR 15 YEARS: RESULTS AND FUTURE DIRECTIONS AFTER SCREENING MORE THAN 300 THOUSAND DONORS

Dr. Anshika Yadav

Introduction:

North-West India has a high prevalence of Thalassemia, and the Beta Thalassemia Trait often remains undetected in the population. Recognizing the need to address this public health issue, we initiated the “Blood the Lifeline” project by screening voluntary blood donors.

Aim:

The primary aim of this study was to screen voluntary blood donors in an endemic area in northwestern India for the Thalassemia trait.

Materials & Methods:

The screening program was conducted from January 2006 to December 2022 on Voluntary blood donors.

Screening Process: EDTA Pilot tube from each donor was collected and analyzed within 24 hrs of collection. RBC Counts, Hb Concentration, MCV, MCH, and RDW-SD were noted. A combination of Formulas like Mentzer’s index <13; Shine and Lal Index (S&L) < 1530; Green & King < 65 were used for screening.

Positive Samples on initial screening underwent a confirmatory test as done by demonstrating the elevation of concentration of HbA2 by HPLC VARIANT II fully automated analyser.

Results:

A total of 377,503 voluntary blood donors for 16 years were screened. The Mean Hemoglobin of positive donors was 12.1 gm/dl; the Mean RBC Count was 6.24 m/cu mm, MCV 67.79 fl, MCH 21.04 pg, RDW-SD 42.11fl & HbA2 was 7.48%. The majority of positive cases were found in the Sindhi (16.68%), Punjabi (10.32%), and Muslim (9.81%) ethnic groups. The Rajasthani population accounted for 6.01% of positive cases.

Conclusion:

This comprehensive screening program revealed a relatively high prevalence of Thalassemia trait in 2.29% of the screened population. The communities with higher prevalence (Sindhi, Punjabi, and Muslim) were educated about the disease and a targeted screening program will be carried out in these ethnic groups.

The results of this study serve as a foundation for future initiatives aimed at minimizing the impact of Thalassemia at a community level.

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PRE-DONATION DONOR HYDRATION IS A SIMPLE COST-EFFECTIVE STRATEGY TO REDUCE VASOVAGAL REACTIONS IN WHOLE BLOOD DONORS

Dr. Vadad -, Dr. Rasika Dhawan Setia, Dr Mitu Dogra, Dr Gunjan Bhardwaj, Dr. Amena Ebadur Rahman

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Introduction:

Most common deterrent to donor retention is experience of a vasovagal reaction (VVR) during blood donation. Interventions like caffeine intake, audio-visual distraction, application of muscular tension etc. have been attempted in various studies to attenuate this adverse hemodynamic response; however, practicality and continuity of the intervention across different collection settings remains questionable. Water ingestion produces hemodynamic effects that cause significant cardiovascular changes like increased activation of sympathetic nervous system, peripheral vascular resistance & BP that peaks approximately 30mins after water intake. Offering guests a glass of water is a basic Indian tradition. In this study, we tried to encash this common practice as a routine donor welcome activity & evaluate its effectiveness on VVRs.

Aim:

To assess effectiveness of pre-donation donor hydration on rate of VVRs in whole blood donors (WBD).

Materials and methods:

32499 WBD were assessed & study population divided into 2 groups.

Group 1 included 10573 WBD, retrospective study-January 2021 to December 2021, to analyse extent of the problem. Data retrieved from electronic & manual records.

Group 2 prospective study -January 2022 to June 2023 (21926 WBD). Pre-donation hydration strategy implemented -a glass of water (approximately 350ml) offered to WBD at time of registration. Average time taken from registration to donation is 20-30 minutes, which coincides with time for BP to peak.

Results:

VVR rate dropped to 53/21926(0.24%) in WBD given pre-donation hydration versus 113/10573(1.07%) in pre-intervention group (P<0.0001). Ingestion of 350 ml of water, 30 minutes before donation had significantly decreased VVRs to 0.24% versus 1.07%(RR 0.2530;95% CI – 0.1816 to 0.3525).

Conclusion:

Pre-donation donor hydration is simple cost-effective and easily implementable strategy across settings to reduce VVRs in WBD, resulting in overall donor safety as well as reduction in moderate to severe VVR and avoid possible litigations arising out of any complications arising thereof.

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DONOR HEMOVIGILANCE IN A BLOOD AND COMPONENT CENTRE, DEPARTMENT OF PATHOLOGY AT A TERTIARY CARE CENTRE – A CROSS SECTIONAL STUDY

Dr. Viraj Warbhe, Dr. Anjali Patrikar, Dr. Sabiha Maimoon

Introduction

Hemovigilance is an important aspect of blood safety which aims at identification, monitoring, and prevention of adverse reactions, incidents, and adverse events related to blood donation and transfusion for both blood donors and patients.

Objective

Adverse donor reactions have a detrimental effect on donor retention, which is important for meeting the rising demand of blood. This study's objectives were to calculate adverse donor reactions and to identify any demographic correlations.

Materials & Methods

A cross sectional study was conducted at the Department of Pathology at a Tertiary Care Hospital (Blood Bank) for 8 months of time duration. A total 1572 Blood Donors were studied in this study. Professionally trained donor attendants drew blood and all donors were observed during and following donation for possible adverse events for 20 minutes. Blood donors were asked to report if they suffered from any delayed adverse consequences.

Results

Out of 1572 blood donors, 23 donors experienced adverse reactions. The incidence was one in every 68 donations. The mean age of donors experiencing adverse events was 28 years, of which 74% were male. Average weight of the blood donors was 66kg. Out of 23 donors, 15 (65%) were 1st time donors, 12 (52%) donors developed reaction during donation. 21 (95%) developed vasovagal reaction (VVR), 8 (35%) had nausea, 18 (78%), 4 (17%) had vomiting, 18 (78%) experienced dizziness, 16 (69%) had generalized weakness, 12 (52%) had sweating, 8 (35%) had anxiety. 10 male donors (59%) and 4 female donors (67%) were in between the age of 18 to 25 year of age. Arterial prick, nerve injury, cardiac arrest, and seizures were not observed.

Conclusion

Regular reporting of adverse donor events will help in enhancing blood centre employees' documentation of all elements of a full blood donation procedure.

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ANALYSIS OF BLOOD DONOR DEFERRAL PATTERN IN A TERTIARY CARE BLOOD CENTRE OF SOUTHEAST PART OF THE RAJASTHAN

Dr. Arifa Bano, Dr. Hargovind Meena, Dr Rashmi Parashar

Introduction:

Blood donor selection is an important step of blood transfusion safety designed to safeguard the health of both donors and recipients. For this donor selection is necessary in addition to the screening of the blood bags for infectious diseases. However, deferral lead to loss of precious blood/components available for transfusion.

For preventing this we should have knowledge about causes of deferral and their frequency. The NACO statistics show that the annual rate of blood donation in India is about 7.4 million units, against the requirement of 10 million units.

AIMS & OBJECTIVE:

1. To analyze the blood donor deferral pattern in our tertiary care blood centre
2. To formulate a policy regarding retention of temporary deferred door.

Material & Methods:

Data of whole blood donors presenting in a new medical college & hospital blood centre, government medical college, Kota and outdoor camps over eight months from December 2022 to July 2023 were evaluated retrospectively. National guidelines were used for selection and deferral of whole blood donors. 7888 participants who came for whole blood donation were included in the study. Out of total 7888 participants, 387 WBD were deferred. Most of them were deferred on physical examination and haemoglobin testing. Most common reason for deferral is underweight/underage which is (26.8%). Anaemia contributes to 15.6% in total deferral. Other causes are medical causes & surgical causes (14.6%), inadequate sleep (14%), vaccine (2.1%), alcohol (4.9%), high risk (5.3%), tattoo (3.4%), tooth extraction (3.8%), Abnormal B.P. (3.1%) donated within three months (6.4%).

Conclusion:

Insight into donor deferral reason promote proactive measures towards donor recruitment and retention. Donor education regarding donor eligibility criteria and anaemia correction in potential donor is the key highlight of study.

A PROSPECTIVE STUDY ON EVALUATION OF IRON STORES IN REGULAR BLOOD DONORS BY SERUM FERRITIN IN A TERTIARY HEALTH CARE CENTRE

Dr. Jyoti Singh

INTRODUCTION:

Repeat blood donation plays a crucial role in maintaining a stable and adequate blood supply. Frequent blood donations can lead to iron deficiency anemia in repeat blood donors due to the loss of iron-containing RBCs. Serum ferritin is a biomarker of iron storage which provides insights into the iron status of individuals thus signifying the importance of serum ferritin in routine donor investigation.

AIMS AND OBJECTIVES:

The aim of study is to evaluate the effect of repeated blood donation on body iron stores in both voluntary and replacement blood donors.

MATERIALS AND METHODS:

There was a Prospective study conducted for 3 months from June 2023 to August 2023 in department of Transfusion Medicine. Total of 160 voluntary and replacement repeat male blood donors who had donated and the last donation being within the previous year, and continued to donate for at least once per year were considered. Donors were divided into three groups, depending on their number of donations. Group I donors donated 1-5 times (118 donors; 73% of total) Group II ,6-10 times (30 donors; 19%) and Group III >11times (12 donors, 8%) lifetime donations. Samples were tested for serum ferritin to check for body iron stores. Data was analyzed using MS Excel.

RESULTS:

There was 33% decrease in the mean serum ferritin values in Group II (46.99 µg/L) in contrast to Group I (70.33 µg/L), and 52% decrease in Group III (33.85 µg/L) in contrast to Group I.

CONCLUSION:

The present study shows iron depletion in regular voluntary and replacement blood donors with increase in number of donations. Hemoglobin estimation alone in regular blood donors may not be adequate; serum ferritin estimations may need to be done to detect depleting body iron stores. Iron supplementation needs to be considered in regular, repeat voluntary blood donors.

A RETROSPECTIVE STUDY OF ADVERSE DONOR REACTIONS IN WHOLE BLOOD DONORS IN A TERTIARY CARE HOSPITAL

Dr. Jyoti Singh

INTRODUCTION:

Blood donation is a relatively safe procedure and donors usually tolerate the donation process well. Still, some donors may experience unpleasant adverse donor reactions (ADRs) of variable severity during or after the blood donation procedure. These ADRs can have a negative impact on donor recruitment and retention.

AIM AND OBJECTIVE:

To estimate the severity of adverse events occurring in whole blood donors.

MATERIAL AND METHOD:

This was a retrospective study conducted for a period of 1 year from July 2022 to June 2023 in the Department of Transfusion Medicine. The data was analyzed using MS Excel.

RESULT:

A total of 9,430 healthy donors were registered taken from departmental records. Out of which males were 9234 (97.92%) and females were 196 (2.07%). All donors were observed for any possible adverse events during and after the procedure for 20 minutes as per departmental SOP. During this period of one year out of 9,430 donors, 161(1.7%) donors experienced donation related adverse effects. Among these 87% (140/161) were males and 13% (21/161) were females. Out of these 89.28% (125/140) males and 80.95% (17/21) females recorded hematomas, and 10.72% (15/140) males and 19.05% (4/21) females experienced generalized vasovagal reactions. 0.92% of first-time donors and 0.25% of repeated donors developed adverse reaction.

CONCLUSION:

Analysis of adverse donor reactions helps in selecting the blood donors who are at risk of donor reactions. The study helps in assessing the importance of proper pre donation screening along with analyzing adverse events, identifying the donors at risk of donor reactions and adopting appropriate donor motivational strategies, pre-donation counselling, and care during and after donation.

COMPARATIVE ANALYSIS OF IRON STORES, LIPID PROFILE & BLOOD SUGAR LEVEL IN REGULAR & FIRST-TIME DONORS

Dr. Neha Dhariwal, Dr Saroj Rajput, Dr. Brig. Tathagata Chatterjee, Dr. Col. MS Bindra

INTRODUCTION

Low iron stores is a major complication of repeated blood donation. However, most of the blood screening methods do not have guidelines for testing iron studies leading to possible subclinical iron deficiency.

AIM & OBJECTIVE

The aim of this study is to evaluate the effects of repeated blood donation on the iron status, lipid profile & blood sugar levels in voluntary blood donors.

MATERIAL & METHODS

A total of 157 regular (study) & 143 first-time (control) volunteer blood donors were studied prospectively. 5mL of venous blood was drawn from each subject, 2 mL of which was put into Na-EDTA c for a full blood count (Sysmex XP300) & HbA1c (VITROS XT7600). The remaining sample was allowed to clot in a plain container, and the serum was then retrieved for serum ferritin, serum iron, TIBC & Lipid profile measurement by VITROS XT7600.

RESULT

A total of 300 regular blood donors were included in the study. The mean serum ferritin levels in regular donors were 62.29ng/ml & first time donor were 70.07 ng/ml, mean HbA1c among regular donors is 5.53% & first time is 8.32% & mean total cholesterol of regular donors is 173.3mg/dl & first time donors is 165.2mg/dl. A significant difference was observed between the ferritin levels of regular & first time donors ($p = 0.001$) & HbA1c ($p=0.0094$) but no significance difference between total cholesterol ($p=0.056$).

CONCLUSION

Our study concluded that regular blood donors had low iron stores, as shown by ferritin levels and other iron indicators. Based on our study we recommended that inclusion of iron biochemical markers in screening may enhance blood donor safety. Monitoring of blood donors to prevent development of iron deficiency anemia & guidance on dietary iron supplements will increase donor pool.

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TREND OF BLOOD DONOR DEFERRAL BEFORE, DURING, AND AFTER THE COVID-19 PANDEMIC

Dr. Sangeeta Kumari, Dr. Anubhav Gupta, Dr. Suchet Sachdev, Dr. Ratti Ram Sharma

Introduction:

Periodic analysis of blood donor deferral is a good practice to generate evidence to update donor selection criteria to ensure the safety of potential blood donors and blood recipients and to prevent non-judicious loss of potential blood donors.

Aim:

To review donor deferral trends before, during, and after Covid-19 pandemic.

Material and Methods:

This was a retrospective analysis of donor deferral trend at the Blood Centre of tertiary care Centre over four years (2019-2022). Donors were deferred based on the Drugs and Cosmetics Act 1940 and Rules 1945 and National guidelines to blood transfusion services during the Covid-19 pandemic.

Results:

The overall deferral rate was 14.4% for quadrennium (2019-2022). 87.4% were deferred temporarily and 12.6% permanently. Deferral rates were 56.29% v/s 13.23% for female v/s male, 17.73% v/s 12.73%, for voluntary v/s replacement, 24.69% v/s 2.73% for first-time v/s repeat blood donors. Covid-19 accounts for 3.33%, 10.28%, 1.05% deferral for the years 2020,2021 and 2022 respectively. Low hemoglobin was the leading cause of deferral, which accounts for 33.9%. Biennium 2021-22 deferral rates were less as compared to the biennium 2019-20 as following- 11.7% v/s 19.2% overall, 10.6% v/s 17.7% in male, 53.0% v/s 59.4% in female, 14.6%v/s 22.2% in voluntary, 10.3% v/s17.3% in replacement, 19.35% v/s 37.9% in first time and 2.5 % v/s 3.1% in repeat donors.

Conclusion:

Impact of covid-19 on blood donor deferral was more during vaccination phase because of the lack of knowledge about deferral period after Covid -19 vaccination. Blood Transfusion Services should include new deferral criteria with deferral period in Information and Education material and motivate temporarily deferred persons to come back once deferral period is over. As deferral rate was less in repeat donors, Blood Transfusion Services should emphasize the retention of Donors.

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PREVALENCE OF VASOVAGAL REACTIONS IN WHOLE BLOOD DONORS AND EFFECT ON DONOR RETENTION: A DESCRIPTIVE STUDY AT A TERTIARY CARE CENTRE IN NORTH INDIA

Dr. Deepali Chauhan, Dr. Ashish Jain, Dr. Joyisa Deb, Dr. Gita Negi, Dr. Juhi Bhatia, Dr. Daljit Kaur

Introduction

Donating blood is a safe procedure even though a few donors experience side effects of which most commonly are vasovagal reactions (VVR), which can impact donor motivation and return behavior. A descriptive analysis is necessary to study the variables affecting vasovagal reactions(VVR).

Aims and Objectives

To analyze prevalence and variables of vasovagal reactions in whole blood donation and effect on donor retention.

Material and Methods

A descriptive study was performed and retrospective data collected over a period of 3 years (July 2020 to June 2023). Donor characteristics like age, sex, first time/repeat donors, voluntary/replacement donor, waiting period before donation and volume of whole blood collected were analysed.The data collectively taken from records and software. The VVRs were graded mild, moderate and severe.

Results

The study included voluntary and replacement whole blood donors(n=49,657) over a period of 3 years, in this duration 348(0.7%) vasovagal reactions were reported. Among these VVRs, the first-time donors were 201(57%), replacement donors were 247(71%), donors who faced VVRs after prolonged waiting time (>20 minutes) were 184(53%) and female donors were 21(5.4%) of total 386 female donations. Among these VVRs 223(64%),118(34%) and 7(2%) had mild, moderate and severe reactions respectively. The VVRs were reported in different age groups, with 250(72%) in 18-33 years , 91(26%) in 34-49 years, and 7(2%) aged over 49 years. All of these VVRs were managed conservatively and post donation counseling was provided. About 14%(54) donors came for repeat donations later, these all were voluntary donors.

Conclusion

The prevalence of VVRs among whole blood donors in AIIMS Rishikesh is 0.7%, with 1 in every 142 donations. It is important to analyze the variables affecting VVR for knowing the factors influencing it.

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EXTENDED PHENOTYPING OF WEAK D SAMPLES IN UTTAR PRADESH

Dr. Shubhi Yadav, Dr Anurag singh

Aim:

To analyze Fischer and Weiner classification in Weak D samples in Uttar Pradesh

Methods:

Donors Donated blood according to DCA Act after which blood grouping was done on Diagast France Machine. Samples that came Rh Negative were tested for WEAK D, WEAK D was performed on the Diagast France machine. Following this Rh extended phenotyping was done.

Results :

Around 1,20,000 samples were tested out of which 7895 came out to be Rh D negative out of which 20 were WEAK D Positive. The most common phenotype came out to be of D neg C pos c pos E neg e pos K neg,. 60% (n=12) of the donors showed the above phenotype. The most common phenotype came out to be R1r.

Conclusion:

In summary, the study on Extended Phenotyping Of Weak D Samples is highly pertinent due to its potential to refine blood compatibility testing. Improving our understanding of various phenotypes can actually help in people who require frequent transfusions like in Thalassemia, and other disorders. This research contributes to safer transfusions, directly benefiting patient well-being and medical practice and reducing alloimmunisation in patients.

VASOVAGAL REACTIONS AMONG WHOLE BLOOD DONORS OF A TERTIARY CARE CENTRE IN NORTHERN INDIA

Dr. Noorul Aashiqeen, Dr Kshitija Mittal, Dr Tanvi Sood, Dr Gagandeep Kaur, Dr Paramjeet Kaur, Dr Ravneet Kaur

Introduction:

Whole blood donation is generally considered a safe procedure; however, a small percentage of donors can develop vasovagal reactions (VVRs) during or after completion of blood donation.

Aim:

To determine the frequency and risk factors for vasovagal reactions in blood donors

Material and Methods:

This study was conducted in the Department of Transfusion Medicine to establish the prevalence of VVRs among whole blood donors. A retrospective analysis of whole blood donor demographic and blood donation-related information was extracted from the departmental records from January 2023 to August 2023.

Results:

Among 10785 whole blood donations, 16 cases of VVRs were reported, resulting in a VVR rate of 0.15%. The majority of donors who experienced VVRs were males (81.25%, n=13), Females (18.75%, n=3) young (age<30 years, n=7, 43.75%,) and first-time (37.5%, n=6) donors. All the VVRs reported were from donations in outdoor blood donation camps. 87.5% donors (n=14) experienced VVR within 5-15 minutes post donation while VVR during whole blood donation was observed in 12.5% donors (n=2). The most common vasovagal symptoms reported were dizziness and generalised weakness (87.5%, n=14), followed by anxiety (50%, n=8), loss of consciousness <60 s (62.5%, n=10), vomiting (37.5%, n=6), pallor (25%, n=4) and cold extremities (18.75%, n=3).

Conclusion:

Our study reaffirms that whole blood donation is a relatively safe process. Young first time blood donors are at higher risk of VVRs. The incidence can be reduced by ensuring strict screening procedure and blood donor counselling before blood donation in outdoor blood donation camps.

BLOOD GROUP DISCREPANCIES IN DONORS: A RETROSPECTIVE ANALYSIS

Dr. Ankit Garg, Dr. Tanvi Sood, Dr. Paramjit Kaur, Dr. Ravneet Kaur, Dr. Gagandeep Kaur, Dr. Kshitija Mittal

INTRODUCTION:

ABO discrepancies arise due to mismatch between cell grouping and serum grouping results. Accurate ABO and Rh typing in blood donors and patients is essential for the safe and timely issue of blood components to patients.

AIM:

To determine the frequency and causes of ABO discrepancies in whole blood donors.

MATERIAL AND METHODS:

This retrospective study was conducted over a period of seven months (January 2023-July 2023). Records of all ABO and Rh discrepancies in blood donors were retrieved from group discrepancy register and analyzed.

RESULTS:

During the study period, 11386 donor samples were tested of which 12 (0.10%) samples showed discordant results. The mean age of donors was 34 years and all 12 were male donors. The majority of discrepancies were seen in red cell grouping. The most common blood group involved was A (n=5; 41.6 %). The discrepancies were further classified. Type II discrepancy due to weak or missing antigen was most common (n=8, 66.6%) which included weak subgroups of A (n=5), AB (n=2), and B (n=1). Type IV discrepancy due to irregular antibodies was seen in three donors. The antibodies identified in these samples were anti-Leb in two donors and anti-M in one donor. In one donor, initial blood grouping was A Rh D negative using automated immunohematology analyser but the weak D test was positive using column agglutination technique. The donor was labeled as A Rh D positive as a donor and A Rh D negative as a recipient.

CONCLUSION:

All cases of blood group discrepancies should be carefully investigated to determine the cause and to ensure that the blood donor is accurately typed. Blood donors should be informed of the results of the investigation and of any implications for their future donation of blood.

A RETROSPECTIVE ANALYSIS ON BLOOD DONOR DEFERRAL PATTERN IN A TERTIARY CARE CENTRE

Dr. Aman Shakya

INTRODUCTION

Donor deferral is a part of transfusion service to assure the safety and health of the donor as well the recipient. Deferrals lead to loss of whole blood donors and blood units available for transfusion purposes.

AIM AND OBJECTIVES

To analyze the donor deferral pattern in whole blood donors presenting themselves in the blood center and outdoor camps.

To counsel and motivate the temporary deferred whole blood donors to increase the recruitment of donors

MATERIALS AND METHODS

A 1 year retrospective donor deferral data was collected from January 2022 to December 2022 in model blood center, MGM medical college, Indore. Blood donors coming at the blood center or outdoor camps were deferred due to various types of permanent or temporary reasons. DGHS and NACO guidelines were followed for deferral criteria.

RESULTS

42204 whole blood donors were screened and 2092 (5.08%) donors were deferred. 2060 (98.3%) were deferred temporarily and 32 (1.7%) were deferred permanently. 1856 (88.54%) were males and 236 (11.44) were females. The mean age was 24.6 years. Major donor deferral in males were low hemoglobin(19.63%),antibiotics intake within 14 days(18.47%),alcohol intake within 72 hours(12%), body temperature above 98.4 F(11%), underweight(6.9%), sleep inadequacy(4.8%) and history of jaundice within 1 year (4.2%). Whereas in females were low hemoglobin(60%), underweight (13%), history of typhoid within 1 year(6.5%),antibiotics intake within 14 days(4%), age below 18 years(3%).Approximately 60.8% of total deferral were attributed to low hemoglobin, antibiotics intake within 14 intake, alcohol intake within 72 hours, underweight and sleep inadequacy.

CONCLUSION

In this study, we found that majority of donor were temporarily deferred, so strategies should be made to encourage the deferred donors to comeback for donation and adopt lifestyle changes to improve their health.

OBSERVATIONAL STUDY TO ASSESS THE ADVERSE EVENTS AMONG THE VOLUNTARY BLOOD DONORS IN REGIONAL NATIONAL CANCER INSTITUTE IN EASTERN INDIA

Dr. RATHINDRA NATH Biswas, Dr Debanjan Ghosh, Dr Basab Bagchi

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Introduction:

Blood donation procedure involves certain adverse events which are experienced in fewer individuals. The most common side effects observed are mild to moderate vasovagal reactions (agitation, sweating, pallor, cold feeling, sense of weakness, nausea), hematoma, neuropathy, and fatigue.

Aims & Objectives:

To estimate and possibly avoid the cause of unwanted reactions.

Materials & Methods:

We conducted a study of whole blood donor from January 2022 to June 2023 for comprehensive statistical analysis to derive insights from the provided dataset, which encompassed age, weight, haemoglobin, pulse rate, blood pressure, pallor and sweating associated with adverse reactions of blood donors. Our analysis included Descriptive Analysis , chi-square test, and logistic regression analysis.

Results:

Total of 7328 volunteers donated of whole blood and 96(1.31%)had found adverse reaction where female were found10(1.64%)as opposed to 86(1.28%) males. Average age and body weight of donor adverse reaction group were less than control group. Most commonly observed mild to moderately vasovagal reaction was 76(79.17%) followed by phlebotomy side haematoma 14(14.58%) and others were generalised weakness, vomiting and peripheral nerve injury. Involuntary movements and fainting were observed 11(11.45%) among vasovagal reaction group. Donors aged less than < 30 years and weight < 60 kg were significantly associated with vasovagal reaction ($p<0.05$). The logistic regression analysis showed that traumatic venepuncture was a statistically significant determinant ($p <0.05$ and 95% CI) compared to easy, non-harmful venepuncture. The multivariate logistic regression analysis showed that there was a marked statistical significance ($p < 0.05$ and 99% CI), in favour of the factor sweating and pallor.

Conclusion:

Although the number of donors who observed adverse reaction during or at the end of blood donations was very low, it is nevertheless desirable to reduce risks to a minimum. A well-trained, experienced phlebotomist and pre-evaluation counselling of blood donors could further minimize the adverse reactions.

RETROSPECTIVE STUDY TO ESTIMATE DISTRIBUTION OF ABO AND Rh(D) ANTIGENS IN BLOOD DONORS AT TERTIARY CARE HOSPITAL KOTA, RAJASTHAN

Dr. SABITA RAI, Dr. HAR GOVIND MEENA, Dr. RAJESH KUMAR, Dr. SHAILENDRA VASHISTHA

INTRODUCTION

Blood transfusion is a vital lifesaving modality in health care. Considering the unique patterns of blood groups occurring in different ethnicities, estimating the distribution of ABO and Rh antigens in blood group system is important. It helps in blood inventory management, to study population migration patterns as well as for population genetic studies.

AIM

To estimate the distribution of ABO and Rh blood group in donor population of Kota District, Rajasthan.

MATERIALS & METHODS:

The data is collected from the blood centre of Govt. Medical College, Kota from march 2022 to July 2023. Total of 16,200 donors from KOTA district who satisfy the essential criteria as per the Drug and Cosmetic Act, 1940 were taken up for study. The study population included Voluntary donors, replacement donors and outdoor camp donors. ABO and Rh typing were performed manually by saline agglutination method. Forward blood grouping was performed using commercially prepared antisera. In-house Reagents cells were used for reverse grouping. Variables were collected and analysed using Microsoft Office Excel 2011.

RESULTS:

Male donors (97.35%) were more than female donors (2.65%). 94.82% of donors were detected Rh(D) positive and 5.17% of them were Rh (D) negative. The donor population constitute of voluntary donors 14.82%, replacement donors 46.28% and camp donors 38.90%. The distribution of ABO-Rh(D) blood groups were as follows B+ (35.02%) > O+ (29.50%) > A+(22.09%) > AB+(8.21%) > B- (2.07%) > O- (1.55%) > A- (1.01%) > AB- (0.55%).

CONCLUSION:

This study concludes that B+ blood group is the most prevalent blood group in Kota district of Rajasthan. Rh(D) Negativity was 5.17%. Further studies should be performed on a larger scale of population in Rajasthan and the Indian subcontinent, to find out if environmental factors, genetic make-up plays any role in blood group distribution in specific regions.

PREVALENCE OF ADVERSE DONOR REACTIONS AMONG WHOLE BLOOD DONORS- A DESCRIPTIVE STUDY AT A TERTIARY CARE CENTRE IN KERALA

Dr. Greeshma S, Dr. Maya Devi S

Introduction

Blood is a life saving fluid that cannot be created artificially, but is only collected from donors. Donor retention is directly linked with donor satisfaction. Donors might refrain from donating again due to adverse donor reaction which lowers the blood supply in collection centres.

Aims & Objective

To estimate the prevalence of adverse donor reactions and to analyze the factors related to it among whole blood donors at a tertiary care Centre in Kerala.

Materials & Methods

This is a retrospective, descriptive study conducted on whole blood donors over a period of one year, i.e. from September 2022 to August 2023 at a tertiary care Centre in Kerala. All the data was collected using documents of our blood center- donor cards, donor reaction forms and registers.

Results

During this period, 26896 donors donated blood, out of which 19146(71.1%) were voluntary and 7750(28.9%) were replacement donors. 323(1.2%) donors experienced donation related adverse effects. Vasovagal reaction was the commonly observed adverse event. Severe donor reactions like seizures were observed in less than 0.1%(4) of the donors. Donors who had severe reactions were shifted to the casualty and were managed accordingly. Reaction rate among male and female donors were 1.1%(309) and 1.8%(14) respectively. Most of the donors 98.5%(318) who experienced adverse donor reactions belong to the younger age groups(<40 years). Higher rate of adverse reactions were observed among first time donors -2.1%(171) while it is 0.08%(152) in repeat donors. Majority of the donors 62.6%(202) who had adverse donor reactions belong to lower weight(<70kg).

Conclusion

Donation related adverse reactions are multifactorial determined by age, gender, weight and donation status. Only 1.2% of donations were complicated by adverse events and most of these events were vasovagal reactions. Analysis of adverse donor reactions helps in selecting the blood donors who are at risk of reactions.

INCIDENCE, SEVERITY AND PATTERN OF ADVERSE REACTIONS AMONG WHOLE BLOOD DONORS AT A TERTIARY CARE HOSPITAL BLOOD CENTRE

Dr. Archana G

INTRODUCTION:

Blood donors normally tolerate the whole blood donation very well, but occasionally adverse reactions (AR) of variable severity may occur during or at the end of the donation. Most of the adverse reactions are usually mild but for the donor it is an unpleasant experience, and acts as a deterrent for repeat donation.

AIM & OBJECTIVE:

To describe the incidence, severity and pattern of adverse reactions among whole blood donors at a tertiary care hospital blood centre.

MATERIALS & METHODS:

This was a retrospective observational study conducted by analysing 18 months data (January 2022 – June 2023). Details of donors (demographic details, previous donation history and type of adverse reaction) were retrieved from donor adverse reaction register. Data was entered and analyzed in Microsoft excel. Descriptive data were given in summary statistics.

RESULTS:

Of the 16906 donors donated (Males-97.14%), adverse reaction rate was 1.02%(n = 172/16906) (Females-6.39%) of which the rate of mild AR was 92.44% (n=159). AR was higher among donors <30 years 79.06%(n=136) and donors with a weight of <55kg 30.81%(n=53) and first time donors 70.34%(n=121).The most common mild AR were in the form of vasovagal reactions77.98%(n=124) and hematoma16.35%(n=26) whereas moderate AR in the form of hypotension with pre syncope was observed among 5.23%(n=9) of donors and 2.32%donors(n=4) had severe AR in the form of seizures and grievous hurt.

CONCLUSION:

Adverse reactions were higher among young aged first time donors with lower weight.AR are at times more severe to hinder donors from repeat donation. Analysis of AR helps in identifying the blood donors at risk and in adopting better strategies such as meticulous pre donation counselling, reassurance and stringent donor monitoring post donation until adequate hemodynamic recovery to ensure them the greatest comfort during and after donation.

KEY WORDS:

Adverse reactions, Blood donors, Vasovagal reactions.

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TO ESTIMATE THE MAJOR CAUSATION FOR DONOR DEFERRAL IN THE BLOOD CENTER OF A TERTIARY CARE HOSPITAL IN NORTHEASTERN PART OF INDIA AS PER NTBC CRITERIA

Dr. Abhiniti Srivastava, Dr Krystal Sinha

Introduction

Blood transfusion is an essential lifesaving procedure and the requirement of blood transfusion is increasing among inpatients for both medical and surgical causes. Donor screening is an essential step in the process of taking blood donations in order to provide safe blood products to patients and also ensure donor safety. Blood safety is an area of major concern in view of transfusion-transmitted infections and other transfusion reactions that might take place. Aims & Objectives- This study was done to know the trends of deferral among people presenting for donation in the blood center of a tertiary care hospital in Patna on a retrospective basis. Results-The most common cause for deferral in our urban tertiary care setup came out to be low hemoglobin and second highest being history of recent vaccination. Conclusion-Some issues are not associated with deferral due to medical conditions listed by statutory authorities. One of the peculiar findings that came up during the study and not accounted for in literature is the withdrawal of consent by the prospective first time donor on reaching the phlebotomy center. The reason for this needs to be further evaluated, however it could be due to looking at the blood filled blood bags, trypanophobia, presence of other donor, or anxiety. In our center the number of such withdrawal has been 14.2/per month or 0.7/100 donors.

Theme

Clinical Transfusion Practice & Patient Safety

ROLE OF THERAPEUTIC PLASMA EXCHANGE (TPE) IN THE MANAGEMENT OF ANTI-GLOMERULAR BASEMENT MEMBRANE (ANTI-GBM) DISEASE: A CASE SERIES

Dr. Samruddhi Sharad Pawar

Introduction:

Anti-GBM disease is a rare, autoimmune disease in which IgG antibodies bind to intrinsic antigens distributed along the length of glomerular basement membrane. It is characterized by rapid and progressive loss of renal function. The rationale of management is to suppress renal inflammation and production of autoantibodies (with immunosuppression), as well as removal of circulating pathogenic autoantibodies (with TPE). However, there is paucity of data on the role of TPE in management of anti-GBM cases worldwide.

Aims and Objectives:

To study the role of TPE in the management of Anti-GBM disease and clinical outcome of patients.

Materials and Methods:

Three consecutive anti-GBM patients were admitted with complaints of high-grade fever, chills, hematuria, and low urine output. Case-1 and case-2 presented to our institute directly, whereas case-3 was referred with a diagnosis of dialysis dependant anti-GBM disease. In view of decreased renal function and strong suspicion of Anti-GBM disease in case-1 and 2, anti-GBM antibody titres were sent and renal biopsy was performed. Treatment protocol was initiated in accordance with international KDIGO guidelines.

Results:

All three patients had >80% crescentic glomerulonephritis on renal biopsy. Management was initiated with TPE and immunosuppression (Methylprednisolone) and cytotoxic drug (Cyclophosphamide). TPE was done until the anti-GBM antibody titre dropped to <10. Case-1 underwent TPE daily (12 sessions), case-2 and case-3 underwent 14 and nine sessions respectively of TPE alternating with dialysis. Renal function improved in case 1 and 2 and routine dialysis was discontinued. Case-3 showed improvement initially until TPE was done; however, the disease progressed to end stage renal disease and the patient remains dialysis dependent. None of the patients had adverse reactions during TPE.

Conclusion:

TPE is an effective and safe conjunct in treatment of anti-GBM disease as shown by complete reversal in two cases and partial response in third patient.

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AUDIT OF CLINICAL USE OF PLATELET AND PLASMA TRANSFUSIONS ACCORDING TO EVIDENCE BASED RECOMMENDATIONS

Dr. Sankalp Sharma, Dr Phalguni Padhi

Introduction:

Paediatric transfusion recipients has wide variation in transfusion practices due to a variation in biochemical profile compared to adults and weight base dosing.

Aims and Objectives:

Aim of the present study to audit platelet and plasma transfusion practices of neonatal and paediatric patients.

Materials & Methods:

We reviewed Paediatric transfusion practices 2018-2022. Age-group (≤ 24 months) Transfusions were labelled Appropriate (A) or Inappropriate (IA). The criteria for neonatal Platelet transfusions (PLT)were as follows: Prophylactic (PLT) neonates (n=38) <25,000/µl (A), ≥25,000/µl (IA); Therapeutic (PT) with clinical bleeding, WHO Grade (GB) <50,000/µl (A),≥50,000/µl (IA). PLT dosing (n=70) neonatal and pediatric age-group 10-20 ml/Kg (+/-10%), yes (A) or no (IA). Plasma transfusions (PlasT) (n=117) with clinical bleeding (A); PlasT without Bleeding (IA); INR levels (PlasT) ≤1.85 (IA);>1.8 (A); PLasT aPTT in childhood (n=62) greater than two times median, yes (A), no (IA); PlasT Dose (10-20ml/Kg BW), yes(A),no (IA).

Results:

In the neonatal age-group PLT cohort (n=38) with preterm (n=23) and Term (n=15) children. There were (n=15) prophylactic transfusions and (n=23) transfusions with clinical bleeding. In the neonatal age-group 73.3% prophylactic PLT were (IA); 26.6% (A). Therapeutic PLT 82.6% (A); 17.39% (IA). Platelet dose 15.71% of PLT within dose range (A),84.2% PLT higher than recommendations (IA).

In childhood PlasT (n=99) 32.3% were transfused plasma without clinical bleeding (IA). PlasT, INR, GB(I) 83.3%(IA), 16.6%(A); GB(II) 75.0%(IA), 25.0%(A), GB(III)64.7%(A), 35.2%(IA); GB(IV) 72.7%(IA), 27.2%(A).

PLaT, aPTT in children above neonatal period (n=62),GB (I) 90.9%(IA), 9.09% (A); GB(II) 94.1% (IA), 5.88%(A); GB(III) 50%(A),50%(IA); GB(IV) 100% (IA).

PLaT dosing 10.2% (A) with 89.7% (IA) higher than recommendations.

Conclusions:

The potential area of interventions (PLT) is awareness of prophylactic PLT transfusion thresholds and (PLT) dosing during neonatal period.

PLasT evidence based recommendations of transfusions without clinical bleeding, evidence-based laboratory recommendations and plasma dosing regimen.

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To analyze the response of platelet transfusion in oncohematology patients

Dr. Shalinderjeet Kaur, Dr. Rajesh Kumar, Dr. Sonia Gupta

Introduction:

Disease and therapy related hypoproliferative thrombocytopenia is a major problem when managing patients with hematological malignancies and massive platelet transfusions are required to reduce risk of hemorrhage. Platelet Transfusion Refractoriness (PTR) is encountered in up to 30% of patients having hematological disease.

Aim :

To study response of low and high dose of platelet transfusion in oncohematological patients.

Material and method:

Single donor platelet apheresis(high dose) and platelet concentrate(low and high dose) were transfused .Post transfusion counts assessed after one hour and 24h of transfusion and corrected count increment (CCI), percent platelet recovery(PPR) calculated.CCI 1HR- <7.5, 24hr -<4.5 and PPR1 hr- <60% ,24 hr- <40% considered refractory.

Results

Total of 21 hematooncology patients received low and high dose of platelet concentrate and single donor apheresis for tranfusion response. Among these 5 patients received SDP and 2 patients high dose and 14 patients low dose of platelet concentrate. Majority patients were ALL (n=10, 47.6%), AML (n=5, 23.8%), aplastic anemia(n=1, 4.8%), multiple myeloma (n=2, 9.5%), myeloproliferative disease (n=3, 14.3%). 42.9% patients have CCI 1hr <7.5, 66.7% have CCI 24 hr <4.5 and71.4% cases have PPR 1hr <60% and 81% have PPR 24 hr <40%.CCI of RDP<7.5 at 1 hr is 50%,<4.5 at 24 hr is 75% ,PPR of RDP <60% at 1 hr 81.3%, <40% at 24 hr 81.3%.The comparison of response indicators (CCI and PPR) are not significant. CCI and PPR after 1 hour p=0.237 , 0.115 and after 24 hours p=0.280, p=0.950

Conclusion

PTR is a severe condition associated with high risk of death from bleeding. Improved knowledge on mechanism of immune and non immune causes of PTR are needed to design rational therapeutic strategy that aims to improve the efficiency of transfusion.

PREDICTION OF MASSIVE TRANSFUSION AND MORTALITY IN SEVERELY INJURED PATIENTS PRESENTING TO ED OF LEVEL 1 TRAUMA CENTRE

Dr. Aparna Krishna

BACKGROUND:

Early identification of those severely injured patients who require massive transfusion can reduce the mortality in severely injured patients.

AIM & OBJECTIVE:

In this study we identified the predictors of massive transfusion and in hospital mortality in severely injured patients in civilian settings.

METHODS:

We performed a prospective observational study (August 2017 to August 2018) in trauma patients of all age groups and Injury Severity Score ≥ 16 who presented to Emergency Department (ED) of a level 1 trauma. The data on injury, clinical, laboratory and transfusion characteristics were collected from electronic hospital records and blood transfusion records. Multivariate analysis was performed to identify predictors of massive transfusion, 24-hour mortality, in hospital mortality and Intensive Care Unit (ICU) admission.

RESULTS:

Among 986 patients who fulfilled the inclusion and exclusion criteria, 104 (11.8%) patients were massively transfused (MT). Median age 29(0-92);83.4% males with a median ISS 17(16-54); GCS 10(3-15). Overall Commonest injury site was Head while in MT Blunt trauma abdomen was common. Multivariate analysis revealed that Head injury(aOR-0.166,p<0.0001) ,shock index >0.9(aOR-2.13,p<0.003),the patients who received FFP transfusion (aOR-5.60 ,p<0.0001),mechanical ventilation (aOR-0.379,p<0.0001), blood loss>2 litres(aOR-2.93,p<0.003) , pH >7.2(aOR-0.21,p<0.002) pulse pressure <45 mmHg(aOR-4.46,p<0.004) and pulse rate >120 bpm((aOR-3.02,p<0.015) were predictors of MT.

CONCLUSION

Predicting MT in ED can ensure early activation of Massive Transfusion Protocol (MTP), arrange blood and blood products early , reduce wastage and prevent deaths due to trauma induced coagulopathy .Future prospects include prevent under or over transfusion by viscoelastic guided resuscitation.

RED CELL ALLOIMMUNIZATION IN MULTI TRANSFUSED ONCOLOGY PATIENTS IN A TERTIARY CARE HOSPITAL

Dr. Harsha Unni, Dr. D. Meena

INTRODUCTION

Blood transfusion is an integral part of multifaceted therapy in oncology patients owing to intense marrow suppression resulting from chemotherapy, radiotherapy, or disease pathology. Alloimmunization against one or more red cell antigens can occur. Alloantibodies complicate pretransfusion testing by causing delays in identifying compatible units and can result in delayed hemolytic transfusion reactions.

AIMS & OBJECTIVES

To identify specificities of red cell antibodies, and to assess the factors and their association with development of antibodies in multi-transfused individuals.

MATERILAS & METHODS

A hospital-based Descriptive Study was conducted among 100 multi-transfused (≥2 packed red cell transfusions) oncology patients aged above 18 years. Blood grouping, Rh typing and antibody screening using commercial 3-cell panel red cells (Biorad Id-Diacell I-II-III) were performed on all blood samples. Antibody identification of screening positive samples done using 11-cell panel red cells (BioradID Dia-panel). The data was entered into Microsoft Excel software and statistical analysis was done using SPSS version 22.0 software.

RESULTS

The rate of alloimmunization was 1% and the mean age of alloimmunized study population was 70±0.00 years. 1.9% of male patients and 1.2% of patients with non-haematological malignancy developed alloimmunization. The specificity of alloantibody detected was anti-C. Alloimmunization was not statistically associated with age and gender. The association of alloimmunization with total number of transfusions (p value=0.017) and, cumulative number of PRC and PC transfusions (p value=0.045) is statistically significant. The mode of cancer treatment undergone also has a significant association with total number of transfusions received.

CONCLUSION

The rate of alloimmunization is low in multi-transfused oncology patients but is of clinical significance. Routine antibody screening should be mandated as part of pretransfusion testing in multi-transfused patients to ensure transfusion safety. Adopting leukoreduction of cellular blood components and provision for phenotype-matched blood products may further decrease the rate of alloimmunization.

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BEYOND THE SCALPEL: A STUDY ON INTRAOPERATIVE BLOOD LOSS AND UTILISATION OF BLOOD COMPONENTS IN A TERTIARY CARE HOSPITAL

Dr. Amit Kumar Chatterjee, Dr Davood Bava, Dr Pandeep Kaur, Dr Akarshan Gupta, Dr Amit Kumar

Introduction:

Operation Theatre (OT) is a potential location for unnecessary or over-transfusion, owing to the panic situation created by a torrential intra-op bleed.

Aims and Objectives:

To investigate intraoperative blood loss and blood component usage to see its rationality and identify potential areas for improvement.

Materials & Methods:

This is a retrospective study conducted among patients who operated at our hospital and received blood transfusion intra-operatively over a period of 3 months. Data were extracted from patient files and hospital information databases. Patient demographics, pre-and post-operative hemoglobin, details of the surgery, the volume of intra-operative blood loss; number and type of blood components transfused were the parameters analysed.

Results:

A total of 53 patients comprising 35 males and 18 females were included in this study. The mean age was 36 years. The Mean pre- and post-operative hemoglobin was 9.9 and 9.6 g/dl, respectively. The mean intraoperative blood loss was 871 ml. A total of 304 units of blood components were transfused intraoperatively, including 41.1% Packed Red Blood Cells (PRBC)s, 33.9% Fresh Frozen Plasmas (FFP)s, 18.8 % platelets, and 6.2% cryoprecipitates. The highest mean post-operative hemoglobin was seen in orthopedic surgeries (10.2 g/dl). The lowest mean pre- and post-operative hemoglobin were seen in Neurosurgery (9.4) and General Surgery (9.1) g/dl, respectively. The Cardio-Thoracic & Vascular Surgeries (CTVS) demonstrated the highest mean pre-operative hemoglobin (10.5 g/dl), maximum blood loss (mean: 2.21 litters), the highest number of transfusions (49% of all components transfused) and 5 out of 6 Massive Transfusion Protocols (MTPs) activated.

Conclusion:

Most of the RBCs were transfused rationally as post-operative hemoglobin is just adequate. The majority of platelets and cryoprecipitates were transfused as a part of MTP. However, it seems most of the FFPs were used for volume replacement, where crystalloids could have been tried.

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TO STUDY THE OUTCOME OF IMPLEMENTATION OF MASSIVE TRANSFUSION PROTOCOL IN TRAUMA PATIENTS IN A TERTIARY CARE HOSPITAL

Dr. Sudha Subanandam, Dr. subash S, Dr. Latha Balakrishnan

INTRODUCTION:

Massive Transfusion is quite often needed in trauma patients with severe bleeding. Haemorrhage remains a major cause of preventable deaths due to polytrauma , if damage control resuscitation is initiated and followed with standard massive transfusion protocol . MTPs are implemented to disrupt the lethal triad of acidosis, hypothermia and dilutional coagulopathy.

AIM AND OBJECTVES:

To study the outcome of Implementation of MTP to traumatic patients at tertiary care hospital.

MATERIALS AND METHODS:

Adult traumatic patients who are admitted in Emergency room with severe bleeding are included in the study from the month of January 2023 to June 2023(21 patients). Massive Transfusion Protocol is initiated and then followed with clinical and laboratory parameters. MTP is initiated in the ratio of 1:1:1 which includes 6 units of Plasma, 1 dose of SDP(or a pool of 6 units on average) and 6 units of PRBC which are transfused in the following order :- platelets first , then alternating RBC and plasma units .In our set up, transfusion of blood products are further decided upon the results Lab paramerts & ROTEM.

RESULTS:

Bleeding decreased significantly in the first crucial 6 hours in most of the traumatic patients(18 patients) and further transfusion done depending upon the clinical condition. Dilutional coagulapathy and volume overload is not seen in 17 patients .

CONCLUSION:

Massive Transfusion Protocol is the need of the hour for the severely bleeding patients due to trauma and it should be done both by Dept of Transfusion & Clinicians. A well defined hospital specific MTP is needed to initiate, trigger and to end the transfusion of blood components. Early transfusion of platelets, plasma and PRBC to truma patients in the ratio of 1:1:1 is beneficial in reducing mortality and also to improve patients outcome.

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BLOOD COMPONENT IRRADIATION – WHERE DO WE STAND?

Dr. Charumathy Arjunan, Dr Dheeraj Khetan, Prof RK Chaudhary, Dr Vasundhara Singh, Prof Priti Elhence

Introduction:

Irradiation of cellular blood components is currently the only proven method to prevent transfusion associated graft versus host disease(TA-GVHD), a fatal complication of blood transfusion. Gamma irradiation of blood components is being done at our Institute since 1996. However, currently there are no national guidelines on indications for irradiation from India.

Aims & Objective:

To assess the appropriateness of irradiation practices at our Institute in reference to International guidelines.

Material and Methods

Patients requiring irradiated blood components from May 2019 to June 2020 were identified. Transfusion history of these patients was followed, both retrospectively and prospectively till July 2021. Transfusion requests for red cell concentrates (RCC) from all these patients were categorized based on their irradiation status (irradiated-IR / not irradiated-NIR) and was analyzed for appropriateness of irradiation status across different ICD 10 disease categories. Various (British Society for Hematology, Australian and New Zealand Society of Blood Transfusion, Canadian Society for Transfusion Medicine, Japan Society of Blood Transfusion) guidelines were used as reference for assessing the appropriateness.

Results:

255 patients were identified during the study period. A total of 2736 units were issued against the 2264 requisitions. Overall, 1477 (65.2%) RCC requisitions were justified for their irradiation status and 545 (24.1%) were found to be unjust while justification could not be assessed for remaining 242 (10.7%) of the requisitions. The highest proportion of unjust requests among IR requisitions was seen in patients with Acute Lymphoblastic Leukemia (43.3%) followed by patients with Myelodysplastic syndrome (31.7%). While, the most common indication of missed irradiation was Aplastic anemia patients who received ATG therapy (58.2%) followed by patients with Acute Myeloid Leukemia (23.2%).

Conclusion:

The incidence of missed irradiation found in this study reaffirms the need for implementation of uniform set of guidelines on blood product irradiation across the nation.

SIGNIFICANCE OF DIRECT ANTIGLOBULIN TEST IN CLINICAL DIAGNOSIS AND MANAGEMENT: TWO CHALLENGING CASE REPORTS OF AUTO IMMUNE HAEMOLYTIC ANAEMIA

Dr. Riya Mathew, Dr. Jasna AM, Dr. Harsha Unni, Dr. Magdelin Simon Varghese, Dr. Jess Elizabeth Rasalam, Dr. CV Mini

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Introduction:

We present two interesting presentations of Autoimmune haemolytic anaemia(AIHA).Clinical history and laboratory workup help to differentiate AIHA from other haemolytic anaemias.

Case Report:

A request was received for a unit of packed red blood cells(PRBC)for a 12year old female who was diagnosed elsewhere to have hereditary spherocytosis. Haemoglobin at presentation was 5.9g/dL. Patient had reticulocytosis(20%), increased serum bilirubin(8.2mg/dL) and her peripheral smear showed anisocytosis, poikilocytosis, spherocytes and nucleated rbcs. Her blood group was O RhD positive. The antibody screen and identification was pan reactive(BioRad,Switzerland).All the units crossmatched were incompatible. Her DAT was positive(4+) and Monospecific DAT showed isolated IgG positivity(CAT).Best matched unit was transfused uneventfully and further diagnostic workup of HS was advised after discussing the possibility of either misdiagnosed AIHA as HS or coexistence of HS with wAIHA.

Second case-a 38year old P2L2 female, who was admitted for anemia and thrombocytopenia. She was diagnosed to have megaloblastic anemia elsewhere and referred.A request was received for 2 units of PRBC and platelet concentrate. Her haemoglobin was 5.5g/dL and platelet count was 14,000/cumm. Peripheral blood smear showed features of haemolysis. Her forward grouping was AB positive and serum group showed a pan reactivity (3+ in CTT). Grouping was repeated using new sample which was collected by pre warm technique and group was ORhD positive. The antibody screen and identification was pan positive(BioRad, Switzerland).Crossmatches were incompatible.DAT was 4+ and Monospecific DAT was positive for IgG and C3d(CAT).Thermal amplitude of the autoantibody showed 3+reaction at 4^{o}c by tube method,with a titre of 8 at 4ºC suggesting a diagnosis of Bi specific AIHA. In view of the severe thrombocytopenia,the diagnosis of Evan's syndrome was made and managed accordingly.

Conclusion:

These case reports highlight the varied presentations and diagnostic complexities of AIHA. Prompt identification and appropriate management are essential for optimal patient outcomes.

PREVALENCE OF CLINICALLY SIGNIFICANT RED CELL ALLOANTIBODIES IN PREGNANT WOMEN

Dr. Jannet Mary John

Introduction:

Red cell antibody screening (RCAS) is a valuable tool in the detection of alloantibodies to other blood group systems (other than ABO and Rh) in the serum of patients during pregnancy or prior to transfusion. Red cell antibody identification (RCAI) should then be carried out on a larger panel of RBCs to precisely identify the antibody.

Aims & Objectives:

To study the frequency of clinically significant red cell alloantibodies in pregnant females.

Material & Methods:

The antenatal women registered were typed for ABO-Rh antigens. Screening for the presence of antibodies was performed using polyspecific antihuman globulin gel cards (ID-Card LISS/coombs) by Indirect Agglutination Test (IAT) and three cell panel. Those positive, underwent antibody identification using eleven cell panel. Once identified, titration was carried out to quantify the antibody concentration.

Result:

A total of 49 pregnant women were screened, age ranging from 21 - 45 years; 42(85.7%) were in the age group of 21 to 35 years and 7(14.3%) were above 35 years. The most common ABO group was B, seen in 20(40.8%); followed by A in 15(30.6%). 43(87.8%) were Rh-D positive while 6(12.2%) Rh-D negative. Among the Rh-D negative, 2 developed antibodies. Total of 2 antibodies were detected, among which 1(50.0%) was anti-D alone. Anti-D in combination with anti-C was observed in 1(50.0%). Among the 43 Rh-D positive women, none developed antibodies. The presence of blood group allosensitization among this antenatal group was found in 4.1% of women. Antibodies belonging to the Rh system accounted for 100% of the overall alloimmunization.

Conclusion:

Universal antenatal antibody screening though desirable may not be justified due to the expenses. However, it is necessary to impose properly formulated protocols to screen at least the pregnant women with adverse obstetric history.

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IMMUNE THROMBOCYTOPENIA DUE TO BOTRYOMYCOSIS LEADING TO SEVERE PLATELET REFRACTORINESS: A CASE REPORT

Dr. Tamanna Kalra

Introduction:

Platelet refractoriness is characterized by a recurrent inadequate response to platelet transfusions, resulting in lower-than-anticipated increments in platelet numbers after transfusion. This condition is primarily caused by alloimmunization against platelet antigens, which can occur due to several reasons, such as ABO-incompatible platelet transfusions, antibodies targeting HLA antigens, or the presence of fever or sepsis.

Case Report:

A 45-year-old male patient presented to the Emergency Department with hematemesis, hematochezia, fever, and an oral mass. An upper GI endoscopy was performed, and the results were suggestive of a mucosal hemorrhage across the esophagus with gross blood in the stools. Severe thrombocytopenia was found in the patient's complete blood count (6000/ µl). He received multiple units of 11 PRBCs, 20 RDPs, 15 SDPs, and 2 FFP transfusions during the first seven days of hospitalization since the platelet count showed no significant improvement. The range of his platelet count remained between 3000 to 13000/µl. The peripheral blood film and bone marrow aspiration results suggested a marked increase in mature and immature megakaryocytes, suggesting peripheral destruction of platelets, consistent with immune thrombocytopenia. He was then started on intravenous steroids and immunoglobulins (Zyloglob) on day 8. Thereafter, a significant increase in platelet count was seen from 62000/ µl to 4.25 lakh/ µl on day 14.

Conclusion:

Platelet refractoriness, in this case, was due to Secondary Immune Thrombocytopenia, which was likely caused by an infective oral mass lesion, Botryomycosis, which was treated with antibiotics. It's important to manage this type of refractory thrombocytopenia carefully to minimize bleeding episodes and ensure the best possible outcome for the patient. For this reason, knowledge of the etiology of refractoriness and platelet auto- and alloantibodies is of utmost importance.

A SURVEY ON KNOWLEDGE, ATTITUDE, AND PRACTICES OF RESIDENT DOCTORS AND INTERNS ON BLOOD TRANSFUSION PRACTICES IN A TERTIARY CARE CENTRE

Dr. Jasna A M, Dr Harsha Unni, Dr Riya Mathew, Dr Magdelin Simon Varghese, Dr Jess Elizabeth Rasalam, Dr Mini C V

INTRODUCTION:

The knowledge of residents and interns on blood transfusion services may impact patient care and transfusion outcome. Inappropriate transfusion practices among doctors lead to irrational blood component usage and jeopardize patient safety.

AIM AND OBJECTIVES:

To assess the knowledge, attitude, and practices of residents of a tertiary center on blood transfusion

To study the drawbacks of the current blood transfusion practices

MATERIALS AND METHODS:

The study collected data from senior residents (SR), junior residents (JR), and interns of our institution, using a Google form questionnaire in this descriptive cross-sectional study. The survey consisted of three sections: 1. Demography (includes name, designation, and department); 2. Knowledge, 3. Attitude and Practice. The questionnaire was validated by an external expert. There were 25 questions in total with 30 points. Knowledge was analysed by 14 questions which had 19 points and 11 questions for attitude and practice which had 11 points. Participation was voluntary and confidentiality was assured. Data was analysed using Excel and SPSS

RESULTS:

A total of 140 doctors participated in this ongoing study. Out of 140 participants, SR, JR, and interns were 13, 42, and 85 respectively. The median knowledge score (KS) was 9 with an Interquartile range (IQR) of 5. The Median KS in each group was 11, 10, and 8.5 for SR, JR, and Interns respectively. A significant difference in Knowledge was found among JR and interns (p value=0.034).

Median practice score is 4 (IQR = 3). Median PS in each group was 5,5, and 4 for SR, JR, and Interns respectively. The practice score (PS) showed no significant difference with a p-value of 0.288.

CONCLUSION:

The transfusion practices depend upon the knowledge, attitude, and practices of the residents and interns. Induction and continuous training sessions for all residents and staff will help optimize patient safety

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ANALYSIS OF GROUP □V DISCREPANCIES AT A TERTIARY CARE CENTRE - ANALYSIS AND RESOLUTION

Dr. Thiruvenkatam Venkata Samy

Introduction:

Blood grouping discrepancy is encountered when there is mismatch between forward grouping and reverse grouping. Blood components cannot be issued until discrepancy is resolved.

Aim and Objectives:

To analyze the reasons for group IV blood grouping discrepancies and their resolution by serological workup.

Materials and Methods:

This was a retrospective cross-sectional study conducted at the Department of Immunohematology and Blood Transfusion, Tirunelveli Medical College Hospital, Tamilnadu, India. Blood grouping discrepancies encountered over 3 years (July 2020 to June 2023) were retrieved from grouping discrepancy register and analyzed over one month (July 2023). Blood group was determined by conventional tube technique. The causes for group IV discrepancies are cold reactive auto antibodies, circulating RBCs of more than one ABO groups due to RBC transfusion or transplant, unexpected ABO isoagglutinins or unexpected non-ABO alloantibodies.Cold autoantibodies were resolved by Pre warming technique Bombay phenotype was resolved by anti H lectin. Result were entered in Microsoft excel and descriptive statistics were given in summary statistics.

Results:

Of the 1,17,661 samples received for blood grouping, discrepancy was encountered in 134 blood samples (0.11%, n = 134/117661) out of which 46 were group IV discrepancies (34.32%, n = 46/134). 76.08% (n = 35/46) were females. The mean age of the sample population was 34.37±13.72 years. 84.78% of group IV discrepancies were due to cold autoimmune hemolytic anemia (n = 39/46). Remaining discrepancies were due to Bombay phenotype (15.21%, n=7/46).

Conclusion:

Resolving discrepancies before transfusion is essential. In unstable patients, O negative packed red cells and AB plasma can be transfused when resolution is delayed. In case of classical Bombay phenotype, only Bombay phenotype red cells must be transfused.

Keywords:

Blood group discrepancy, Bombay phenotype, cold agglutinins.

AUDIT OF PACKED RED BLOOD CELL ORDERING AND TRANSFUSION PRACTICES IN ELECTIVE SURGICAL PATIENTS IN A TERTIARY CARE HOSPITAL IN EASTERN INDIA

Dr. Namrata Datta, Dr. Satya Prakash, Dr. Somnath Mukherjee, Dr. Ansuman Sahu, Dr. Debasish Mishra

Introduction:

Blood and its components are necessary interventions in lifesaving situations and providing a safe blood supply is an essential part of comprehensive medical care. In elective surgical cases, advancements in medical and surgical practices drastically reduce the need for transfusions in stable patients and allocate valuable resources to emergent patients.

Aims & Objectives:

1)To calculate the Crossmatch to Transfusion ratio (C/T ratio), Transfusion index (TI), and Transfusion probability (TP) among different surgical departments in our hospital.

2)To find the relation between pre-operative hemoglobin levels and the number of units ordered for surgery before framing patient blood management policies in our hospital.

Methodology:

All elective surgical patients sending PRBC requests to blood centers for the provision of PRBC were included. Data collected were age, gender, admitting department, ABO-Rh(D) blood group, pre-operative hemoglobin level, and number of units requested for surgery.

The number of units crossmatched and units issued on the day of surgery and post-operative Day 1 was collected. Data was collected from February to mid-May 2023 and analyzed.

Results:

A total of 3248 patient data was analyzed from 13 surgical departments. CTR was a maximum(9.13) and TP was minimum(0.11) in the Urology department. CTR was a minimum (2.05) and TP was a maximum (0.51) in the CTVS department. TI was minimum in Urology(0.12) and maximum in CTVS(1.10). Out of 3248 patients pre-operative hemoglobin value of 5 could not be traced,1095 had Hb<10, and 2148 had Hb≥10. 3096 patients had a requirement of 0 or 1 unit PRBC peri-operatively and 152 patients had usage of ≥2.

Conclusions:

A regular audit can assess the utilization patterns and frame policies to safeguard patient outcomes and maximize the available resources. Based on our findings, we can modify the laboratory practices for elective patients while maintaining our inventory and minimizing wastage due to outdating.

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TRANSFUSION IN PAEDIATRIC TRAUMA PATIENTS: EXPERIENCE FROM AN URBAN TRAUMA CENTRE

Dr. Ruchi Singla, Dr. Sapna Chopra, Dr. Radheshyam Meher, Dr. Rahul Chaurasia

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Introduction:

Trauma is one of the leading causes of death in children yet data regarding transfusion requirement is scarce. In India,15–20% of trauma deaths are reported among children, representing a potential area to be assessed for further research, effective management, and planning.

Aims:

Evaluate the current transfusion practices among the paediatric trauma population at our centre.

Materials and Methods:

A prospective study was conducted at an urban level 1 trauma centre for 3 months. All patients ≤ 18 years, who received transfusion were included, whereas patients whose guardians/parents did not gave consent were excluded. Basic demographic details, injury details, investigation, transfusion details in ml/kg were collected from patient and blood centre records. A descriptive analysis was done using Microsoft excel.

Results:

Total admission:1904

Paediatric admission:319(16.7%)

Transfusion received:33(10.3%)

Age: ≤ 12 years- 21(63.6%), >12 years- 12(36.4%)

Most common(M/c) gender: Males- 23(69.6%)

M/c time of admission: <4 hours of injury- 14(42.4%)

M/c mode of injury: Fall from height 18(54.5%) followed by RTA in 9(27.2%) patients.

M/c transfusion indication: Need for operative intervention11 (33.3%)

Total mean requirement for RBC was 25.2 ml/kg, whereas platelet and FFP were transfused at 8.5 ml/kg and 18.7 ml/kg respectively. Of which, 63% RBC, 60% RDP and 63% FFP transfusions were required during the initial 24 hours. Cryoprecipitate was used for 1 patient, with liver and splenic trauma. Five (15.1%) patients required ≥ 40 ml/kg RBC transfusion. Overall mean length of stay was 8.66 days and 54.5% patient required ICU stay for a mean duration of 4.61 days.

Conclusion:

Approximately 10% of admitted paediatric patients, were transfused. Most blood components were transfused during initial 24 hours and for operative intervention. Massive transfusion was required in 15.1% of the patients.

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RETROSPECTIVE REVIEW OF RESPONSE TO AN INSTITUTIONAL MASSIVE HEMORRHAGIC PROTOCOL

Dr. Radheshyam Meher, Dr. Rahul Chaurasia, Dr. Sapna Chopra, Dr. Ruchi Singla

INTRODUCTION:

Massively bleeding trauma patients often require a multidisciplinary approach with proactive transfusion support. Massive hemorrhagic protocol(MHP) aims to provide balanced proportion of blood components in a timely manner for prevention and treatment of underlying coagulopathy. An institutional MHP was designed and implemented at our center for such cases.

AIM:

To analyze the utilization of blood components and evaluate the appropriateness of MHP activations.

MATERIAL AND METHOD:

The retrospective study was conducted over a period of 6months. All MHP activations for patients ≥18yrs of age were included. Detailed basic demographics and clinical parameters were collected from patient records, whereas transfusion details from blood bank records and data was analyzed.

RESULTS:

Total 132 MHP activations were performed. Mean age of patients was 34.3yrs, majority(91%) being males. 46% patients had SBP <90mmHg and/or PR ≥120/min. Blunt trauma and RTA was commonest mode and mechanism of injury. 2/3rd patients presented within 4hrs of injury, 38% administered with tranexamic acid, and mean crystalloids administered pre-transfusion was 1.1Litres. Of all MHP activations, 116(87.9%) patients were transfused with all components, in 15(11.4%) only PRBC and in 1(0.7%) only plasma and platelets were used during initial resuscitation. Of 131 patients, ≤3 units PRBCs were transfused in 34(26%), 4-8 units PRBCs in 63(48.1%) and >8 PRBCs in rest 35(25.9%). Similar results observed for plasma and platelet transfusions. Among these 35 patients, total of 415PRBCs, 332RDPs and 274FFP was utilized with mean transfusion requirements of 11.85, 9.48, and 9.44 respectively. These MHP activations resulted in increased utilization of group O PRBCs(33.8%) and AB plasma(35.9%).

DISCUSSION/CONCLUSION:

Majority of MHP activations required massive transfusions and were apt to MHP activations. However, falsely activated in ¼th cases. Urgent requirement for blood components and activation of MHP should be judicious, non-overzealous and properly demarcated to limit inventory challenges for better patient care.

A STUDY OF CLINICAL OUTCOME OF NON HEALING CHRONIC ULCERS TREATED WITH PLATELET RICH PLASMA

Dr. Devesh chandra Dubey, Dr. Babita Raghuvanshi

Introduction:

In developing countries, the most common cause of ulceration are non-healing chronic ulcers. Autologous PRP contains patient's own platelets and plasma. PRP therapy is a simple, low cost and minimally invasive method that provides a natural concentrate of autologous blood GFs that can be used to enhance tissue regeneration.

Aim and Objective:

A study of clinical outcome of NHCU treated with PRP.

Materials & Methods:

Collection of Blood - Under aseptic precautions, 100 ml of blood was drawn intravenously from the antecubital region into bag containing CPDA (14 ml) .

Preparation of PRP The blood centrifuged at 3400 rpm for 10 mins. The supernatant formed is PRP and buffy coat. Preparation of fibrin gel- a) Add patient serum in prepared platelet rich plasma in the ratio of 1:5 b) Add 10 % calcium gluconate in the ratio of 1:2

Each patient was assessed before first dressing, on 5th day, 15th day, 20th day after and final measurement done on 30th day.

a) Surface area:

The ulcer was mapped on a transparent sheet and graph paper. Area was measured in cm2.

b) Volume:

The volume of the ulcer was measured by completely filling the ulcer crater with sterile normal salineVolume was measured in ml.

Result:

Total 31 patients were enrolled in the study, The study, patients were of age 18-85 years..Mean of age group were 46.77±15.80.Mean of size reduction in final sitting it was 17.84.The mean surface area of ulcer in final measurement was 7.56(6.23) 0.64,20.00. with a p-value of <0.05.Mean size of Voloume reduction in prp treatment was 8.78(11.07) 0.19,33.60, p-value 0.020.

Conclusion:

Improvement in ulcers was recorded in PRP treatment .. Treatment with PRP was found better outcomes in respect of healing area and volome. Further study require with larger sample size for consolidation of our finding.

EFFECT OF COEXISTING SEPSIS ON THE OUTCOME IN CASES OF HEMOLYTIC DISEASE OF THE FETUS AND THE NEWBORN DUE TO MATERNAL RH ISOIMMUNISATION UNDERGOING EXCHANGE TRANSFUSION (ET)

Dr. Aparupa Sen Gupta, Dr. Dheeraj Khetan, Dr. Jyoti Kala Bharti, Dr. Prashant Agarwal, Dr. Priti Elhence, Dr. Anita Singh, Prof Rajendra Chaudhary

Introduction:

Coexisting sepsis in infants affected by Hemolytic disease of foetus and newborn due to maternal Rh isoimmunization (Rh-HDFN) is known to reduce tissue oxygenation, derange coagulation and also weakens the immunological defence mechanisms. Exchange transfusion (ET) reduces the risk of bilirubin induced neurodevelopmental dysfunction but the coexistence of sepsis may adversely affect the clinical outcome.

Aim:

To assess the effect of coexisting sepsis on pre-defined outcome variables in Rh HDFN infants undergoing ET.

Materials and methods: Retrospective observational analysis was done for infants who underwent ETs at our institute over a period of five years (May 2016-April 2021). Information on demography, post-natal management (IVIg treatment, ETs, top-up transfusion), laboratory testing (Biochemical, immune-hematological and haematological) and length of hospital stay was collected from the Hospital Information System, department records, and patient case sheet. Effect of ET on platelet counts, hematocrit, bilirubin levels and average length of stay were compared between Rh-HDFN infants with (group-2) and without sepsis (group-1).

Results:

Total 58 infants (n=28 in group 1and 15 in group-2) were included in analysis. There was no statistical difference mean age at time of first ET, average no of IVIg doses received, mean number of ETs required per patient, median change in haematocrit, median fall in bilirubin and median decrease in platelet counts in group 1 vs group 2. While significant differences were observed in the incidence of thrombocytopenia post ET (10.7 % vs 26.6 %), incidence of Hypocalcaemia post ET (3.5 % vs 6.6 %), and average length of stay (10.9 days vs 20 days) in group 1 vs group 2.

Conclusion:

Sepsis was found to have adverse effect on infants affected by Rh-HDFN and this effect was not abrogated by ET. Study with larger sample size is required for establishing the efficacy of ET in infants with sepsis.

PROSPECTIVE AUDIT OF BLOOD TRANSFUSION PRACTICES AMONG NURSES AND ROLE OF EDUCATION AND INTERVENTION IN TERTIARY CARE HOSPITAL

Dr. Nippun Prinja

Introduction:

Periodical internal audits evaluates process flow of blood transfusion practices which arrests the spectrum of adverse events.

Objective:

To provide evidence that blood is being ordered, handled and administered according to hospital transfusion guidelines and to highlight the deviations with secondary objective of improving Knowledge and Practices in nursing officers.

Material & Method:

Nursing officers were audited on 50 patients each in P1 and P2 phase. Training of 243 nursing staff was done after P1 phase. Training comprised of education and interventions over 45 days-18 didactic lectures & 36 bed side classes. Nurses were audited both before and after completion of the training.

Results:

145 nurses had Knowledge and Practice score in between 11 to 15 in P1 which improved to 243 (100%) in P2. Transfusion order for 1 patient was not written in P1 whereas 100% compliance was seen in P2. Non-compliance in taking consent for transfusion improved from 5 to 1 in P2. Blood request error and sample labelling error reduced from 8% to 0 and 4% to 0 respectively in P2. Sample labelling was inappropriate in 2 patients in P1 which improved to nil in P2. Checking of Vital signs check and i.v. cannula patency improved from 96% to 98%. Crosscheck of PRBC by nursing officers before transfusion reduced from 8% to 0% and from 30% to 2% among medical officer ($p<0.05$). Delay in initiation of transfusion, reduced from 7 to 2 patients.

Conclusion:

Timely audit of transfusion practices reduces mistakes and errors hence improved patient care.

COMPARISON OF THE EFFECT OF TRANSFUSION OF PACKED RED BLOOD CELLS FROM TWO DIFFERENT AGE GROUP MALE DONORS IN MAINTAINING A PRE-TRANSFUSION HAEMOGLOBIN LEVEL IN THALASSEMIA CHILDREN

Dr. Harshita Agarwal, Dr. Tanvi Sood, Dr. Ravneet Kaur, Dr. Kshitija Mittal, Dr. Paramjit Kaur, Dr. Gagandeep Kaur

INTRODUCTION:

Variability in the blood donor population can affect the haemoglobin content of the packed red blood cell (PRBC). We hypothesized that the thalassaemic patients when transfused with PRBCs from younger donors will show better increment in their haemoglobin.

AIMS & OBJECTIVE:

Comparison of the effect of transfusion of PRBCs from two different age group male donors in maintaining a pre-transfusion haemoglobin level in the range of 9-10.5 g/dl in thalassaemia children.

MATERIALS and METHODS:

In this prospective open label randomized controlled trial (CTRI/2023/03/050299) male blood donors in the age group of 18-30 years and 45-65 years were enrolled. The thalassemic children in the age group of 3-9 years were included in the study. The patients were randomly allocated using serially numbered opaque sealed envelope method into two different groups. Patients in Group 1 received blood transfusion from donors of age group 18-30 years while patients in Group 2 received transfusion from donors of age group 45-65 years. Child falling in one of the two groups remained in the same group for 3 months. Pre-transfusion haemoglobin was measured in the subsequent visit.

RESULTS:

The mean haemoglobin content of PRBCs transfused to Group 1 and 2 patients was 53.48±6.54g and 51.21±6.30g respectively (p=0.0445). Average pre-transfusion haemoglobin in Group 1 and 2 patients was maintained at 9.13±0.47g/dl and 9.23±0.48g/dl respectively (p=0.6). Group 1 patients received an average total blood volume of 294.73±49.78 ml whereas Group 2 received 245.29±28.3ml (p= 0.009). Group 1 patients had average total number of donor exposures of 1.61±0.49 units while Group 2 had average donor exposure of 1.12±0.31 units (p=0.01). However, average number of visits by Group 1 and 2 patients were 4.2±0.41 and 4.3±0.48 respectively (p=0.58).

CONCLUSION:

Transfusion of blood from young blood donors showed no additional significant benefit.

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ASSESSMENT OF BLOOD TRANSFUSION PRACTICES IN CRITICALLY INJURED PATIENTS UNDERGOING TREATMENT IN TRAUMA INTENSIVE CARE UNIT

Dr. Anubhav Gupta, Dr. Lakhvinder Singh, Prof. Kajal Jain, Prof. Sameer Aggarwal, Prof. Ratti Ram Sharma

Background:

Blood component therapy plays a pivotal role in the management of critically injured trauma patients. Identifying predictors of transfusion and evaluating its effects on patients' prognosis is crucial for patient blood management.

Aims & Objectives:

The study aims to determine the need for transfusions in critically injured patients, evaluate the proportion of blood components administered during trauma triage, and identify risk factors causing increased blood component requirements

Materials & Methods:

One hundred critically injured patients were studied for demographic, clinical, and hematological parameters, as well as their transfusion profile. The patients were divided into groups based on transfusion type, components, and head injury. Results showed differences in presentation, length of ICU and hospital stay, outcomes, and predictive scores for transfusion.

Results:

The study found that 38% of patients required transfusions during the acute resuscitation phase, and 69% during their hospital stay. The mean number of red cell, plasma, and platelet components transfused per patient was 2.3±1.6, 3.1±1.7, and 3.3±2.0. Low hemoglobin and platelet count at admission significantly increased the need for transfusions. An increase in heart rate predicted blood transfusion in these patients. The most common indications for blood transfusion were shock due to acute hemorrhage after trauma, followed by surgery and anemia. ABC and RABT scores were more sensitive in determining transfusion need. Red cell transfusion was associated with increased hospital stay, but overall transfusion therapy did not affect hospital stay length or 28-day mortality.

Conclusion:

The study found that low hemoglobin and platelet count are significant predictors of transfusion, while SBP and HR have some predictive value. Other shock predictors like SI, MSI, ABC score, and RABT score have good predictive value for transfusion. Transfusion did not affect outcomes or hospital stay, but increased PRBC requirement was associated with longer hospitalization.

EFFECT OF STORAGE AGE OF TRANSFUSED PLATELET CONCENTRATES ON PLATELET INCREMENT IN CRITICALLY ILL PATIENTS

Dr. Vivek Muraleedharan, Dr. Paramjit Kaur, Dr. Kshitija Mittal, Dr. Ravneet Kaur, Dr. Gagandeep Kaur, Dr. Tanvi Sood

Introduction:

Platelets undergo changes in their functional integrity, capacity to aggregate and activate during storage. This study aimed to determine the influence of storage age of platelet concentrates on platelet increment and clinical outcomes in critically ill patients.

Aims and Objectives:

To determine the effect of storage age of transfused platelet concentrates on platelet increment, clinical bleeding, infections and length of stay (LOS) in critically ill patients.

Material and methods:

This prospective randomized controlled trial (CTRI/2023/03/050676) was conducted in a tertiary care centre after obtaining approval from institutional ethics committee. Critically ill patients admitted to the intensive care unit (ICU) and requiring platelet transfusion were included and written informed consent was obtained. The Acute Physiology and Chronic Health Evaluation (APACHE III) scores of the patients were assessed. Patients were randomized into two groups based on the storage age of the platelet concentrates they received: Group 1 (≤ 3 days) and Group 2 (> 3 days). The patients were assessed for post-transfusion absolute platelet increment (ACI), corrected count increment (CCI), percent platelet recovery (PPR), and various clinical outcomes.

Results:

A total of 42 patients were enrolled, 24 in Group 1 and 18 in Group 2 which included 22 males and 20 females. The mean age of the patients was 43.4±18.6 years. Patients in Group 1 had a significantly higher mean ACI (33000/µL vs. 30200/µL; $p< 0.001$), CCI (18,577/µL vs. 16,095/µL; $p< 0.001$) and PPR (67.04% vs. 48.73%; $p< 0.001$) than Group 2. However, there were no significant differences between the two groups in terms of clinical bleeding, infections, LOS or adverse transfusion reactions.

Conclusion:

The fresh platelets stored ≤ 3 days were associated with a better platelet increment, CCI and PPR, but the storage duration did not have any impact on clinical outcomes in critically ill patients.

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EFFECT OF ANTI-D TITRE ON TRANSFUSION REQUIREMENT DURING FETAL AND NEONATAL PERIOD IN RHD-HDFN

Dr. Vasundhara Singh, Dr. Dheeraj Khetan, Dr. Aparupa SenGupta, Dr. Ajay Joseph, Prof. Prashant Agarwal

Introduction:

Hemolytic Disease of Fetus and Newborn (HDFN) due to Anti-D alloimmunisation is the leading cause of fetal anemia. Intra-Uterine Transfusions (IUT) and post-natal transfusions are often required for its management. The significance of Anti-D titre in predicting transfusion requirements of the baby has not been widely studied

Aims and Objectives:

To assess if Anti-D titres have an association with transfusion requirement during fetal and neonatal period in HDFN.

Materials and Methods:

This was a retrospective observational study including pregnant women undergoing IUT due to Anti-D alloimmunisation from 2016 to 2019. Data was collected from department registers and hospital electronic records. Number of IUTs required per-patient, interval (days) between two IUTs (Inter-IUT interval), interval (days) between 1st-IUT and delivery, requirement of transfusion in postnatal period (exchange transfusion, top-up transfusion) were compared across different groups according to anti-D titre at 1st-antenatal visit.

Results:

Out of 139 pregnant women who underwent IUTs, 34 were excluded due to missing data. 105 patients with 337 IUTs were included. Mean number of IUTs required in patients with anti-D titres of ≥16-32 (2.70 IUTs) and ≥64 (3.56 IUTs) were found to be significantly higher compared to IUTs required (1.69 IUTs) in patients with lower (≤8) anti-D titres (p value=0.001, chi-square test). Similarly, higher anti-D titers were associated with significantly longer intervals between 1st-IUT and delivery (44.44±30.1 days for titres of 16-32 and 57.31±29.4 days for titres of ≥64) as compared to patients with low (≤8) titres (26.08±12.7 days) (p value=0.002, chi-square test). However, higher Anti-D titres were not associated with increased length of inter-IUT intervals or increased transfusion requirement in postnatal period.

Conclusion:

Higher anti-D titres pregnancies had more number of IUTs per patient and longer interval between 1st IUT and delivery indicating that IUTs had to be started early as compared to lower titres.

PRE-EXISTING RED CELL ALLOIMMUNIZATION IN HEMATOPIETIC STEM CELL TRANSPLANT (HSCT) PATIENTS-AN INTERESTING CASE SERIES

Dr. Deepthi Krishna, Dr Deepti Sachan

Introduction :

A prerequisite for a successful HSCT is the availability of a human leukocyte antigen (HLA) identical stem cell donor is critical .Although the transplantation of an ABO & Rh mismatched HSCT is feasible,proper immune-hematological(IH) workup & management is important for a safe HSCT.Due to previous multiple blood transfusions, often they are alloimmunized which may impact post-HSCT transfusion requirements and donor engraftment.

Aim :

These cases intends to bring out the interesting immunohematological findings .

Case 1: A 13 year old female, Thalassemia major, blood group (bgp) O negative and Donor specific antibodies(DSA) class I positive (A*03:01-MFI 1033) planned for Allogeneic HSCT (Donor-father, bgp-O pos, HLA match- 6/12). On pre IH workup ,ICT showed Anti-D and Anti-C Rh antibodies(Anti-C 1:4, Anti-D 1:2) ; Rh-Kell phenotyping for the patient was C-c+E-e+K-; and donor was C+c+E-e+K-. TPE was done for the patient on alternate days inview of high DSA prior to HSCT.

Patient was engrafted with PRC and SDP transfusions and discharged on POD 29. On followup, POD 60, Bgp was O pos (mixed field reaction in anti-D).

On POD 100, bgp shows O pos , ICT- negative, DCT- 3+ Positive, eluate as Anti-C and phenotype shows C+c+ E-e+K- after red cell engraftment.

Case 2: A 4year old female child ,Sickle-beta thalassemia, Bgp B pos for Allogeneic HSCT from father(Bgp -B pos ;HLA match 12/12). ICT was positive for Anti-Kell(K) antibodies(1:64). Kell phenotyping was negative for both patient and donor. Engrafted and successfully discharged without any sequale on POD 17.

Conclusion:

It is important to do proper immunohematological workup as a routine in all HSCT recipients and donors for timely identificatioin of antibodies and proper management of the patients.On followup of the patient,it helps in understanding red cell engraftment of ABO, Rh and other minor antigens as well.

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TO STUDY THE FEASIBILITY & EFFICACY OF ERYTHROCYTAPHERESIS IN THE MANAGEMENT OF SICKLE CELL CRISIS: ROLE OF A TRANSFUSION MEDICINE SPECIALIST

Dr. Neelesh Jain

Introduction:

Our Tertiary care center is located in Chhattisgarh state of Central India where sickle cell trait prevalence is almost 10% with approximately 3% of the population being homozygous sicklers. Considering this, I convince the hospital management to start an exclusive Sickle cell anemia OPD in the Transfusion Medicine Department. Sickle crisis management requires a specific expertise in procedures like Red Cell exchanges, pain control etc.

After a due discussion with my colleagues in the other departments including- Hematology, General Medicine, Pediatrics & Critical care, a formal protocol was devised to manage acute sickle crisis patients including performing erythrocytapheresis.

It's first of its kind active clinical program successfully run by a transfusion medicine department.

Aim & Objectives:

To Study the feasibility & efficacy of erythrocytapheresis in Sickle Cell crisis treatment.

Material and Methods:

More than 200 sickle patients have been registered and are on regular follow up and more than 50 therapeutic erythrocytapheresis procedures have been performed successfully in last 2 years. The study population included homozygous Sickle patients who underwent erythrocytapheresis during sickle crisis.

Results:

• A total of 31 sickling crisis patient's undergone 50 erythrocytapheresis procedures. One patient underwent 8 times, three patients underwent thrice and six patients underwent the procedure twice during the study period. 8 patients were below 10 years of age. ABO/Rh matched and cross match compatible PRBC units were exchanged, keeping the volume: volume ratio is 1:1.

• Eleven patients experienced the adverse reactions like chills with rigors.

• Frequency of crisis has reduced with improved quality of life during the 1 year follow up of the patients.

Conclusion:

Erythrocytapheresis is very well feasible and are efficient therapeutic modalities to treat acute sickle crisis. Transfusion medicine physician plays a crucial role in the sickle cell crisis management.

Theme
Hemovigilance

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A STUDY OF ACUTE TRANSFUSION REACTIONS AT A TERTIARY CARE CENTRE: RETROSPECTIVE ANALYSIS

Dr. Damayanti Dey, Dr Shweta Dhote, Dr Shubhangi Lad

Introduction:

Transfusion of blood products is a double-edged sword. Transfusions are lifesaving but with considerable risk to the patient. These risks can be broadly classified as infectious and non-infectious complications. Non-infectious complications are known as adverse transfusion reactions and are further analysed as acute and delayed. This study is conducted with the primary objective of evaluating the types and frequency of acute transfusion reactions at a tertiary care centre, a pilot effort towards hemovigilance from the institution.

Aim:

To determine the frequency and type of Acute Transfusion Reactions (ATRs).

Objectives:

To look into Acute Transfusion reactions (ATRs) across age and gender. To analyse the distribution of types of ATRs. To investigate the division of ATRs according to blood group and clinical diagnosis. To study types of ATRs according to the type of component transfused.

Materials and Methods:

A 3-year retrospective analytical study of all transfusion reactions reported to the Department Of Immunohematology and Blood Transfusion. All reactions were evaluated and classified under standard definitions.

Result:

During the study period a total of 21,888 units of blood components were issued of which 38 (0.174 %) units were reported as acute transfusion reactions.

Of these 38, 25 (65.8 %) males and 13 (34.2 %) females experienced ATRs. 31 (81.58 %) Febrile non-haemolytic transfusion reactions, 6 (15.79%) allergic transfusion reactions and 1 (2.63%) Immunologic hemolytic transfusion reaction due to allo antibody were observed. A maximum number of ATRs were seen in blood group A followed by O, B and AB.

Conclusion:

Most acute transfusion reactions were febrile non-haemolytic transfusion reactions followed by allergic reactions. This underlies the need for constant monitoring and strict implementation of standard protocols for the transfusion of blood and blood products

A RETROSPECTIVE STUDY OF ADVERSE DONOR REACTIONS IN WHOLE BLOOD DONORS IN A TERTIARY CARE HOSPITAL

Dr. Jyoti Singh

INTRODUCTION:

Blood donation is a relatively safe procedure and donors usually tolerate the donation process well. Still, some donors may experience unpleasant adverse donor reactions (ADRs) of variable severity during or after the blood donation procedure. These ADRs can have a negative impact on donor recruitment and retention.

AIM AND OBJECTIVE:

To estimate the severity of adverse events occurring in whole blood donors.

MATERIAL AND METHOD:

This was a retrospective study conducted for a period of 1 year from July 2022 to June 2023 in the Department of Transfusion Medicine. The data was analyzed using MS Excel.

RESULT:

A total of 9,430 healthy donors were registered taken from departmental records. Out of which males were 9234 (97.92%) and females were 196 (2.07%). All donors were observed for any possible adverse events during and after the procedure for 20 minutes as per departmental SOP. During this period of one year out of 9,430 donors, 161(1.7%) donors experienced donation related adverse effects. Among these 87% (140/161) were males and 13% (21/161) were females. Out of these 89.28% (125/140) males and 80.95% (17/21) females recorded hematomas, and 10.72% (15/140) males and 19.05% (4/21) females experienced generalized vasovagal reactions. 0.92% of first-time donors and 0.25% of repeated donors developed adverse reaction.

CONCLUSION:

Analysis of adverse donor reactions helps in selecting the blood donors who are at risk of donor reactions. The study helps in assessing the importance of proper pre donation screening along with analyzing adverse events, identifying the donors at risk of donor reactions and adopting appropriate donor motivational strategies, pre-donation counselling, and care during and after donation.

Theme

Immunohematology

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DARATUMUMAB: DRUG WITH TRANSFUSION DILEMMA-CASE REPORT

Dr. Amit Kumar Biswas, Dr. Anurag Gairola, Dr. Rajat Jagani, Dr. Amit A Pawar, Dr. Ujjwal Dimri

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Introduction

Multiple Myeloma is a malignancy of terminally differentiated plasma cells resulting in clonal proliferation in the bone marrow. Daratumumab (DARA) is an anti-CD38 monoclonal antibody that has promising results in relapsed and refractory MM(RRMM). DARA interferes with immunohaematological workup by causing incompatible results while cross-matching by AHG phase and presenting as a pan-agglutination picture in the indirect antiglobulin test, causing a delay in the issue of compatible units.

Aim & Objectives

To resolve the above discrepancy, the simplest method was by treating the PRBC units with sulfhydryl reducing agent i.e., 2-Mercapto ethanol [2-ME]. It aids in understanding a newer concept and expanding our horizon of knowledge.

Materials & Methods

Out of the available methods to solve this problem we utilized the treatment of red cells with 2- ME at our centre. The on-ground efficacy of the same was studied for a patient of RRMM, under regular follow-up. In consideration of the underlying illness, the patient required several units of red cell transfusion.

Results

In all instances, the patient had incompatibility found during crossmatching in the AHG phase. Utilizing the treatment technique of red cells with 2-ME at our blood centre, we could provide compatible units for the patient following the treatment of multiple units with 2-ME. Post-treatment negative indirect antiglobulin test results on the patient's blood sample demonstrated the validity of the procedure.

Conclusion

DARA therapy has emerged as a treatment option in patients with RRMM. Usage of DARA is promising for the said group of patients; However, when used in upfront regimens it creates complexities in routine immunohaematological workup. 2-ME treatment of red cells has emerged as a cheap, simple, and feasible technique to overcome these challenges to resolve incompatibility issues in patients with RRMM on DARA treatment. Coordination between treating and transfusing physicians is the key.

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DIAGNOSTIC APPROACH & IMMUNOHEMATOLOGICAL CHARACTERIZATION OF BLOCKED 'D' PHENOMENON

Dr. Sourav Mukherjee, Dr. Sudipta Sekhar Das

INTRODUCTION

The blocking of 'D' antigen sites of neonatal red cells in hemolytic disease of the fetus and newborn (HDFN) also known as "Block D" is quite rare and when encountered should be evaluated meticulously. In this study, we analyzed immunohematologically the blocking phenomenon of D antigens in neonates who were suspected to suffer from HDFN due to Rh incompatibilities

AIMS AND OBJECTIVES

Objective of this study is to identify 'blocked D' phenomenon encountered in cases of HDFN by simple, sensitive methods, so that they can be implemented routinely.

MATERIALS AND METHODS

This prospective observational study was conducted over a period of 4 years after obtaining ethical clearance and written informed consent. Neonatal and maternal samples were included in the study when few criteria were met. Detailed immunohematological work-up for "Block D" was done on 6 samples. Complete patient details were obtained from hospital information system. Clinical outcome of each neonate and laboratory parameters was obtained from patient's case files.

RESULTS

All mothers were Rh-D Negative with median age 29 years. All of them revealed anti Rh-D antibodies in their serum with titer ranging from 256 to 1024. The age range of newborns was between 2-4 days with mean birth weight of 2.86 kg. All neonatal red cells were DAT positive and Rh-D typing on eluted red cells confirmed presence of D antigen. We observed that antibodies identified in baby's sera were comparable with antibodies present in the mother. While all the neonates received phototherapy; two of them also received exchange transfusion. Gradual increase in mean Hb, decrease in both total serum bilirubin and DAT were observed for day 0,1,3,5 and 7 ($p < 0.05$).

CONCLUSION

Despite advances in laboratory medicine, simple immunohematological tests like DAT, antibody screening and elution studies still remain the diagnostic tools to diagnose 'Blocked D'.

UNRAVELLING THE COMPLEXITIES OF COMPATIBILITY TESTING IN MULTIPLE ALLO-ANTIBODIES: EXPLORING CHALLENGES AND SOLUTIONS: CASE REPORT

Dr. Rakesh Kumar, Dr Shweta Ranjan, Dr Bankim Das

Introduction:

The administration of multiple blood transfusions in patients poses a significant risk of alloimmunisation, leading to the potential development of delayed hemolysis. This complicates the process for blood transfusion services in their efforts to identify cross-match compatible PRBC promptly. The presence of multiple alloantibodies in recipients adds further complexity, are clinically significant and cause evanescence, making more challengingfor compatible Packed red cell(PRBC).

Aims & Objective:

Aim:

To effectively manage anemic patients with multiple alloantibodies in the context of hemolyticanemia.

Objectives:

1. To identify the specific alloantibodies may lead to delayed hemolysis in recipients.

2. To explore the limitations and difficulties encountered by blood transfusion services in finding cross-match compatible PRBC.

Materials & Methods:

We present the case of a 43-year-old female who presented with severe anemia, with a hemoglobin level of 3.0 g/dl at General medicine.In response to the transfusion request, the patient's blood samples and the request for two units of PRBC were sent to the Blood Bank for compatibility testing. However, during the testing process, the sample was found to be incompatible with the PRBC of the same blood group.There was no prior history of transfusion or transplantation, she had experienced a pregnancy two years earlier. We proceeded to perform antibody screening and identification, red cell phenotype of the patient's blood, and to the confirmation of the presence of anti-Fya and anti-Jkb alloantibodies.We successfully identified antigen-negative units and compatible, were issued to the patient for transfusion.

Results & Conclusion:

Here highlights the importance compatibility testing and antibody identification to ensure safe and effective transfusions for patients with multiple alloantibodies. By employing advanced serological techniques such as phenotyping, antibodies identification, enzyme treatment, we can overcome compatibility obstacles and provide appropriate blood to meet the specific needs of patients with multiple alloantibody.

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A RETROSPECTIVE STUDY OF THE PREVALENCE OF RED CELL ALLOIMMUNIZATION IN PREGNANT WOMEN FROM A TERTIARY CARE HOSPITAL IN TAMIL NADU

Dr. Franzine Marie Syiemlieh, Dr. S. Subash, Dr. B. Latha

INTRODUCTION:

Maternal red cell alloimmunization still remains an important cause of hemolytic disease of fetus and newborn(HDFN). It can be caused by previous pregnancy or transfusion. The mother becomes sensitized by foreign antigens inducing an immune response. In subsequent pregnancies, these antibodies are actively transported through the placenta causing destruction of fetal RBCs. Of all RBC antigens, those of the Rh system are the most antigenic and of the non Rh system antibodies, Anti-Kell is considered the most clinically significant.

AIMS AND OBJECTIVES:

The study was conducted to determine the prevalence of alloimmunization to various RBC antigens in pregnant women in our tertiary care hospital.

MATERIALS AND METHODS:

All Rh Negative antenatal women presenting to the out patient department and inpatient admissions were included from January to June 2023 and the total cases were 364. Indirect Agglutination Test was done following which , antibody screening and identification was performed for positive cases using Column Agglutination Technology.

RESULTS:

Out of 364 females, 14(4%) of them were alloimmunized. All these 14 women were alloimmunized to D antigen(100%). Other alloantibobodies identified were:

Anti - C : n=5(36%)

Anti - E : n=1(7%)

Multiple antibodies were seen in 5 patients in the following combination:

Anti -D and Anti - C: n=5(36%)

Anti -D,Anti - C and Anti - E: n=1(7%)

CONCLUSION:

RBC alloimmunization still remains a major problem in a developing country like India. The introduction of antenatal and postnatal Rh(D)Immunnoglobulin prophylaxis has reduced alloimmunization in pregnant women. Antibody Screening can thus serve as an important tool in guiding the physician to lower the incidence of HDFN due to Anti D or other alloantibodies.

CONSIDERATIONS FOR PRE-TRANSFUSION IMMUNOHEMATOLOGY TESTING IN PATIENTS RECEIVING THE ANTI-CD38 MONOCLONAL ANTIBODY DARATUMUMAB: A REAL-WORLD DATA FROM A TERTIARY CARE ONCOLOGY CENTER IN EASTERN INDIA

Dr. Durba Biswas, Dr. Ayesha Sinha, Dr. Najla Haneefa, Dr. Debapriya Basu, Dr. Suvro Datta

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Daratumumab, a monoclonal antibody against CD38, is widely used to treat multiple myeloma, amyloidosis etc. As CD38 is also expressed on RBCs, this drug binds to all red cells and is detected by antiglobulin reagents, thereby interfering with pretransfusion testing (PTT).

Aims & objective:

1. To analyze the profile of patients receiving daratumumab and their presentation to the blood center
2. To analyze and choose an appropriate protocol of PTT in these patients

Material and Methods:

Patients receiving Daratumumab from 01/01/2018 to 31/01/2023 were reviewed. Pre-transfusion tests performed to mitigate the drug-interference and transfusion outcome were analyzed.

Results:

A total of 44 patients received Daratumumab during this period, of which the majority were male (n=24) and more than 50 years of age (n=36). Indications included multiple myeloma(n=37), amyloidosis (n=3), refractory NHL (n=3), post-BMT PRCA (n=1). For patients who presented before administration of DARA (n=33) DAT, antibody screening and extended phenotype were performed. Thirteen (13) patients were already DAT positive and all were antibody screen negative. Eleven (11) patients who reported post DARA administration, antibody screen was pan-reactive, DAT was positive and phenotyping was not performed. Genotyping was performed on two patients. Thirty-seven (37) patients required transfusion. Extended phenotype matched RBCs were transfused to patients who presented before DARA administration and had the phenotyping done. Antibody screening with DTT-treated RBCs was performed for the rest and compatible units were issued. In patients where RBC genotyping was used to predict the phenotype, phenotype match units were provided. Patients were followed up for 6 months during which all the transfusions were uneventful without any alloimmunization.

Conclusion:

As the use of monoclonal antibodies continues to grow, the potential interferences in pre-transfusion testing must be recognized and appropriate methodologies should be in place after validation. Good communication between transfusion services and hematologists/oncologists is a must.

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PRESENCE OF IRREGULAR ANTIBODY (ANTI – P1) CAUSING ABO DISCREPANCY IN A HIV SEROPOSITIVE ANTENATAL CASE

Dr. Sudeep Kumar, Lt Col (Dr) Amit Pawar, Dr Ujjwal Dimri, Lt Col (Dr) Amit Biswas

Introduction

The presence of anti-P1, may interfere in immunohaematological workup of HIV seropositive antenatal patient.

Aims & Objectives

To resolve the ABO discrepancy risen due to anti-P1 and to approach the case for selection of compatible crossmatch blood to antenatal anemic mother.

Materials & Methods

Blood sample of a HIV seropositive antenatal case showed ABO discrepancy. All IHL protocol were followed. Autocontrol and DAT was negative at both 4 and 370 C. Antibody screening and identification panel were put and extended phenotyping of maternal sample was performed.

Results

Resolution of ABO discrepancy revealed blood group to be A 1 Rh 'D' positive. Antibody detection panel showed the presence of anti P1 antibody at 40 C and at room temperature, confirming it to be a cold agglutinin. Antigen profiling showed the absence of P1 antigen on red cells. Hence the cause of the ABO blood group discrepancy was a cold antibody i.e. anti-P1. The blood negative for the P1 Antigen was selected for transfusion.

Conclusion

Anti-P1 typically is a weak, cold reactive, saline agglutinin optimally reactive at 40 C and not seen during routine testing. Anti-P1 being an IgM type does not cause hemolytic disease of the newborn since the P1 antigen is poorly expressed on fetal RBC's. When anti-P1 is suspected, testing patients serum against enzyme treated red cells or incubating tests at lower (40 C) can enhance reactions to confirm specificity. Providing units that are crossmatch-compatible at 370 C and the antiglobulin phase, without typing for P1, is an acceptable approach to transfusion in such cases. Cold autoantibodies are known to occur following infections due to Mycoplasma pneumoniae, and human immunodeficiency virus. Such conditions are self limited and the autoantibodies rarely induce any clinically significant hemolysis. However, in this patient the autocontrol was negative, ruling out such possibilities.

UNRAVELING THE MYSTERY OF ANTI-D IN AN RH POSITIVE INDIVIDUAL- A CASE REPORT

Dr. Ramya Govindaraj, Dr Subash S, Dr Latha B

Introduction:

The Rh system is the highly immunogenic blood group system only second to the ABO system causing HDFN and HTRs.The LW antigens are Rh antigens and are present abundantly in D positive individuals than D negative individuals. The anti-LW often mimics anti- D antibodies. Anti- LW antibodies are originally alloantibody produced only by the rare LW(a-b-) person who lacks the expression of all LW antigens.

Case Discussion:

Patient X who is a 4month old child with severe anemia/?pure red cell aplasia ,no previous h/o blood transfusion with increased breathing with Hb 2.4g/dl of O Rh positive blood group was in need of transfusion but on routine crossmatch all the 'O' Rh D positive units were incompatible. In extended immunohematological work up blood group is 'O' Rh D positive ,DAT negative,Autocontrol negative and antibody screening and identification showed the presence of anti- D antibodies making the scenario still confusing..As per the literature, anti-LW antibodies are the close mimicker of anti-D antibodies. So we proceeded with DTT treatment of patient's red cells which differentiated the anti LW from anti- D,since the D antigen is resistant to DTT.LW antigens are sensitive to DTT and hence we came to the conclusion of the presence of anti- LW antibodies in the patient's serum..

Conclusion:

In our case,the formation of anti LW antibodies may be due to the transient loss of LW antigens which can happen in the pathological conditions like leukaemia or lymphoma but specifically in this child,pure red cell aplasia may be the cause.So we transfused the child with D negative prbc which were compatible.Eventhough LW antibodies are not clinically significant,it is necessary to distinguish anti LW antibodies from anti -D. Genotyping is the only way to confirm the presence of LW (a-b-) genotype.

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OUR EXPERIENCE OF RED CELL ANTIBODY SCREENING IN A SMALL SIZED BLOOD CENTRE-THE LOGISTICS AND NITTY GRITTIES INVOLVED

Dr. Sunita Tulsiani, Dr Krishnendu Sengupta, Mr. Tushar More, Mr. Rajesh Shinde, Dr. V.P. Antia

INTRODUCTION:

Red cell antibody screening enhances safety of blood transfusion. However, there are many logistics involved for a small sized blood centre in providing antigen negative blood with the available small inventory , minimizing reagent wastage.

AIM :

To screen for the presence of red cell alloantibodies in patients who had taken multiple transfusions and to workout the best antibody screening methodology for a small setup.

MATERIALS/METHOD:

The study population included 750 patients, who had taken one or more blood transfusion. These comprised mainly of hematology, oncology and dialysis patients. Antibody screening (commercial 3 cell panel) and antibody identification (11 cell panel) were carried out. One of the alloimmunized patient was further followed up for their next 5 transfusions, given at different intervals. Due to emergency requirement issues, this patient had to be given AHG crossmatched blood. Out of the 750 patients, results of three cell panel was compared against commercial single screening cells for 100 samples.

RESULTS:

Allo-antibody was identified in 2 (0.26%) of 750 patients. The antibodies detected were anti c and Anti M. Both the patients had taken outside transfusions before coming to our hospital. The patient who was followed up for transfusion did not develop any additional antibody. The results of three cell panel was comparable to single screening cell.

CONCLUSION:

We had low alloimmunization (0.26%) rate .The reason maybe that we have been doing AHG crossmatch by CAT methodology for all patients for more than 15 years and regular patients have been coming to our hospital only for repeat transfusions. As the alloimmunization rate is less, antibody screening by single screening cells has been useful. We recommend that in small setups, one should design their own antibody screening protocol appropriate to the population being screened, strength and limitation of the method being used after proper validation.

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HEMOLYTIC DISEASE OF THE NEWBORN SECONDARY TO RH AND OTHER MINOR BLOOD GROUP ANTIBODIES

Dr. SHANTHI BONAGIRI

Introduction:

Hemolytic disease of the fetus and newborn (HDFN) can occur through maternal antibodies either naturally occurring (anti A, anti B) or immune antibodies which develop following a sensitizing event like transfusion or pregnancy. The hemolytic process may result in anemia or hyperbilirubinemia or both; thereby affecting fetal / neonatal morbidity and mortality.

Alloantibodies other than anti D have emerged as an important cause of HDFN and are now responsible for greater proportion of these cases. Timely detection and close follow up of this condition is necessary to reduce harmful effects on the newborn. Transfusion services play a vital role in the antenatal detection, monitoring and providing transfusion support to such cases.

Aim & Objectives:

To determine the incidence and Associated risk factors for neonatal hyperbilirubinemia resulting from ABO, RH incompatibility and other minor blood group antibodies in a tertiary care hospital.

Material and Methods:

A retrospective analysis of all the neonatal jaundice samples referred to our transfusion medicine department was done from April 2016 to March 2023.

Results:

Reviewed 210 cases all presented with neonatal jaundice, with in 24 hrs to 2months age of the baby. 90% are male babies.Minor blood group antibody mediated hemolytic disease of the new born (HDN) was detected in 27.36 % cases. Anti-D incidence was 42.3%, double RH antibodies (D/C/E) were detected in 23.07 %cases, and non-RH minor group antibodies detected were Duffy and Anti-M. ABO incompatibility mediated HDN was observed in 5 cases.

Conclusion:

Thus, it highlights the importance of thorough antenatal ABO, RHD blood grouping and antibody screening for prevention or early detection of hemolytic disease of the fetus and newborn, especially in cases of mothers with clinically significant red cell alloantibody.

Key words:

Hemolytic disease of the new born, minor blood group antibodies etc..

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NAVIGATING LIMITATIONS AND CHALLENGES: CASE REPORT ON ANTIBODY TO HIGH-PREVALENCE RED CELL ANTIGEN WITH SYSTEMATIC REVIEW OF LITERATURE

Dr. Akshay Chopra, Dr. Shamee Shastry, Dr. Ganesh Mohan, Dr. Deepika Chenna, Dr. Ancy Ninan

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Introduction:

Antibody against high-frequency antigen (HFA) leads to extensive immunohaematological workup which is time-consuming and sometimes unfruitful.

Aims:

To highlight the challenges faced in diagnosis and management of a case of antibody against HPA in our center with review of literature.

Method:

A 31-year-old female, G2P1L1, at 35 weeks with pre-term premature rupture of membranes with breech presentation, underwent emergency LSCS. Her first pregnancy, six years ago, was uneventful and she gave no history of transfusions. Her sample was sent for grouping and crossmatching and in view of an incompatible crossmatch, we undertook further immunohematological workup.

Result:

Blood group was O RhD Positive with no discrepancies (CAT). AHG crossmatch was incompatible with four ABO matched units. Antibody screening and antibody identification panel were pan-reactive (BioRad) with a negative autocontrol. Patient's DAT was negative. AHG crossmatch with saline-suspended units was incompatible. Antibody screen with saline-suspended panel cells again revealed pan reactivity. IAT with adult and cord O group cells showed no change in reactivity (3+ in both). Suspecting an antibody against HFA, we undertook enzyme and DTT treatment. IAT with papain-treated panel cells retained the reactions (3+) whereas IAT with DTT-treated panel cells showed no reaction. This concluded that the patient had an antibody against HFA which got destroyed by DTT, but persisted with papain. Patient phenotype was R2R0 and was positive for k antigen. Thus the antibody could belong to Yt, Vel, Sc or LW systems. The patient did not require transfusion support. Molecular genotyping forwarded. 18 articles with key word search - antibody to red cell high prevalence antigen have been reviewed.

Conclusion:

Even though patient blood management would be the ideal first avenue, the importance of adopting molecular genotyping, a nationwide reference laboratory, and a rare donor register cannot be emphasized enough.

RH & KELL PHENOTYPING IN VOLUNTARY BLOOD DONORS

Dr. Garima Thakkar, Dr Nidhi Bhatnagar, Dr Sangita Shah, Dr Mamta Shah, Dr Kamini Gupta, Dr Rahul Rajvanshi

INTRODUCTION:

In Human beings ,there are 44 blood group systems and 354 antigens currently recognized by ISBT (December, 2022). Rh BLOOD GROUP SYSTEM has 56 antigens, out of them 5 antigens “D”, “C”, “c”, “E” and “e” are clinically most significant antigens in blood transfusion. The KELL BLOOD GROUP SYSTEM has 25 highly immunogenic antigens. Cases have been reported where IgG type of antibodies against Rh and Kell antigens which react at 37°C and are responsible for transfusion reactions and haemolytic disease of new-born. It is always a better option to provide Rh - Kell matched blood to patient.

AIMS AND OBJECTIVES:

1) To study prevalence of Rh - Kell phenotype in voluntary blood donors.

2) To provide Rh and Kell antigen matched blood products to patients to prevent alloimmunization.

3) To make donor directory of Rh & Kell phenotyped donors for further use.

MATERIAL AND METHOD:

Sample size: 1014 voluntary donors

The antigen typing for Rh antigens (D,C,c,E,e) and Kell (K) was performed on the collected EDTA samples from 1014 voluntary donors . The test was performed by Erythrocyte Magnetic Technique using microplate (DuoLys) in a fully automated immunohaematology system (QwaLys Evo 3; Manufacturer: Diagast, France).

RESULTS:

• From 1014 phenotyped donors, the most common antigen frequency was of “e” (98.6%) followed by “D”(96.2%),“C”(89.4%), “c”(54.8%), “E”(18.6%).The frequency of “K” antigen was (1.38%).The most common Rh phenotype from the study population was R1R1(CDe/CDe) (45%) and the rarest phenotype was r’r’ (CE/ce) (0.1%).

CONCLUSION:

• Knowledge of the phenotype frequency in local population is helpful in making donor database for the blood centre.

• In situations where clinically significant alloantibodies are found in patient’s serum, antigen negative blood unit can be easily arranged by requesting a directed blood donation from the matching donor from donor directory.

EVALUATION OF INCOMPATIBLE CROSSMATCH AT A TERTIARY CARE BLOOD CENTER

Ms. Drashti Gajera, Dr Nidhi Bhatnagar, Dr Mamta Shah, Dr Sangeeta Shah, Dr Rahul Rajwanshi, Dr Kamini Gupta

INTRODUCTION:

Compatibility testing is one of the basic tests of pretransfusion testing. Resolving problems in crossmatch should be carried out after proper workup and should following departmental guidelines and SOPs (Standard Operating Procedures).

AIMS & OBJECTIVES:

To find the incedence and cause of incompatible crossmatch and to formulate root cause analysis to help ensure safe transfusion.

MATERIALS AND METHODS:

This prospective study was conducted in Immunohaematology (IH) laboratory, Blood Center from 1stJanuary 2021 - 30thSeptember2022. A total of 200 incompatible cross matches were reviewed out of total 91,550 cross matches performed by column agglutination technique (CAT) in polyspecific (IgG + C3d) gel cards (BIORAD) in a period of 21 months. Incompatibility was further evaluated using direct anti-human globulin test, auto control, antibody screening, and antibody identification by CAT.

RESULTS:

On evaluation of 91,550 sets of patients' sample, only 200 were found to be incompatible (0.27%). Incompatibility rate is higher in females 110(55%). Out of 200 , 120(60%) patient's IH workup showing incompatibility were because of presence of antibodies, out of them, 53 patients had autoantibody, 49 patients had alloantibody, 18 patients had both autoantibody with/without alloantibody. 61(30%) cases of incompatible crossmatch were due to clerical & technical errors, among them wrong blood in tube(WBIT) was the most common one. Other causes were ABO group discrepancy (10/200) (5%), clotted samples (2/200)(1%), Haemolysed samples (2/200)(1%), and five due to DAT-positive donor units(5/200)(3%).

CONCLUSION:

In this study, autoantibody & alloantibody (60%) was the most prevalent cause of incompatible crossmatch, and the most common alloantibody identified was anti-M in cardiology,surgical & truma patients. Root cause analysis is a systemic method for identifying all the contributing factors to a problem, so that the corrective action can be taken. A logical stepwise approach will enable the provision of safe transfusion.

RESOLUTION AND ANALYSIS OF ABO BLOOD GROUP DISCREPANCIES AMONG DONORS AND PATIENTS AT A TERTIARY CARE CENTER

Dr. Arjun Udayakumar, Dr. Suhasini Sil, Mr. Vineet Sharma, Dr. Poonam Coshic, Dr. Hem Chandra Pandey

Introduction:

ABO blood grouping results are considered to be valid when two positive and two negative test results are obtained and there is concordance between forward and reverse grouping. Strength of reactions ≥2+ is considered valid. Any deviation is considered as discrepancy and requires investigation for resolution.

Aim & Objective:

To analyse ABO blood group (BG) discrepancies and their reasons among blood donors and patients.

Materials & Methods:

Study type: Retrospective study

Study setting: Blood centre, Main hospital

Study population: Donors and Patients typed for ABO BG

Study period: July 2022 – June 2023

Study methods: BG initially performed by EM technology in Qwalys evo (DIAGAST, France). Discrepant samples tested by CTT and resolution done. Infant samples (<4 months age) are not investigated further. Wherever required, additional techniques like using antisera (Anti-A1 lectin, H-lectin, Anti-AB), adsorption elution (by CTT), saliva testing (by CTT), antibody screen (by CAT, Biorad) etc were performed. Data collection done from BBMS and IH log-book, entered in excel sheet, anonymised and analysed.

Results:

Donor ABO BG

Total:56919

BG discrepancy:24 (0.042%) or 4.2 per 10,000 donors

Reasons: ABO subgroups:16 (75%), cold auto-/allo-antibodies:4(12.5%) and low-titre antibodies:4(12.5%)

Patient ABO BG

Total:63319

BG discrepancy:544 (0.86%) or 86 per 10000 patients

Reasons:

Neonates:301(55.33%) Infants:120(22.06%), Post-ABO incompatible BMT: 51(9.4%), ABO subgroups:43(7.9%), Cold auto-/allo-antibodies:20(3.67%) and Low-titre antibodies:9 (1.65%)

Conclusion:

Donor ABO discrepancies appear limited to reasons resolvable by application of IH tools alone in majority cases. Patient ABO discrepancies, however, are varied in nature with resolution requiring knowledge of patient characteristics and disease in addition to right application of IH tools based on patient information. An immunohematologist thus requires good communication with clinical staff and sound IH knowledge for timely resolution and transfusion.

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TYPE AND SCREEN OR TYPE AND CROSS MATCH? VALIDATION OF TYPE AND SCREEN AS PRE-TRANSFUSION WORK UP IN A TERTIARY CARE HOSPITAL BASED BLOOD CENTRE

Dr. Ishita Ahuja, Minal Rane, Rupesh Salgaonkar, Ujwala Dmello, Dr. Rajesh.B. Sawant, Dr. Varsha Vadera

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INTRODUCTION:

Recommendation that the full cross match could be replaced by an abbreviated cross match in patients with negative antibody screen has been made by many researchers in the past few decades. Approximately 1% of the general patient population receiving transfusion of blood components in our hospital have a positive antibody screen .The issue of whether to omit anti-human globulin crossmatch for patients screened as negative for RBC alloantibodies remains controversial.

AIMS AND OBJECTIVES:

To validate type and screen policy over type and cross match during pre-transfusion workup.

MATERIALS AND METHODS:

All patient samples were subjected to parallel testing by Column agglutination technology (CAT) for both antibody screening using a commercial three cell panel and for the AHG crossmatch. This study was a blind trial done over a period of 12 months by two different operators.

All the samples were tested on a semi-automated analyser (Ortho Workstation) or fully automated immunohematology analyser (Ortho Vision)

RESULTS:

A total of 1371 patient samples were subjected to Type and screen and type and cross match. 12/1371 samples showed antibody screening positive. 5 out of these 12 cases with positive antibody screen showed compatible cross match results.

Total 2363 cross matches were done and 20 were found incompatible. 1 crossmatch was incompatible in-spite of a negative antibody screening result.

When compared to standard AHG cross match strategy, Type and screen had false positive rate of 0.36% and false negative rate of 0.83%

Sensitivity and Specificity were 91.6% and 99.6% respectively.

Positive predictive value was 68% and negative predictive value was 99.9%

The overall accuracy of Type and Screen approach was 99.5%

CONCLUSION :

Type and screen approach could be successfully validated and accepted for implementation as a pre-transfusion screening protocol.

DEVELOPMENT OF BOMBAY BLOOD DONOR REGISTRY - A STEPPING STONE TO PREPARE INHOUSE BOMBAY PHENOTYPE ANTIBODY SCREENING CELL PANEL

Mr. Siva Kumar, Dr SHIVANAND KUMATAGI, Dr Vinu Rajendran, Dr Amita R, Dr Debasish Gupta

Introduction:

Arrangement of blood units, screening and identification of alloantibody, and issue of phenotype matched unit for a Bombay-phenotype patient is a potential challenge for the blood centre. The H antigens in available screening cells hinders its use in Bombay group patients. Creation of a Bombay donor registry and Bombay phenotype screening cell panel facilitates the arrangement of matched units.

Objectives:

- To perform extended-phenotyping and enrol in donor registry
- To prepare an in-house antibody screening panel for use in Bombay Phenotype individuals.

Materials and Methods:

This was a prospective study conducted at tertiary-care blood center over 6 months. Individuals of Bombay Phenotype, residing within same district were included following counselling after obtaining consent. Extended Phenotyping was performed and demographic details and the antigen profile were entered in the registry.

Results:

We have included 11 individuals and nine out of them are males. Nine were of age group 30-40 and two were less than 25. Direct Antiglobulin Test was negative for all the participants.

The prevalence of antigens were Rh D+(63.6%), D-(36.4%), C+(54.6%), C-(45.4%), c+ (81.8%), c-(18.2%), E+(9.1%), E-(90.9%), e+(100%), K-(100%), k+(100%), Jka+ (72.7%), Jka-(27.3%), Jkb+(63.6%), Jkb-(36.4%), Fya+(72.7%), Fya-(27.3%), Fyb+ (45.4%), Fyb-(54.6%), Lea-(100%), Leb-(100%), M+(81.8%), M-(18.2%), N+(63.6%), N- (36.4%), S+(45.4%), S-(54.6%), s+(81.8%), s-(18.2). None of our study participants were e-, K+, k-, Le+ or Leb+. Bombay donor registry with extended phenotyping was created with this project and the members were motivated to come forward for the future requirements. Screening cell panel was formulated with 11 donor cells.

Conclusion

This registry of typed antigens will help in providing matched units in short time which in turn prevent allo-immunisation. Registered individuals may also benefit for their future transfusion requirements. We intend to expand our registry and prepare sustainable panel cells to support the requirement in and around the state.

AN UNUSUAL SEROLOGICAL PRESENTATION OF BOMBAY PHENOTYPE IN AN INDIAN PATIENT: A CASE REPORT OF NOVEL MUTATION OF FUT 1 GENE

Prof. Priti Desai, Dr Anisha Navkudkar, Dr Swati Kulkarni, Dr Naga Muralidhar Merugu

Introduction:

Bombay phenotype (Oh), is characterized by absence of H, A, B antigens on red cells and secretions. Bombay phenotype can be misinterpreted as "O" if pooled O cells not used in serum grouping and if anti-H lectin not used in discrepancy cases .

Aims and Objectives:

To describe a case of Bombay phenotype with unusual serological results and novel mutation in FUT1 gene.

Results:

A 35-year-old female, admitted with abdominopelvic mass at a tertiary care oncology centre. Her historical blood group was unknown with no history previous transfusion. Initial blood group results showed O Rh 'D' positive and negative antibody screen. During the same admission, 2 AHG compatible (CAT) O Rh 'D' positive PRBC units were uneventfully transfused with 24 hours interval.

Two months later, a request for two units PRBCs was received as preoperative requirement. Blood grouping revealed O Rh 'D' positive with incompatible crossmatch with multiple units. The antibody screen and identification showed pan-reactivity, negative autocontrol and DAT. To rule out Bombay/Para-Bombay phenotype, sample was tested with anti-H lectin, which showed absence of H antigen. Adsorption-Elution studies confirmed absence of A, B and H antigens. Salivary studies indicated non-secretor status. The anti-H antibody titre of IgM and IgG was 16 and 2 respectively, which was low. On molecular testing, the direct DNA sequencing of the coding regions of FUT1 and FUT2 was indicative of Bombay phenotype with identification of novel mutation for site 346 A >G of FUT1 gene.

Conclusion:

The present case, initially typed as O Rh 'D' positive due to undetectable levels of anti-H and hence, uneventful transfusions, subsequently identified as Bombay phenotype with low titre of anti-H. The unusual serological presentation due to low anti-H titre is possibly attributed to novel mutation. Molecular testing may prove as a crucial tool in such cases.

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AN INTERESTING CASE OF ANTI-M

Dr. Sowmya S, Dr. P Arumugam

BACKGROUND:

Anti-M is a relatively common naturally occurring antibody reacting optimally at 40C and weakly or nonreactive at 370C. It is usually clinically insignificant but can be active at 370C because of wide thermal amplitude of IgM component or presence of IgG component.

CASE REPORT:

A 25 year old Rh Negative antenatal mother with obstetric code of G2P1L1, at 18 weeks of gestation presented with grouping discrepancy. Her husband's blood group was O Rh D positive. The grouping discrepancy did not resolve with prewarming technique. Antibody screening and identification of the sample revealed anti-C and anti-M. The IAT was repeated with enzyme treated Rh D, C, e & M antigens positive and negative O cells, which has excluded anti-C and confirmed the presence of Anti-M. The Grouping discrepancy was resolved with M negative red cells. The presence of IgG component was ascertained by DTT treatment of the serum. The titer of anti-M was found to be 8.

CONCLUSION:

Anti-M antibody is generally considered as a naturally occurring clinically insignificant antibody. However, Anti-M is capable of causing HDFN, as well as prolonged anemia (red cell aplasia) due to its ability to destroy the erythroid precursor cells. The identification of IgG component of anti-M and its titer predicts the amount of haemolysis in the fetal circulation. Hence, the necessity of continuous follow-up by antibody titration and assessment of Middle Cerebral Artery Peak Systolic Velocity by USG Doppler study.

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HEMOLYTIC DISEASE OF NEWBORN DUE TO ANTI-C : A CASE REPORT

Dr. Thenmozhi Palanisamy, Dr. Arumugam Pothipillai, Dr. Hamsavardhini Swathandran

Introduction:

Hemolytic disease of the fetus and newborn is the destruction of red cells of the fetus and newborn by the antibodies produced by the mother due to maternal alloimmunization by naturally occurring ABO antibodies or by previous pregnancies or by previous transfusion.

Case report:

We report a case of 3/365 days old term male baby of birth weight 2.3 kg, appropriate for gestational age delivered by normal vaginal delivery born to P2L2 mother had normal vital signs immediately after birth. Baby was admitted in Special New Born Care Unit on the 2nd day of life with the complaints of yellowish discoloration of skin up to palms and soles. Laboratory investigations of baby showed decreasing level of hemoglobin and markedly raising bilirubin levels to the extent of 26.2mg/dl. DAT of baby's blood was positive. Blood group & Rh Type of mother and baby were O RhD Positive and father was B RhD Negative. IAT of mother's serum was positive. Antibody screening and identification of mother's serum revealed anti-c. The eluate from baby's red cells also showed anti-c. It was further confirmed by the absence of Rh c antigen expression on mother's and babies red cells and presence of Rh c antigen expression on father's red cells.

Conclusion:

The practice of red cell antibody screening during antenatal visits irrespective of RhD status of the mother helps in prediction, monitoring and intervention of early onset of fetal anemia. The management of hemolytic disease of newborn by exchange transfusion also depends on the same knowledge.

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RARE BUT NOT UNSEEN PHENOTYPE IN ROUTINE CARE

Dr. PRIYA ANBARASU, Dr. ARUMUGAM POTHIPILLAI, Dr. HAMSAVARDHINI SWATHANDRAN

INTRODUCTION :

Bombay(Oh) phenotype was first discovered in Bombay by Dr. Y.M.Bhende in 1952.It is a rare Autosomal recessive phenotype characterized by absence of H, A and B antigens on red cells and in secretions. When patient needs transfusion,arranging compatible blood will be challenging. We report an interesting case of Bombay RhD Negative phenotype in a pregnant woman.

CASE REPORT:

A 32 year old primi gravida at 28 weeks of gestation was referred to our institute for resolving blood group discrepancy. Patient was typed as O RhD Negative with positive Indirect Antiglobulin Test (IAT). Grouping discrepancy between cell and serum grouping was observed (cell grouping showed as O negative and serum grouping gave positive reaction with O pooled cells). Sample was further tested with Anti-H lectin along with O cells as control and she was confirmed as Bombay RhD Negative phenotype. IAT was positive with 4+ strength using gel technique. Auto control and Direct Antiglobulin Test (DAT) were negative. No past history of transfusion. Family screening revealed Bombay RhD Negative in her brother. Anti-H in patient's serum was adsorbed using phenotypically matched O RhD positive RBCs. IAT and Antibody Screening with anti-H adsorbed serum didnot reveal any alloantibodies. Also IAT using Bombay RhD positive red cells showed negative result using tube as well as gel technique. Saliva secretor status was assessed and was confirmed to be a non-secretor. IgM Anti-H titer was 32 and IgG was 8. Serial evaluation of titers and middle cerebral artery peak systolic velocity were advised to monitor fetal anemia.A Bombay negative phenotype was identified and kept informed about need of blood during emergency.

CONCLUSION:

The case highlights the importance of inclusion of O cells in serum grouping and to create a rare blood donor registry.

EFFECT OF FRESH FROZEN PLASMA IN THE TREATMENT OF C1Q DEFICIENT PATIENTS

Dr. Vijayshree Sakpal

INTRODUCTION:

Complement component C1q is the central pattern recognition molecule in the classical pathway of the complement system and is known to have key role in the innate and adaptive immunity. It has wide role in infections and immunity.

Case Report:

Case 1: 16 years old female patient with complaints of fever and Hypo- hyper pigmented rashes over the body. Anti dsDNA – positive, Audiometry – B/L moderate conductive hearing loss present, Whole exome genome sequencing - C1QC Exon3 deletion.

Case 2: 8 years old male with complaints of fever, oral ulcers and hypo- hyperpigmented rashes over the body. CT Brain – chronic subdural haemorrhage, skin biopsy – lupus erythematosus, pus culture –pseudomonas aeruginosa Anti dsDNA- positive, whole exome genome sequencing genetic test - C1QC Exon 3 deletion.

Case 1 and case2 are siblings.

Laboratory investigations were as follows.

CRP- negative, ANA by Immunofluorescent – Negative, Anti –dsDNA – positive

2D ECHO- normal, LFT- Normal, RFT – Normal, APLA IgG, IgM–Negative, HIV-negative,

HbsAg – negative, Whole exome sequencing genetic test – C1QC Exon3 deletion. Serum C3, C4 Levels – Normal.

Treatment – FFP transfusion= 10mg / kg every month, Tab wysolone 10mg, tab HCQ (200mg), tab calcimax, tab Azathioprine.

Discussion:

Homozygous C1Q deficiency predisposes to Systemic lupus Erythematosus in majority of cases, as there is impaired clearance of immune complexes and impaired handling of apoptotic cells lead to complement proteins deposition in the tissues of the patients. As complement is crucial for the physiological processing of immune complexes.

In the present cases FFP transfusion per month according to the weight of the patient has shown better improvement in the patient's symptoms.

Conclusion:

Adequate amount of Fresh frozen plasma transfusion is necessary to replace the complement of the blood in C1Q deficient patients.

COLD AGGLUTININ DISEASE: NAVIGATING CLINICAL AND LABORATORY INSIGHTS

Dr. Priyanka P, Dr Vanamala Alwar, Dr Shanthala Devi AM

INTRODUCTION

Cold agglutinin disease(CAD) is a rare autoimmune hemolytic anemia, which is IgM mediated. CAD can be Primary or Secondary with varied clinical presentations, presenting as a diagnostic and therapeutic challenge sometimes.

AIMS & OBJECTIVES

1. To analyse the clinical association and laboratory findings in patients with significant cold agglutinin titres(CAT).
2. To discuss immunohematological and transfusion challenges in CAD.

MATERIALS AND METHODS

The patients with CAT of >= 64 were included in the study by retrospective review of data (2018-2023) .Clinical presentation, laboratory and serological characteristics were reviewed and analysed.

RESULTS

Of 205 requests for CAT received in this period, 37 (18.0%) cases had significant titres. The Male: Female ratio was 1:1.46. Etiologically Patients with Primary CAD (n=9) were fewer than Secondary (n=28). The Mean Hemoglobin was 7.2 g/dl and LDH was increased (Mean= 656.1pg/ml).Hemoglobin of <10g/dl was seen in 66.6% of primary and 85.7% of secondary CADs. Peripheral smear showed RBC clumping in 82.35%, Red cell indices were spuriously elevated (Mean MCV 104fL,MCH 53.3pg,MCHC 49.9%).

In immunohematological work up, grouping discrepancies was found in 56%, requiring special methods to resolve. DCT was positive in 75% cases .

56.75 % (n=23) of patients required blood transfusion of which incompatibility was noted in 65.2% (n=15) cases.

Significant titres were categorized into 3 groups :64-128 (n= 12), 256-512(n= 12), 1024-2048 (n= 13).

Severity of anemia, evidence of hemolysis and transfusion requirements were similar across the 3 groups. (Mean hemoglobin : 7.3gm/dl, 6.8gm/dl and 7.46gm/dl respectively)

W.r.t Thermal amplitude, Reactivity upto 4C, 25C, 37C was seen in 100%, 56% and 56% respectively.

CONCLUSION

CAD presents frequently with hemolysis. Peripheral smear findings are a useful screening tool for CAD. Grouping discrepancies and incompatible transfusions are often encountered difficulties. In patients with CAD, titre strength can vary, irrespective of the disease severity.

RARE PARTIAL D-TYPE DLO: MOLECULAR ANALYSIS

Dr. Anurag Singh, Dr. (Prof) H.O.D. Tulika Chandra, Dr. (Prof) Swati Kulkarni, Dr. Garima Mishra

Aim:

To analyze Partial D DLO on a molecular basis.

Methods:

Donors Donated blood according to DCA Act after which WEAK D was performed on the Diagast France machine. Following this Rh extended phenotyping was done. And samples were sent to NIIH Mumbai. DNA was prepared by the Chloroform method, after which multiplex PCR was done, followed by QMPSF and Sanger Sequencing.

Results:

Around 1,20,000 samples were tested out of which 7895 came out to be Rh D negative out of which 28 were WEAK D Positive and one came to be DLO. c.851C>T was the nucleotide change seen. R1r was the phenotype that appeared. The allele where it was present was 4 and 5.

Conclusion:

Individuals whose red blood cells do not carry all the parts of the D mosaic can, when exposed to the full D antigen, produce anti-D alloantibodies directed against one or more of the missing epitopes, thus defining the phenotype “partial D.” Loss of D epitopes is associated with either gene rearrangements or point mutations. Matching rare Rh antigens at the haplotype and genotype levels should be implemented in practice. A clinical benefit should be demonstrated.

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MASKED RHD ANTIGEN – SOLVED RIDDLE

Dr. Arumugam Pothipillai, Dr. Hamsavardhini Swathandran, Dr. Harish Gowdham Deivendran

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Background:

The blocking of D antigen sites in fetal/neonatal RBCs by maternal IgG Anti-D antibodies is known as blocked D phenomenon. These antibodies prevent the RhD positive neonatal cells from agglutinating with the D antigen typing reagents. We are reporting a case of RhD Hemolytic Disease of Fetus and Newborn where the neonate was typed as RhD negative with routine typing.

Aims:

To find the RhD status of the baby, find if any alloantibodies are present.

Methods:

Routine blood grouping, Direct Antiglobulin Test, Elution studies on neonate's red cells. Antibody screening and Identification on the mother's sample.

Results:

Antibodies identified in mother's serum were Anti-D & Anti-C. Anti-G was ruled out by adsorption elution studies with R2R2 and r'r red cells. The eluate from neonate's red cells revealed Anti-D. The eluted RBCs of neonate revealed expression of RhD antigen, hence typed RhD positive.

Conclusion:

The Strongly positive Direct Antiglobulin test in neonate and identification of similar antibodies in neonate's eluate and mother's sample along with corroborative clinical findings always suggest blocked phenomenon.

ABO HEMOLYTIC DISEASE OF FETUS AND NEWBORN IN A TERTIARY CARE CENTRE IN NORTHERN INDIA

Dr. Mohd Anas Sheikh, Dr Gurpreet Kaur Dhillon, Dr Shilpi Saxena

Introduction

ABO Hemolytic disease of the newborn is an alloimmune condition that develops in a newborn when the IgG antibodies produced by the mother pass through the placenta. ABO-HDFN occurs almost exclusively in neonates of blood group A or B who are born to group O mothers. Although ABO HDFN is believed to be more common than Rh HDFN, it is usually less severe. However there have been many reports of ABO-HDFN requiring treatment in form of top-up transfusion or exchange transfusion.

Aims & Objective

The study was conducted to analyze the spectrum of disease in ABO HDFN.

Materials & Methods

We studied three cases of ABO HDFN which presented with neonatal jaundice and/or anemia requiring further treatment and management during the period 1 Oct 2022 to 1 Aug 2023. Immunohematological workup of the cases was done including ABO Rh typing, Coombs testing, antigen phenotype and antibody titration for newborn, mother and father. The cases were then monitored for clinical and laboratory parameters till full recovery.

Results

Out of total of three cases, two were A group while one case was B group newborn. All the cases were given IVIg and intensive phototherapy, one patient also required top up PRBC transfusion. There have been no long term sequelae till date.

Conclusion

Although the severity of ABO HDFN varies, most respond well to intensive phototherapy and IVIg therapy. Early detection and astute management is the key to better outcomes.

Keywords

ABO-HDFN, hemolytic disease of the fetus and newborn, Direct Antiglobulin Test, Phototherapy, top up transfusion.

Identification of Bombay blood group of a voluntary blood donor by serological and molecular testing: A case report

Dr. Neema Vijay, Dr. Sankalp Sharma, Dr. Alaka Vijayan C

Introduction:

The Bombay blood group, also known as “Oh” phenotype, was discovered in 1952 in Bombay, India. It is inherited recessively(hh) and lacks A, B, and H antigens on red cells. People with Bombay group produce anti-A, anti-B, and anti-H antibodies in their serum and are non-secretors of A, B, and H substances in their saliva.

Aims & Objectives:

To confirm Bombay blood group through serological and molecular methods of a voluntary blood donor in our blood centre which showed agglutination with O cells in routine blood grouping.

Materials & Methods:

The blood grouping, both forward and reverse, was done at 4°C, 24°C, and 37°C by Tube Agglutination method. Direct Coombs test(DCT), Indirect Coombs test(ICT), and autocontrol were performed. Anti-H titration with O cells was done at 4°C and 24°C by Tube Agglutination method. Antibody screening was performed by 3-cell panel. Saliva Inhibition test was done to confirm secretor status. For further confirmation, molecular analysis was done.

Results:

The forward grouping showed O positive group (No agglutination with anti-A, anti-B, anti-AB, anti-A1 lectin and 4+ agglutination with anti-D IgM) and reverse grouping showed agglutination with O cells (No agglutination with A cells and B cells). Further testing with anti-H revealed no agglutination. DCT, autocontrol were negative and ICT was positive(4+). Antibody screening test was pan-reactive. Anti-H titration was performed with donor plasma and showed titre of 4 at 24°C and titre of 8 at 4°C. Saliva Inhibition test revealed non-secretor status of A, B and H substances. In molecular study, DNA analysis of coding regions of FUT1 gene revealed Homozygous mutation c.725T>G and deletion of FUT2 gene.

Conclusion:

The blood group of the donor is confirmed as Bombay Phenotype RhD positive. Donor was registered in rare donor registry and advised screening of family members. Donor was counselled regarding blood transfusion.

SPECTRUM OF ALLOIMMUNIZATION AND TRANSFUSION FREQUENCY IN RELATION TO GENE MUTATION IN TRANSFUSION DEPENDENT β - THALASSEMIA PATIENTS

Dr. Tunu Bhatria

Introduction

Thalassemia, an autosomal recessive disorder, results from mutations in the α- and β-globin gene clusters on chromosomes 16 and 11. β-Thalassemia disrupts hemoglobin production, leading to shortened red blood cell lifespan, anemia, and reliance on frequent blood transfusions. Antibody development is a significant concern in thalassemia patients due to recurrent transfusions.

Aims & Objective

- To determine frequency of transfusion in relation to type of gene mutation in thalassemia patient.
- To determine rate of alloimmunization in relation to type of gene mutation in thalassemia patient.

Materials and Method

This is a cross sectional study done over two years. In this study, 261 transfusion-dependent β -thalassemia patients registered at our institution, was investigated collaboratively by Department of Transfusion Medicine and Department of Biochemistry. Ethical clearance was obtained. Blood samples were collected before each transfusion and screened for alloantibodies using 3 cell panel (Surgiscreen ortho clinic diagnostic). Patients with positive antibody screening results underwent further testing for alloantibody identification. Gene mutations was analyzed in the Biochemistry Department. Inclusion criteria encompass all β -thalassemia patients receiving transfusions at the center, while exclusion criteria include known autoimmune hemolytic anemia or alloimmunization, and lack of patient/parental consent.

Results

Of the 261 thalassemia major patients included in the study, 168 were male and 93 were female with mean age 9.21 yr (ranging from 1yr to 37 yrs).we got 15 types of genetic mutation, out of which most frequent was IVS 1-5 (G>C) HOMO (72.26%) & we got alloimmunization in 1 patient after subsequent transfusion which is related to IVS 1-5 (G>C) HOMO genetic mutation. Transfusion frequency was almost equal in all type of genetic mutation.

Conclusion

There is no significant relationship between genetic mutation with spectrum of alloimmunization and frequency of transfusion.

WITHIN THE CONFINES OF A AND B'- ABO SUBGROUPS: AN AMBISPECTIVE STUDY AT A TERTIARY CARE CENTER IN NORTHERN INDIA

Dr. Juhi Bhatia, Dr. Deepali Chauhan, Dr. Daljit Kaur, Dr. Ashish Jain, Dr. Gita Negi

Introduction:

The ABO blood group system has various phenotypes with varying regional distribution.

Aims and Objectives:

To determine the frequency of A2/A2B subgroups at our center.

Material and Methods:

An ambispective study was done to determine the A2/A2B phenotype distribution for the blood donors and patients visiting our hospital. Retrospectively reported A2/A2B/weaker subgroups in the patients and donors were analyzed over 7 years (July 2016-July 2023). Given the reported cases, a prospective study was done in blood donors to phenotype A2/A2B. The A and AB blood groups were tested with anti-A1 lectin to identify A2/A2B by Conventional Tube Technique over 3 months (May 2023-July 2023).

Results:

Of the whole blood donors studied prospectively [(n=5085);(May 2023-July 2023)], 20.62%(1049) typed as A and 8.08%(411) as AB blood group. Forty-eight A2/A2B subgroups were found, of which 99.61%(1045) typed as A1, 0.38%(4) as A2, 89.29%(367) as A1B and 10.7%(44) as A2B. No donor was found to have anti-A1 or weaker subgroup.

The retrospective data was available for 20 cases as reported among 83,057 donors (n=9) and 1,64,014 patients (n=11) in 7 years. Ten (02A2, 08A2B) of the 20 cases were phenotyped as A2(02;01 patient, 01 donor;10.0%) and A2B(08;5 patients, 3 donors;40.0%), and 10 as weaker subgroups of A/B/AB(05 patients, 05 donors;50.0%). Eleven of these (08 A2B, 01A2, 02Awk) cases had Anti-A1 antibodies.

Conclusion:

The A2B subgroup is more prevalent than A2(10.7% vs. 0.38%) in the blood donor population visiting our center. The donors and patients with ABO subgroups were informed and counselled regarding their blood type and the future blood transfusion strategy. The patient population can also be studied prospectively for A and AB subgroups for the prevalence study for the region. Such phenotypes should be tested for the presence and thermal amplitude of anti-A1 to prevent discrepancies in forward/reverse grouping and crossmatch incompatibilities.

ANALYSIS OF ANTI-A AND ANTI-B ISOAGGLUTININ TITRES BY CONVENTIONAL TUBE AND MICROCOLUMN AGGLUTINATION TECHNIQUE IN O RH D POSITIVE MOTHERS AND THEIR EFFECT ON NEONATAL OUTCOME

Dr. Noorul Aashiqeen, Dr Ravneet Kaur, Dr Paramjeet Kaur, Dr Gagandeep Kaur, Dr Kshitija Mittal, Dr Tanvi Sood

Introduction:

Hemolytic disease of the fetus and newborn resulting from ABO incompatibility occurs in neonates born to mothers with blood group O as IgG anti-A and anti-B isoagglutinins, can cross the placenta. It is important to determine Anti A and B titres in O group mothers for timely management of neonates at risk.

Aims and Objectives:

To analyse anti-A and anti-B isoagglutinin titres by conventional tube (CTT) and microcolumn agglutination technique (CAT) in O Rh D positive mothers and their effect on neonatal outcome.

Material and Methods:

This prospective observational study was conducted in the department of Transfusion Medicine at a tertiary center. All O Rh D positive pregnant mothers of ≥ 35 weeks of gestation admitted to the labor room were enrolled. 5ml blood sample was collected and the serum was subjected to dithiothreitol (DTT) treatment followed by IgG anti-A and anti-B titres by CTT and CAT. All A and B blood group neonates born to these mothers were followed for 7±2 days for neonatal jaundice. Neonates with positive direct antiglobulin test (DAT) were subjected to elution and antibody identification.

Results:

A total of 55 pregnant females with O Rh D positive blood group were enrolled of which 8 were excluded. The mean IgG anti-A titres in O positive females (n=47) by CTT and CAT were 4.42 and 27.74($p< 0.001$) respectively. The mean IgG anti-B titres by CTT and CAT were 4.65 and 32.25($p< 0.001$) respectively. Neonates born to these mothers (n=47) with A and B Rh D positive blood group were further followed. The DAT was positive with strength ranging from 1+ to 3+ using CAT in four neonates of which two were managed with phototherapy while two required exchange transfusion.

Conclusion:

The IgG anti-A and anti-B titres were higher using microcolumn agglutination technique but the neonatal outcomes were similar.

RED CELL ADSORPTION STUDY FOR DETERMINING THE FREQUENCY OF ALLO-IMMUNISATION IN PATIENTS WITH AUTO-IMMUNE HEMOLYTIC ANEMIA IN A TERTIARY CARE CENTRE OF NORTHERN INDIA

Dr. Suhasini Sil, Dr Hem Chandra Pandey, Dr C S Chippy, Dr P Suganya, Dr Poonam Coshic, Mr. Vineet Sharma

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Introduction:

Patients with autoimmune-hemolytic anemia (AIHA) requiring transfusion present a unique challenge to the IH laboratory as there could be underlying alloantibodies masked by autoantibodies. Work-up of such patients requires technical skills and reagents. The present study outlines the importance of adsorption technique in providing safe blood.

Aims and Objectives:

To analyse the utility of adsorption technique in identifying clinically significant allo-antibodies in AIHA.

Materials and Methods:

Study type- Retrospective observational

Study period- July2018 to June2023

Allogenic-adsorption was performed as per departmental SOP. Data from IH-logbook was entered in excel-sheet, anonymised and analysed. Cold adsorption was performed in Cold-AIHA patients and cold-adsorption followed by warm adsorption in Mixed-AIHA patients.

Results:

Total AIHA patients= 368,

Adsorption not performed= 280, no h/o transfusion or unavailability of adequate sample.

Adsorption performed= 138, Warm-AIHA, Cold-AIHA and Mixed-AIHA present in 129 patients, 7 patients and 2 patients respectively.

Alloantibody identified= 75(54.3%); single specificity= 42(56%), multiple specificity= 33(44%).

Anti-E(~50% cases)= single specificity in 15 patients, with other alloantibodies in 22 patients. Other common specificities included anti-S(13%) and anti-Jka/anti-Jkb(12% each) either singly or with other alloantibodies. Infrequently identified alloantibodies included Anti-D, Anti-C, Anti-c, Anti-e, Anti-Cw, Anti-K, Anti-Fya/Fyb, Anti-M, Anti-N and Anti-s.

Conclusion:

Observed high frequency(54.7%) of allo-immunisation in AIHA patients highlights importance of adsorption in improving transfusion safety. Adsorption techniques require reagents and technical expertise but could be modified to suite laboratory limitations (eg. R2R2 cells omission would not affect antibody detection in majority). Even with minimal reagents (antisera to Rh, K, Jka/Jkb and papain) adsorption could be started at most tertiary level blood centres. Improved communication with treating physicians and awareness of likelihood of alloantibodies in AIHA patients would improve availability of samples, optimal transfusions and improved quality of care.

EVALUATION OF CRITICAL TITRE OF ANTI- D IN MATERNAL SERUM FOR PREDICTION OF CLINICALLY SIGNIFICANT HDFN

Dr. Madhavi Ambhore, DR. ABHISHEKH BASAVARAJEGOWDA, DR. DIBYAJYOTI SAHOO

INTRODUCTION:

HDFN is caused by maternal allo-immunization against red blood cells, most commonly by anti- D, which leads to hyperbilirubinemia, foetal anaemia and in severe cases kernicterus and intrauterine death of foetus. Antibody screening and titration helps to detect the allo-immunization early in pregnancy. Till now various studies has described the critical titre as 8-32 with no clear consensus from India.

AIM & OBJECTIVE:

To evaluate critical titre of Anti- D in maternal serum for prediction of clinically significant HDFN.

METHODS:

In a prospective observational study, 36 allo-immunized anti- D pregnancies were included & followed up till delivery. Titration was done with conventional tube method after which all patients were advised foetal Doppler. New-born were followed up till the day of discharge with serum bilirubin level & treatment (phototherapy, exchange transfusion) being received.

RESULT:

Out of 36 pregnancies, 23 had titre of ≥ 16. Out of these 23 deliveries, 18 new-borns received phototherapy and 5 were lost to follow up. When the titre was less than 8; none of the patients required phototherapy. With titres of 16 and 32, 57% and 87.5% patients required phototherapy respectively. When the titre ≥64, all the patients required phototherapy. These values were statistically significant with a p value of 0.005 ($\chi 2 = 23.61$). The Likelihood ratio for titre cut-off of titre for probability of receiving phototherapy was 31.43 with a p value < 0.001. One missed abortion was observed with titre of 256. 2 new-borns received exchange transfusion with titre of 256 and 512 respectively.

CONCLUSION:

This study shows that half of babies whose antenatal Anti- D titre >16 and all babies whose antenatal titre >32 require phototherapy. Therefore, 32 can be considered as critical titre and titre 16 should be evaluated which can cause mild HDFN.

PREVALENCE OF MAJOR CROSSMATCH INCOMPATIBILITIES - A DESCRIPTIVE STUDY IN A TERTIARY CARE CENTRE IN KERALA

Dr. HADHIYA THAHIR, Dr MAYA DEVI S

INTRODUCTION:

Crossmatching is an integral part of pretransfusion testing, ensuring safe blood transfusion. Incompatibilities in crossmatch is one of the main challenges faced by a transfusion medicine expert on a routine basis.

AIMS AND OBJECTIVES:

To estimate the prevalence of major crossmatch incompatibilities in a tertiary care centre.

To analyze the causes of an incompatible crossmatch

MATERIALS AND METHODS:

A retrospective, descriptive study was conducted in our blood centre. During the study period(from September2022-August2023: 1year), all the major crossmatch was done by column agglutination technique (CAT) in AHG phase using Bio-Rad Anti IgG+C3d gelcards. Using the data collected from the documents - cross match registers, Immunohematological work up books; all the major crossmatch incompatibilities were noted and analyzed.

RESULTS:

During the study period, out of a total of 41,975 major crossmatch (AHG Phase), 125 was found to be crossmatch incompatible (0.29%).

Crossmatch incompatibility was found to be higher in females (63.2% n-79) than in males (36.8% n-46)

In 73.6% cases(n-92), there was history of prior sensitization events, while in 26.4% cases, there was no history of prior sensitization events.

Out of the total crossmatch incompatibilities,

44.8%- due to autoantibodies(n-56)

36%- due to alloantibodies (n-45)

16.8%- due to non-immune causes (eg: Technical errors) (n-21)

2.4%- due to alloantibody with an underlying autoantibody. (n-3)

Among the crossmatch incompatibilities due to alloantibodies(n-45);

73.33%- Single alloantibody (n-33)

20%- Multiple alloantibodies (n-9)

6.66%- Alloantibodies of unknown specificity(n-3)

The most common alloantibody was found to be anti-small c antibody (30.36%) followed by anti E antibody (16.07%), Anti M antibody (12.5%) , Anti S antibody(12.5%). Other alloantibodies detected were anti C(8.92%), anti D(7.14%), anti Jka(5.35%), anti P(1.78%), anti e(1.78%), anti Fya(1.78%), and anti K(1.17%).

CONCLUSION:

Incompatible crossmatch poses a challenge in the field of Transfusion Medicine. Root cause analysis is necessary to take corrective action.

Theme
Innovations in Transfusion Medicine

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ESTABLISHMENT OF INDIA'S FIRST FROZEN RED BLOOD CELL (fRBC) PROGRAM: ASSESSING THE QUALITY CONTROL PARAMETERS OF fRBC AND SHARING INSIGHTS OF AN ENRICHING EXPERIENCE

Dr. Amit Pawar, Dr Rajat Jagani, Dr Satish Kumar, Dr Ujjwal Dimri

Background:

With growing concern for shortage of blood supply in future due to decrease in eligible blood donors and concurrent increase in recipients, cryopreservation of red blood cell could lead the way for future technology development and better inventory management. Cryopreserved units are also utilized in combat care for meeting transfusion needs of rare antigen phenotype patients, patients with multiple alloantibodies and during disaster management or outbreak of a pandemic.

Methods:

One hundred and ninety five units of packed RBC were glycerolized (HGM, 35–40% w/v glycerol) using an automated cell processor and subsequently frozen for storage. Product weight, volume, hematocrit, RBC count, WBC count and hemoglobin were estimated prior to freezing. Seventy eight such units were later thawed and deglycerolized starting at one year from the date of first glycerolization and then regularly at three monthly interval. Units were additionally assessed for supernatant osmolality, supernatant hemoglobin, supernatant potassium and product pH. Viability was assessed from RBC recovery and percentage hemolysis. All tests were repeated at end of day 7, 10 and 14 postthaw for the units that were deglycerolized as per regulatory guidelines.

Results:

The mean red cell recovery on Day 0 of deglycerolization was found to be 83.25+3.75% with hemolysis percentage as 0.42+0.22% which was well within the acceptable criteria. All the units showed product pH, supernatant potassium and supernatant osmolality within the acceptable limits upto Day 14 post-thaw. All the units were also found to be sterile with culture negative upto Day 14. No adverse transfusion reactions were observed in the patients who were transfused.

Conclusion:

The results of the study showed that the red cell units which were cryopreserved (glycerolization-deglycerolization) using the automated cell processor ACP 215 (Haemonetics, Braintree, MA, USA) had excellent in vitro viability while being stored at 4˚C+2˚C during the 14 days post-thaw period.

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ADVANTAGE & IMPLEMENTATION OF RFID (VEIN TO VEIN BLOOD TRACEABILITY) IN A TERTIARY CARE HOSPITAL

Mr. Deepak Kumar, Ashok Kumar, Omprakash Mandal, Mohd. Imtiyaz,Swati Pabbi, Rahul Katharia

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Introduction:

Traceability from donor to patient is crucial to ensure the availability and the quality of blood products.

Aims & Objective:

Based on RFID technology, this module end-to-end tracking solution enhances vein-to-vein traceability through five modules: Collection & Encoding, Transport, Processing, Inventory, and Patient Safety.

Materials & Methods:

We have started for RFID for PRBC from March 2023, till the date we have issued 1243 PRBC to different ward/OT/ICU. Installation of SSTR rack in Refrigerator then followed by software installation. Network facility in Ward/OT/ICU RFID Tag encoding after testing of PRBC. Reserve cross match and save. Hands on training at ward/OT/ICU end. Issue RFID device at each floor

Results:

Out of 1243 PRBC, there is no mismatch blood transfusion reported from ward/ot/icu

Time taken before and after RFID blood issue implementation vs manual blood issue, 3 Min vs 9 min. Real time tracking & monitoring of transfusion.

Collection of transfused empty blood bag & transfusion follow-up, earlier 92 % vs 100%

Physical inventory time taken was 1-2 hr. prior vs auto generation after RFID (no need to take inventory physically).

Expiry notification alert (separate color code indication in SSTR enabled blood issue as per FIFO

Conclusion:

It can quickly identify any blood product from storage Blood Bank Refrigerator.

Multiple blood product bag searching, inventory dashboard management and issuing problem can be solved easily by using RFID technology

RFID technology could be a very essential step for blood centre for establishing more accurate and error free blood collection and distribution process (Vein to vein real time inventory & traceability of blood)

PLATELET FUNCTION TESTS AND ATYPICAL LYMPHOCYTES - IN DENGUE ILLNESS

PLATELET FUNCTION TESTS AND ATYPICAL LYMPHOCYTES, AN INDICATOR TO SEVERITY OF DENGUE INFECTION

Dr. Yogini Patel

Abstract:

Critical shortage of platelets in the city has led to preferential transfusion of platelets. 600 patients were tested for NS1, screened for platelets count, mean platelet volume (MPV), IGG and IGM.A significant difference in Chi Sq. ($p < 0.05$) value was observed in patients with low platelet count, high MPV, not associated with overt bleeding as compared with patients with low platelet count, normal mean platelet volume and overt bleeding. 70% of the platelet function tests (PFT) of patients with presence of atypical lymphocytes showed derangement. A regular follow up of platelet count test at six hourly interval revealed that the crisis period for an active dengue patient persists only for “twenty four hours”, and it can be easily overcome with simple intravenous (IV) saline transfusion by flushing and/or oral hydration. We also observe that the PFT also gets corrected and the atypical lymphocytes disappear.

Conclusion:

we can avoid transfusion in around 60.2% of patients who are tested positive for NS1 dengue parameters with low platelets, Deranged PFT and presence of atypical lymphocytes are indicators of severe form of dengue illness.

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FACTOR XII DEFICIENCY: SCREENING BY ISTH-BAT SCORE AND PATTERN OF GLOBAL HAEMOSTATIC TESTS IN A TERTIARY CENTRE

Dr. Meenakshi Bhatia, Dr Rutvi G Dave, Dr Sukesh C Nair

INTRODUCTION:

Factor XII is a coagulation protein which when deficient results in significant prolongation of APTT (activated partial thromboplastin time). FXII deficiency is commonly an incidental diagnosis and often causes paradoxical thromboembolic complications instead of a bleeding diathesis.

AIMS AND OBJECTIVES:

To assess patients with factor XII deficiency by the ISTH-BAT score and study the pattern of tests of global haemostasis in such patients.

MATERIALS AND METHODS:

Patients identified with isolated factor XII deficiency between July 2021 to July 2023 were included in this study. Bleeding symptoms were scored based on the ISTH-BAT (Bleeding Assessment Tool). ROTEM by modified EXTEM (low physiological dose of recombinant TF) was studied in these patients.

RESULTS:

22 cases were included in this study with different degrees of factor XII deficiency. 3 cases were severe, 3 were moderate and 16 cases had mildly reduced levels of factor XII. The ISTH-BAT scores for all cases were between 0 and 4 and insignificant for age. ROTEMs showed normal parameters in 81% (n=18) of patients, with 27% (n=6) showing shortening of CFT (Clot Formation Time) indicating a hypercoagulable state.

33% (n=1) of the severe and 100% (n=3) of the moderate cases showed increase in clotting time, however only 33% (n=1) of the severe and 33% (n=1) of the moderate cases showed increased CFT.

CONCLUSION:

Factor XII deficiency is not associated with any increased risk of bleeding in patients with reduced factor levels. Implementation of screening tools such as the ISTH-BAT score provides us with a way to reduce unnecessary transfusions in such cases.

Tests of global haemostasis are predominantly normal in cases of factor XII deficiency and support the same conclusion. CFT shortening in ROTEM studies provide some clue as to the prothrombotic episodes which occur in such cases, however, further clinical correlation is required.

EVALUATION OF EFFICACY OF THROMBIN VS CALCIUM GLUCONATE AS AGONIST FOR ACTIVATION OF PRP USING MULTICOLOR FLOWCYTOMETRY

Dr. Niharika Yadav, Dr. Atul Sonker

INTRODUCTION:

Platelets produce several growth factors such as PDGF, IGF-1, VEGF and TGFβ which play a key role in the process of healing and regeneration. The release of these growth factors depends on platelet activation. This study aims to find a potent activator of platelet which is capable of releasing greater amount of growth factors which may be beneficial when used clinically.

AIM &OBJECTIVE:

The aim of this study is to identify more potent activator, while comparing two platelet agonists i.e. Thrombin and Calcium Gluconate, of platelets in PRP (Platelet Rich Plasma) which could release greater amount of Platelet derived growth factors (PDGF).

MATERIALS AND METHODS:

A total of 10 PRP samples were prepared from random donor platelets collected from healthy, male, group matched donors. All PRP samples were subjected to activation using thrombin and calcium gluconate separately. After incubating the test samples with agonists, the analysis was done on multicolor flowcytometry using a gating strategy based on ubiquitously expressed platelet membrane marker CD41.

This ubiquitously expressed platelet marker was combined with antibodies against the activated alpha2b-beta3 (PAC-1), Lysosomal Activated Membrane Protein (CD63) and P-selectin (CD62P).

RESULTS:

We were able to detect the ubiquitous platelet antigen CD41 over all the platelets analyzed. Expression of platelet activation markers PAC-1, CD63 and CD62P was comparatively higher in platelets activated with thrombin as compared to those activated with calcium gluconate.

CONCLUSION:

Thrombin is a better platelet agonist as compared to calcium gluconate. Thus, activation of platelets with thrombin may result in better release of platelet derived bioactive molecules and may have better regenerative effect when used clinically.

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EFFICACY OF NOVEL LOW COST AUTOLOGOUS BONE MARROW ASPIRATE CONCENTRATE (BMAC) PROCESSING TECHNIQUE USING QUADRUPLE BLOOD BAGS AS ADJUVANT THERAPY IN MANAGEMENT OF AVN OF HIP JOINT

Dr. Kamini Khillan, Dr Vivek Ranjan, Dr Anant Tiwari

Introduction:

Bone marrow derived stem cells are being used for quite a few years for early stages (Stage I and Stage II) of avascular necrosis of hip . A modified technique for collecting Bone marrow aspirate using quadruple blood bags and processing in the standard blood bank component preparation centrifuge to prepare a Bone Marrow Concentrate (BMC) with good results has been studied .

Aims:

The most common surgical treatment is core decompression (with or without adjuvants) for early stage disease with ideal goal to postpone or stop the progression of the disease before femoral head collapses.

Objective:

A Retrospective study evaluating :1. Efficacy of a low cost Autologous BMC preparation procedure adjuvant therapy 2.Use of a modified surgical technique of Core Decompression

Methods:

All patients with Grade I or Grade II (Steinberg Classification) irrespective of the etiology were considered for the study. 50 ml of bone marrow was aspirated was collected in the Top and Bottom quadruple blood collection bags ,processed with Hereus 6000i; centrifuged at 3900 RPM for 10 min at 220C with a g force of 493. Final volume of 10 ml concentrated BM aspirate which amounted to 40x103 - 50 x103cells per hip was injected with Jamshedji needle into the tract with the sclerotic cavity ,chosen under C-arm and pilot hole is sealed with bone wax.

Results:

Harris Hip Score, Visual Analogue Scale, was used for comparing the progression of the osteonecrosis stage & radiological comparison before and after surgical procedure. 18 patients, underwent this procedure and none of them have progressed to later stages till now except one with bilateral AVN .

Conclusion:

This method, safe and easy to replicate, with minimally invasive technique and financial implications .It allows early weight bearing post operatively (as tolerated) and halts progression to untimely Total Hip Arthroplasty .

Theme

Not Otherwise Specified

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ESTABLISHING AGE AND GENDER-BASED NORMAL REFERENCE RANGE OF ADAMTS13 ACTIVITY LEVEL IN THE INDIAN POPULATION: A PROSPECTIVE STUDY

Ms. S Riya, Dr Ganesh Mohan, Dr Shamee Shastry

Introduction:

ADAMTS13 (a disintegrin-like and metalloproteinase with a thrombospondin Type 1 motif, member 13) is fundamental in regulating hemostasis and thrombosis. A rapid diagnosis and characterization of thrombotic thrombocytopenic purpura (TTP) in a timely manner is critical in the management. Establishing the ADAMTS13 activity reference range will generate an accurate result in the management of TTP.

Aims & Objectives:

To establish an age and gender-based normal reference range of ADAMTS13 activity level.

Materials & Methods:

This is a prospective observational study including 40 healthy voluntary donors. The Ethical approval will be taken from the Institutional Ethical Committee. The Samples from donors will be collected in BD vacutainers and centrifuged at 3000rpm for 3 minutes, followed by the separation of plasma and storage at -80°C. The kit used for ADAMTS 13 activity is TECHNOZYM ADAMTS 13 Activity ELISA. The reference range for ADAMTS 13 activity level is 40-130%.

Results:

A total of 40 healthy voluntary donors, consisting of 20 females and 20 males, aged between 22 and 59 years (Mean age 43.2). The donors were further categorized into four age groups: 21-30 years, 31-40 years, 41-50 years, and 51-60 years. The reference range of ADAMTS13 activity observed in the adult population was 42.41-123.33% (Mean 82.86, ± SD 20.477, CV 24.716%). There was no significant difference between observed values among genders (males 78.8 & females 86.9, P= 0.2138). The ADAMTS 13 activity observed in 21-30 years, 31-40 years, 41-50 years, and 51-60 years was 81.005, 82.31, 78.59, and 87.31 respectively. Comparatively ADAMTS activity levels are higher among the 51-60 age group (87.31 ± 22.62) compared to other age groups.

Conclusion:

Establishing the population reference range helps us to evaluate the ADAMTS13 activity of patients in suspected TTP cases.

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JOURNEY TOWARDS INTERNATIONAL CERTIFICATION – AN EXPERIENCE

Dr. Jhalak Patel, Dr. Vishvas Amin, Mrs. Palak Panchal

Introduction:

Internationally accredited or certified healthcare centres and laboratories are recognized for their superior test and quality of care reliability, operational performances and Quality management and competence. Indian Red Cross Society, Ahmedabad District Branch possesses National Accreditation Board of Hospitals and Healthcare Providers (NABH) since 2014; in the purview of meeting international standards and matching the quality of blood internationally; the institute opted to go on a journey of American Association of Blood Bank, presently known as Association for the Advancement of Blood and Bio-Therapies (AABB)- Certificate in Quality. So here we describe our journey towards the AABB-Certificate in Quality.

Aims and Objective

To share the journey towards International Certification in Quality introduced by AABB and Asian Association of Transfusion Medicine(AATM).

Methods:

The institute researched about the international quality standards and accordingly made an action plan to proceed further with payment fees required for the certification in Quality

Results:

The entire process of certificate in Quality was a systematic review of documents schedule of 11 Weeks. We initiated the payment in last week of June 2021 and started with the first induction zoom meeting on 20th July 2021 and successfully completed process before 11 weeks and received AABB Certificate in Quality on 13th Oct 2021.

Conclusion:

From our experience, AABB- Certificate in Quality is not difficult if the Quality Management system is in place along with dedicated staff, adequate infrastructure and comprehensive action plan.

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RETROSPECTIVE EVALUATION OF THERAPEUTIC PHLEBOTOMY IN A TERTIARY CARE HOSPITAL, HYDERABAD, TELANGANA, INDIA

Dr. Sudhir Kumar Vujhini, Dr. Mahesh Kumar Kandukuri, Dr. Murali Krishna Bogi, Dr. Shanthi Bonagiri

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Introduction:

Phlebotomy is the removal of blood from the body, and therapeutic phlebotomy is the preferred treatment for blood disorders in which the removal of red blood cells or serum iron is the most efficient method for managing the symptoms and complications. Therapeutic phlebotomy is currently indicated for the treatment of hemochromatosis, polycythemia vera, porphyria cutanea tarda, sickle cell disease, and nonalcoholic fatty liver disease with hyperferritinemia. In the present study, we have retrospectively evaluated therapeutic phlebotomy cases, their demographic details and indications.

Aims and Objectives:

To evaluate demographic details and indication for therapeutic phlebotomy in our Institute.

Materials and Methods:

The study was conducted in the Department of Transfusion Medicine & Immunohematology, in a Tertiary care hospital, Hyderabad, India. Data was collected retrospectively from the records available in the Department from Jan 2023 to July 2023.

Results:

Total therapeutic phlebotomy cases included were 170 cases with a total of 256 sessions. Out of 170 cases, 152 were males and 18 were females. Age ranged from 19 years to 68 years. Hemoglobin of the patients ranged from 15.5 g/dl to 23.3 g/dl.Maximum sessions performed were four.Most common indication was Polycythemia Vera.

Conclusion:

We conclude that phlebotomy is a safe procedure for high haemoglobin above 18 g/dl or Hematocrit/ PCV above 47% and can be considered as a component of treatment for patients with high serum iron levels.

COMPARISON OF COAGULATION PROFILE AMONGST NORMOTENSIVE PREGNANCY AND PRE-ECLAMPSIA PATIENTS AND ITS IMPACT ON MATERNAL OUTCOME

Dr. Akshaya R, Dr Nithya M Baiju, Dr Athira Sasidharan, Dr Aboobacker mohammed Rafi, Dr Ramesh Bhaskaran

Introduction:

Pregnancy is a prothrombotic state characterised by increase in thrombin and procoagulant factors. Preeclampsia is a syndrome affecting 3–5% of pregnancies; diagnosed with elevated blood pressure, proteinuria and maternal organ dysfunction/foetal growth restriction. Excessive activation of coagulation with increased platelet activation and deposition of fibrin degradation products in the placenta leading to endothelial damage is observed in Preeclampsia.

Objective:

To compare the coagulation profile amongst Normotensive pregnant and Pre-eclampsia patients and its impact on maternal outcome

Methodology

A cross sectional study conducted in the Department of Transfusion Medicine in collaboration with the Department of Obstetrics and Gynaecology in a tertiary care hospital between April -June 2023. All pregnant women admitted for delivery were selected and divided into two groups - normotensive and preeclampsia. Data were obtained from medical records and hospital information systems. Tests included a complete hemogram, PT/INR, aPTT & Fibrinogen. Maternal outcome was assessed using the gestational age and mode of delivery, duration of hospitalisation and transfusion requirements.

Results:

A total of 68 cases-48(70.58%) normotensive and 20(29.4%) pre-eclampsia were recruited. No statistical difference could be seen in haemoglobin, red cell & white cell parameters. In preeclamptic patients(n=20) thrombocytopenia (30%), Prolonged PT /INR & aPTT (20%), preterm delivery (35%), prolonged postpartum hospitalisation (25%), DIC (20%), HELLP syndrome (5%) and pulmonary oedema (5%) were observed. Transfusions were given to 15% patients with DIC.

Conclusion:

Study found a higher risk of coagulopathy in preeclampsia compared to normotensive pregnancy. Thrombocytopenia along with prolonged PT & aPTT in preeclamptic patients could act as an indicator for the early management and peripartum monitoring of these patients. Prevention of seizures with magnesium sulphate, reversal of coagulopathy by transfusion and timely delivery of foetus continues to be the main pillars of management.

CASE SERIES OF HbQ-INDIA, A RARE ALPHA GLOBIN VARIANT IN A REFERRAL LABORATORY SETTING IN WESTERN INDIA

Ms. Drashti Gajera, Dr Nidhi Bhatnagar, Dr Mamta Shah, Dr Sangeeta Shah, Dr Rahul Rajwanshi, Dr Kamini Gupta

INTRODUCTION:

HbQ variants are rare alpha globin chain variants commonly found in Sindhi /Lohana communities. It results from a point mutation of α-1 globin gene at position 223 of the coding region of exon 64. It has an autosomal dominant inheritance pattern, usually clinically silent in heterozygous state unless associated with other conditions like beta thalassemia, alpha thalassemia, HbE disease, or nutritional anaemia. High performance liquid chromatography (HPLC) identifies HbQ-India with a prominent peak present just after the Sickle window.

We are presenting a series of family study of 3 case having HbQ-India identified by performing HPLC:

Case 1 : A 26-year-old female (caste-Lohana) who came to us for premarital screening.

Case 2 : A 63 year old male (caste-Sindhi) having multiple osteoporotic wedge fracture.

Case 3 : A 49 year old female (caste- Sindhi) with anaemia.

AIMS & OBJECTIVES :

To describe HPLC findings of the above three cases of HbQ- India.

MATERIAL & METHOD:

Request for screening was received at blood centre. A complete blood count was done on automated cell counter. Haemoglobin analysis was carried out using high-performance liquid chromatography (HPLC) Bio-Rad VARIANT II Hb Testing System.

RESULT:

HPLC screening of all cases showed a peak in an unknown window after the Sickle window (RT- 4.30-4.44 minutes) with reduced HbA0 and normal HbF levels. All three were diagnosed as heterozygous HbQ-India with normal HbA2 levels. Further workup was done by screening of their family members among whom a few were positive for HbQ-India.

CONCLUSION:

HbQ-India is a very rare alpha chain variant with a very low frequency, 0.4% in India, usually seen in heterozygous state. Awareness of this entity is important for appropriate recognition to prevent clinically symptomatic hemoglobinopathies.

ABO BLOOD GROUP SYSTEM AND GASTRIC CANCER - A CASE CONTROL STUDY

Dr S Subash, Dr B Latha, **Dr. Shankar Praveen**

INTRODUCTION

Gastric Cancer is the 2nd most common cause of death worldwide. About 10 lakh patients are newly diagnosed with Gastric Cancer each year with 7 lakh deaths every year. Gastric cancer can be caused by interaction between environmental factors and genetic variations. Individuals with blood groups who are more susceptible to pernicious anemia are more prone to develop Gastric Cancer

AIMS & OBJECTIVE

To study the relationship between ABO blood groups and gastric cancer and to determine the distribution of gastric cancer among ABO blood groups

MATERIALS & METHODS

We have conducted a Case-control study in our medical college with a Cohort Case of 100 Gastric Cancer cases from November 2022-June 2023.A cohort of 20431 healthy blood donors from November 2022-June 2023 was taken as control

RESULTS

We have found from our study that out of the 100 gastric cancer cases, 31 belonged to Blood group A, 36 to Blood group B, 31 to Blood group O and 2 to AB blood group. Among 20431 healthy blood donors, 20.43% belonged to Blood group A, 33.86% to blood group B, 38.57% to Blood group O and 7.14% to Blood group AB.

Odds ratio was calculated by comparing Gastric cancer patients with blood donor controls. OR(A) was found to be 1.51, OR(B) was 1.06, OR(O) was 0.80

CONCLUSION

Based on our study we conclude that the risk of Gastric cancer in Blood group A was significantly higher(OR=1.51) than in non-A groups with Blood group O showing significant reduction in risk(OR=0.80) of developing gastric cancer. The susceptibility to gastric cancer may be due to an increased risk of H.Pylori infection. However, the exact molecular mechanism for the relationship between ABO blood groups, H.Pylori infection and gastric cancer needs to be further explored.

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CHALLENGES AND OUTCOME IN ESTABLISHING BLOOD TRANSFUSION SERVICES IN THE INITIAL PHASE OF A NEWLY UPCOMING INSTITUTE OF NATIONAL IMPORTANCE IN SOUTH INDIA

Dr. ARUN R, Dr Tejaswi Chada

Introduction:

A blood transfusion service should ensure a safe, affordable and reliable blood supply for the patients in need. Right from the space identification to procurement of equipments to getting the license approval and in providing sustainable support to patients in need, one has to face various challenges.

Aims:

Our main aim was to analyse the challenges faced and the outcome achieved while establishing blood transfusion services in the initial phase of a newly upcoming Institute of National Importance in South India.

Methodology:

This was conducted at All India Institute of Medical Sciences, Bibinagar, Hyderabad. Data regarding turn around time on procurement of instruments, obtaining MOU with mother blood bank, getting approval from Licensing authority and the challenges faced in procuring blood and the data on blood units procured, issued and discarded were captured.

Results:

As the constructions were going on and because of space constraints, blood storage centre was started. It took 8 months for receiving equipments from Central Ministry in phased manner. Getting MOU from the mother blood bank took 2 months and approval from Licensing authority took one month. Being a government institute, we faced challenges in getting approval from each and every concerned section authority which increased our turn around time. Availability of required units in the Mother blood bank, getting administrative approval each time, availability of transport were the challenges faced while procuring blood and due to which we could not support certain patients. Inspite of these challenges, we procured 171 and issued 130 units.

Conclusion:

Though administrative challenges faced were common for both blood storage centre and blood centre, we would have had a safe, reliable blood supply for patients in need if we had our own blood centre in the initial phase itself and the challenges in blood procurement would have been avoided.

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APPLICATION OF ONE EARTH, ONE FAMILY, ONE FUTURE IN TRANSFUSION MEDICINE

Dr. ARUN R

One Earth, One family, One Future establish the value of all life in the universe and their interconnectedness in an increasingly globalized and diverse world. Our hypothesis is can we apply this theme in the field of transfusion medicine?

One Earth which means protecting our domicile - Total Quality management and ethical practices plays a vital role in protecting our transfusion services from medico legal issues. Donor confidentiality, informed consent of donor and patient, appliance of various levels in the documentation hierarchy pyramid helps in setting the things in right direction. Improvement in screening methodologies helps to curtail zoonotic infections.

One family means unity in protecting the needy- Ensuring a safe, affordable and reliable blood supply for the patients in need should be the main objective of blood transfusion services. Still quality blood is at far reach for some of the vulnerable. Translating the existing policies into bed side implementation helps in assuring the rational use of blood and blood components thereby assuring safe sustainable affordable blood to all the needy.

One future means ensuring everyone to grow together- availability and accessibility of blood and blood components which are of uniform quality across the nation irrespective of socioeconomic status or geographical location. Formulation of single uniform norms across the nation helps in bringing out a change in Good manufacturing practices. Making use of technological improvements like drones for supply of blood components in remote areas and usage of artificial intelligence helps in the sustainable growth of our services and ultimately national transformation.

To achieve the goals of One Earth, One family, One Future in Transfusion Medicine, the policy makers should ensure equality of blood transfusion standards by focusing on the transformation from vein to vein in the field of Transfusion Medicine.

ROLE OF THERAPEUTIC PLASMA EXCHANGE IN PATIENTS OF HEMOLYTIC UREMIC SYNDROME: A CASE SERIES.

Dr. Rahul Trivedi, Dr. Rahul Trivedi, Dr. Mehakdeep Kaur, Dr. Ravneet Kaur, Dr. Kshitija Mittal

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Introduction:

Hemolytic uremic syndrome (HUS) is a clinical syndrome that presents as triad of micro-angiopathic hemolytic anemia, thrombocytopenia and acute kidney injury. Therapeutic plasma exchange is the main modality for the treatment of HUS as per American society of apheresis guidelines.

Aim:

To evaluate the role of TPE in patients of HUS.

Material and Methods:

This retrospective study was conducted in the department of transfusion medicine of a tertiary care centre of North India. Demographic details, laboratory and clinical parameters and treatment records for all patients who underwent TPE for HUS from 1st July 2019 to 31st July 2023 were retrieved and analysed.

Results:

Five patients underwent TPE during the study period of which 3 were of pediatric age group (4-6 years) and 2 were adults above 60 years of age. A total of 26 procedures were done for these 5 patients. All procedures were performed using Spectra Optia cell separator (Terumo BCT, USA). The number of TPE procedures performed per patient varied between 1-11. First cycle of TPE was done approximately 2 weeks after onset of disease. Most of the cycles were done on alternate days. Fresh frozen plasma and 0.9% normal saline was used as the replacement fluid in all procedures. Improvement was observed in 4 patients clinically and by laboratory parameters - decline in serum LDH levels, increase in Hb and stabilizing renal function tests. Four patients were discharged under stable conditions. One patient was very sick and did not respond to therapy and expired due to multiple comorbid conditions.

Conclusion:

Therapeutic Plasma exchange is effective in the treatment of HUS patients.

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ATTITUDE OF MEDICAL INTERNS TOWARDS TRANSFUSION MEDICINE SPECIALITY IN A TEACHING HOSPITAL IN SOUTHERN INDIA

Dr. Abhishekh Basavarajegowda, Dr. Revathy Nair, Dr John Gnanaraj, **Dr. Esha Toora**, Dr Jyotis Pothen Raju

INTRODUCTION:

The undergraduate MBBS interns are actively involved in blood transfusion in all medical institutions but the quality of formal education and training in the subject offered to them during the four years of undergraduation is very minimal. Transfusion medicine is not included as a mandatory subject in the UG teaching curriculum as per the norms of the National Medical Council in our country. This can affect their perception of Transfusion Medicine in terms of medical education, clinical practice, and as a future career option.

AIMS & OBJECTIVES:

To assess the attitude towards Transfusion Medicine among the medical interns.

MATERIALS & METHODS:

This study was conducted among the MBBS interns of the batches from 2021-2023. The attitude assessment was performed as an online survey using a self-administered questionnaire consisting of 15 questions. Data analysis was done in SPSS version 22.

RESULTS:

A total of 141 responses were obtained. In reponse to the the importance of transfusion medicine with regard to its curricular value in MBBS course, 93.6% of the participants responded favorably. A 89.4% of the participants expressed optimism that having a better understanding of transfusion medicine will enable them to make better treatment decisions regardless of their area of expertise. Only 47.5% of participants were able to integrate their knowledge from UG for ordering and blood administration. A reluctance to choose transfusion medicine as a future specialty was demonstrated by 75.9% of participants.

CONCLUSION:

This study shows that medical interns have a favorable attitude towards transfusion medicine, suggesting incorporation of transfusion medicine subject in undergraduate curriculum can be beneficial.

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HEMOLYSIS IN STORED RBC UNIT – REASON FOR CHANGING PROTOCOLS?

Dr. Rut Naik, Dr. Pratul Sinha, Dr. Vilasini Patil, Dr. Romesh Jain

INTRODUCTION:

Hemolysis in stored RBC units can be due to multiple reasons. Processes and protocols of a blood bank are designed to prevent transfusion of a hemolysed unit, to ascertain the reason and follow-up with a corrective and preventive action. Our case starts from observing hemolysis in a stored RBC unit on 5th day of collection.

AIM:

To modify blood bank protocol to account for cold agglutinins leading to hemolysis in donated PRBC component.

MATERIALS AND METHODS:

A unit of RBC component showed hemolysis on 5th day of collection while assessing daily inventory. On visual inspection the unit showed a clot like mass which was a darker shade of red than the hemolysis in the surrounding solution.Serological workup was performed.

RESULTS:

On visual inspection of bag: supernatant plasma showing significant haemolysis with distinctive autoagglutination of donor cells.

Blood group: B Rh D positive on forward grouping and reverse group; ICT negative

On extending the reverse group at 4°C: forward group B positive; Reverse group showed O; absence of alloantibody and Auto control being 1+; DCT was negative

The reactions at 4 °C resolved when the tests were conducted at room temperature.

CONCLUSION:

The autoantibody was missed in the routine blood group and antibody screen conducted in donor units as its thermal range was too low and being insignificant at 37°C or room temperature. Such cases would require an additional step of auto control being incubated at 4°C during the blood group tests performed on donor units.

The cold antibody caused significant hemolysis that was visually detected on 5th day of storage. This would imply a revision of policy of issue of fresh blood to patients and specially of cardiac surgery patients.

Donor notification for non-infective reasons should be implemented.

Theme

Patient Blood Management

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IMPLEMENTING PATIENT BLOOD MANAGEMENT IN PRIVATE HEALTH CARE SECTOR: MISSION IMPOSSIBLE???

Dr. Pandeep kaur, Dr Davood U.B, Dr Amit chatterjee, Dr Amit Kumar, Dr Akarshan Gupta

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Introduction:

Patient Blood Management (PBM) strategies minimize transfusion-associated risks, enhance outcomes, and reduce costs. Establishing PBM in resource-limited settings is itself a burdensome task, the same in private sector comes with its own challenges. The proper implementation of and strict adherence to transfusion guidelines is considered as one of the major cornerstones of a successful PBM program.

Aims & Objectives:

1. To evaluate the changes in blood component utilization patterns before and after implementation of the PBM program.

2. To understand in detail about the specific challenges faced in implementing PBM in a private health care sector blood center.

Methods:

This was a retrospective study on the PBM program implementation in a 1400 bedded tertiary care teaching institution, from June 2022 to June 2023. Outcome measures were Red Blood Cell (RBC), Fresh Frozen Plasma (FFP), platelet and cryoprecipitate transfusions; pre transfusion hemoglobin (Hb) levels and platelet counts; and incidence of adverse transfusion reactions.

Results:

Comparing the post-PBM era with the pre-PBM, there was a decrease in red blood cell transfusion by 22.4%, decrease in FFP Transfusion by 2.6% and 24.5% decrease in platelet transfusion. There was a significant increase in cryoprecipitate utilization. Overall, there was a 26% decrease in blood component utilization. The mean pre transfusion hemoglobin threshold was reduced from 9.1 g/dl to 7.9 g/dl and mean pre transfusion platelet counts was reduced from 27000/µL to 14000/µL.

Conclusions:

The challenges we faced in implementing PBM were the resistance from the clinicians, concerns over reduction of revenue, constant efforts in educating residents and nursing staff, lack of sufficient evidence in Indian scenario (lack of Indian guidelines) and limitations due to non-availability of timely supporting laboratory services. Continuing education and feedback to specialties will uphold the program, improve patient outcomes, and decrease the unnecessary transfusions.

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EVALUATION OF TRANSFUSION PRACTICES FOR PATIENT BLOOD MANAGEMENT IMPLEMENTATION IN A TERTIARY CARE CENTER

Dr. Sai Jahnavi

Introduction:

Blood transfusion, a lifesaving intervention, is also associated with risks of infections, increased morbidity and mortality. Patient blood management (PBM) can optimize the use of allogenic blood transfusions while improving the patient outcomes.

Aims and objectives:

As a first step in implementing PBM, a study on existing baseline practices was conducted, which aims to

a) analyse the indications for various blood components.

b) know the percentage of un-indicated transfusions

Materials & Methods:

A retrospective observational study was conducted at a tertiary care hospital from May 2022 to May 2023. Data was obtained from request forms and medical records. The data was analysed using R software for component transfused, indication and appropriateness for transfusion as per BSH guidelines.

Results:

Out of the 534 patients analysed, medical departments accounted for 329 requests (61%). General medicine accounted for 39.9% of transfusions followed by Nephrology (15.9%), CTVS (12%) and Obstetrics(10.3%). PRBC was the most commonly transfused component(360,67.5%) followed by FFP(91,17.1%), SDP(70,13.1%), RDP(33,6.2%) and Cryoprecipitate(4,0.8%). The most common indication for PRBC transfusion in the surgical departments was surgical bleeding/anemia with 70.6% transfusions in the post-operative, 18.6% in intra-operative and 10.7% in pre-operative period. The most common indication in the medical departments was nutritional anemia(95,17.8%) & CKD(74,13.9%). FFP was most commonly used in surgical patients where indication was not clearly mentioned and. to correct hypoproteinaemia and coagulopathy in 26 chronic liver disease patients(30%). Thrombocytopenia was the most common indication for transfusion of RDP and SDP. However 24% of patients receiving RDP and 78% of patients receiving SDAP had a pre transfusion platelet count of more than 50,000/uL. Majority of the patients in our study were either under transfused or over transfused with 96.2% inappropriate transfusions.

Conclusion:

Adopting the judicious usage of blood components reduces the burden on transfusion services while improving patient outcome.

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THE EXPERIENCE OF GOAL DIRECTED BLEEDING MANAGEMENT BY ROTATIONAL THROMBOELASTOMETRY (ROTEM) IN A TERTIARY CARE CENTRE

Dr. Sangeetha S, Dr Subash S, Dr Latha B

INTRODUCTION:

Rotational thromboelastometry (ROTEM) is the recently evolving point of care viscoelastometric hemostatic assay used in diagnosing and treating coagulopathies by implementing goal directed bleeding management in the bleeding patients.Selective use of the assay had dramatically decreased the unwanted transfusion in many surgical specialties.

AIMS & OBJECTIVES:

To study the rotational thromboelastometry(ROTEM) utilization pattern in various specialities in our hospital from January 2023-June 2023.

MATERIALS &METHODS:

It is a retrospective study which analyze the ROTEM utilization pattern in various specialities like Cardiothoracic surgery,Surgical gastroenterology,Emergency department,Liver Transplantation unit,Intensive medical care unit.In this study we have observed the total of about 70 ROTEM tests from January 2023-June 2023 to diagnose and treat coagulopathies.

RESULTS:

We have found that out of 70 tests,majority of ROTEM utilization is observed in Cardiothoracic surgery which is about 20(28.6%)tests,Surgical gastroenterology which is about 15(21.42%) tests,Emergency department (trauma patients)which is about 14(20%) tests,Intensive medical care unit about 16(22.9%) tests,Liver transplantation 5(7.1%) tests.

CONCLUSION:

We conclude that the majority of the ROTEM utilization is seen in Cardiothoracic surgery department mainly for the intraoperative and postoperative bleeding management,similarly in Surgical gastroenterology cases. Trauma patients utilize the test in initial phase of acute traumatic coagulopathy and medical cases in view of Disseminated intravascular coagulation and malignancies associated bleeding management…The advent of ROTEM in our hospital had drastically reduced the units of allogenic blood transfusion.Our experience in our centre is that the concept of patient blood management goes beyond the optimal utilization of blood components for the needy patients and also reduced the mortality of the patients.

EARLY CRYOPRECIPITATE TRANSFUSION THROUGH GOAL DIRECTED MASSIVE TRANSFUSION – HOW CRUCIAL IT IS TO ADDRESS THE FIBRINOGEN IN MASSIVE OBSTETRIC HAEMORRHAGE

Dr. Ganesh Mohan, Dr Shamee Shastry, Dr Bemma Paonam, Dr PA Prethika

Background:

Fibrinogen increases by 150% from baseline during pregnancy and a value below 200 mg/dL is strongly associated with severe DIC and poor prognosis. We had analysed the effectiveness of massive transfusion protocol (MTP) and goal directed massive transfusion (GDMT) in addressing the fibrinogen component in Massive Obstetric Haemorrhage (MOH).

Methods:

A comparative analysis on all the massive transfusion in MOH for five years. Controls were managed by 1:1:1 MTP and cases were managed by Thromboelastography guided GDMT. Blood components transfused, changes in laboratory parameters pre and post transfusion, component utilisation, fibrinogen assay and time to achieve hemostasis were analysed. Percentage change in fibrinogen, cryoprecipitate utilization and the time of issue of cryoprecipitate were analysed for the role of fibrinogen in MOH.

Results:

Out of total 96 MOH cases, 42 patients received MTP (group 1), and 54 patients received GDMT (group 2). Average age was 29.22±4.53 vs 30.56±4.61 in both groups respectively. Two patients succumbed in group 1 compared to one managed by GDMT. Fibrinogen results were not available with 19.04% in group 1 and in 25.92% of patients in group 2. Blood component utilization was more in group 2 with a reduction in platelet components and an increase in cryoprecipitate usage ($p<0.05$). Average time taken to issue cryoprecipitate was 47.21 minutes (±14.79) in GDMT compared to 84.87 minutes (±27.91) in the protocol management ($p<0.05$). Strongest predictor of cryoprecipitate transfusion was K time (correlation – 0.739, $p<0.01$). Pre and post massive transfusion parameters showed improving trend in hematological parameters in both the groups. Percentage fibrinogen increase in group 1 and 2 was 55.22% and 73.97% respectively ($p<0.0001$).

Conclusion:

Early cryoprecipitate transfusion helps to address the unique physiology of MOH and early replenishment of fibrinogen helps to achieve hemostasis more easily.

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AN AUDIT OF APPROPRIATENESS OF PLATELET TRANSFUSION IN ACUTE LEUKAEMIA PATIENTS

Dr. Vishnu Prasad Pillai S, Dr Ujjwal Dimri, Dr Rajat Jagani, Dr Amit Ajay Pawar, Dr Sudeep Kumar

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Introduction:

Platelet transfusion plays a vital supportive role in the treatment of Acute leukemia patients undergoing chemotherapy and Hematopoietic stem cell transplantation. These patients require frequent transfusions and variations in the criteria of platelet transfusions amongst various institutes and clinical practitioners lead to an inappropriate use of platelets thereby leading to transfusion related complications in the recipients and depletion of the inventory. Limited research has been conducted to evaluate the appropriateness of platelet transfusion in this specific population. This study is an audit conducted to determine how appropriately platelets are transfused in acute leukemia patients at a tertiary care institution.

Aim & Objectives:

To audit the appropriateness of platelet transfusion in Acute Leukemia patients based on the guidelines from British Society of Hematology (BSH).

Materials And Methods:

A one-year retrospective audit was conducted in acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML) patients at a Tertiary care Centre. Every transfusion event was assessed as either appropriate or inappropriate based on guidelines from BSH. Details such as the patient demographics, type of platelet product, pre-transfusion platelet count, transfusion indication and specialty which ordered the transfusion were all documented.

Results:

The proportion of transfusions appropriately indicated in consonance with the BSH guidelines was 86.4%. The proportion of appropriateness of platelet demand by Department of Internal Medicine and Pediatrics were 81.6% and 91.2%respectively. Majority of the inappropriate transfusions were the ones which had a pre-transfusion platelet count between 10- 20×10^9/L without a valid justification (46%).

Conclusion:

The rate of inappropriate platelet transfusions in acute leukemia patients underscores the learning needs of physicians, particularly those in training, regarding adequate use of platelets in hematologic malignancies to optimize its utilization and patient outcome.

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AN ANALYSIS OF BLOOD USAGE IN AN ELECTIVE SURGERIES AND FORMULATION OF MAXIMUM SURGICAL BLOOD ORDERING SCHEDULE IN A TERTIARY CARE HOSPITAL

Dr Sumathira Venkatesan, Dr Subash S, Dr Latha Balakrishnan

Introduction:

Blood transfusion is an essential part of perioperative care in surgeries. Creating a data driven MSBOS is useful in optimizing transfusion ordering practices. Maximum surgical blood ordering schedule is a guide which helps in the decision of ordering & transfusing blood which in turn helps in the efficient usage of blood inventory

Aim & Objectives:

To analyse the usage of blood in an elective surgeries in our tertiary care hospital, formulation of a Maximum Surgical Blood Ordering Schedule (MSBOS) for procedures where a complete cross-match is mandatory, and improvement in the efficiency of blood utilization.

Methods:

This is a cross-sectional , hospital based study conducted at tertiary care hospital during the period from January 2023 to June 2023 for the duration of six months. Patients underwent elective surgeries in five departments (Orthopaedics, General surgery, Neuro Surgery Vascular & Cardio thoracic) were included. The different transfusion indices such as Cross-match to transfusion ratio (C/T), transfusion probability (%T), transfusion index(TI) and MSBOS were calculated for each procedure.

Results:

A total of 3895 units of blood were cross-matched for 2588 patients but only 1714 units were transfused to 1045 patients. i.e.40% of blood cross-matched was utilized. The overall C / T was 2.3, MSBOS was 0.45.

Conclusion:

This study showed that there was excessive cross-matching of blood. MSBOS which provides guidelines for frequently performed elective surgical procedures by recommending the maximum number of units of blood to be cross-matched preoperatively will result in efficient utilization of blood products.

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PRE-OPERATIVE BLOOD ORDERING – CHOOSE WISELY!!

Dr. Karan Kumar, Dr. Priyadarsini Jayachandran Arcot, Dr. Poonam Coshic

Introduction:

A multi-specialized research health center needs to implement a standard blood ordering schedule for elective surgeries and perform regular audits on blood ordering practices to ensure the judicial usage of resources.

Aims and Objectives:

This retrospective study is a step towards implementing a maximum blood-ordering schedule in our Institute.

Materials and methods:

Blood ordering and utilization of 10 surgical specialties (performing over 180 different surgical procedures) were analyzed for 1 year to formulate an institutional maximum blood-ordering schedule.

Results:

Out of 7967 patients, the cross match- transfusion ratio, transfusion probability, and transfusion index were 2.5, 34.5%, and 0.7 respectively. There was a gross over-ordering of blood units pre-operatively (82.4%).

Conclusion:

Sixty-seven percent of the elective surgeries can be performed safely with type and screen alone saving 77% of the total expenditure if we were to cross-match the exact number of units demanded. Hence, this study reiterates the importance of regular auditing of blood requisition patterns and the introduction of maximum blood-ordering schedule to prevent wastage of precious blood bank resources.

ESTIMATION OF BLOOD UTILIZATION IN COMMON ELECTIVE SURGERIES: A KEY TO FORMULATE MAXIMUM SURGICAL BLOOD ORDERING SCHEDULE

Dr. Tamanna Kalra

Introduction:

Assessing blood utilization in surgical procedures through programmes like Maximum Surgical Blood Ordering Schedule (MSBOS) is crucial. Reviewing blood ordering habits and statistics can regulate transfusion practices. This study has helped to formulate MSBOS for common elective surgeries to reduce unnecessary blood ordering.

Aims & Objectives:

Present study aims at estimating the blood demand and the actual blood utilization in common elective surgeries, using transfusion indices, to formulate a MSBOS.

Material & Method:

Observational-cross sectional study has been conducted at Blood Centre, Department of IHBT, AIMSR, Bathinda for 4 months. Surgical procedures like Coronary artery bypass grafting (CABG), Transurethral Resection of Prostate (TURP), Total Knee Replacement (TKR), Transurethral Resection of Bladder Tumor (TURBT), Percutaneous Nephrolithotomy (PCNL) and Lower segment caesarean section (LSCS) have been included. Data collection was done from blood center records, and blood utilization indices like Crossmatch to transfusion ratio (CTR), Transfusion probability(TP), Transfusion index(TI) & Blood utilization%(BU) were calculated to formulate the MSBOS.

Results:

Out of 185 patients observed, 91 had TKR, 31 had LSCS, 30 had CABG, 18 had PCNL, 13 had TURP, and 6 had TURBT. 254 units of blood were crossmatched and 133 were transfused to 93 patients, i.e., 52.36% of crossmatched units and 50.2 % of total patients were transfused. The CTR was ≥ 2.5, TI ≤ 0.5, TP< 30% & BU% ≤ 50% for 4 procedures i.e., TURP, TURBT, PCNL & TKR. MSBOS calculated using Mead's criteria (1.5 ×TI) for these 4 surgeries was less than 0.5. For TKR and CABG, MSBOS was 1 and 3 respectively.

Conclusion:

As MSBOS calculated was less than 0.5 in TURP, TURBT, PCNL & TKR, therefore, "Type and screen" policy was recommended for the above 4 surgeries. Formulating MSBOS for routine elective surgeries is of utmost importance to prevent the wastage of precious resources.

2021 AABB PATIENT BLOOD MANAGEMENT SURVEY – A GLOBAL SNAPSHOT: AN AABB INITIATIVE AND ROADMAP AHEAD

Dr. Aikaj Jindal, Dr. Richard Gammon

Introduction and Aims & Objectives:

To assess patient blood management (PBM) practices across the globe, the Association for the Advancement of Blood and Biotherapies (AABB) conducted a survey on PBM in 2022 which was unique due to its transcontinental outreach and served as a worldwide snapshot of the prevalent practices.

Materials & Methods:

AABB's Transfusion Safety/PBM subsection did a survey from May 31, 2022 through June 15, 2022. It was distributed to global AABB hospital members and non-AABB members.

Results:

Responses were received from 274 facilities including 69 non-NA member responses across 5 WHO regions. Globally, 126/274 (45.9%) respondents reported having a PBM program. Globally, the PBM programs involved pathologists 71(56.3%), blood bank supervisor/managers 53(42.1%) and transfusion medicine consultants 26(21.1%). Globally, transfusion thresholds were derived from AABB 205/267(76.8%), College of American Pathologists 111/267(41.6%) and hospital-developed guidelines 119(44.6%) used individually or combined. Out of the 206/274(75.1%) who reported the usage of alternates to blood products, the majority used vitamin K 188(91.2%), tranexamic acid 167(81.1%), and fibrin sealant 85(41.2%). Blood is not an option programs (BNAO) were available at 110/273 (40.3%) of respondents' facilities. Globally, 60/272 (22.1%) had a formal service to manage the patient's anemia. Regarding the promotion of single-unit transfusions, this was reported globally by 101/126 (80.2%) vs 27/55(52.0%) in 2013. Formal PBM training and education was conducted globally at 62/126 (49.2%) centers.

Conclusions:

The percentage of PBM programs reported has increased since the last survey, however, it is still in a minority of hospitals outside of NA. The majority have implemented transfusion thresholds based upon professional association recommendations and promote single-unit red blood cell transfusions. Areas of improvement include BNAO programs, anemia management and educational programs which have decreased since the last survey. This survey tells us where we are today and may serve as our roadmap ahead.

IMPLEMENTATION OF PATIENT BLOOD MANAGEMENT (PBM) FOR BLOOD UTILIZATION IN CARDIOTHORACIC AND VASCULAR SURGERIES (CTVS): NEED OF THE HOUR

Dr. Simranjeet Kaur

Introduction:

Patient blood management has recently emerged as a paradigm, focusing on evidence-based approach for rationalizing transfusion services. PBM implementation in a single surgical discipline like CTVS can be much easier. The study provides an overview and need for PBM implementation in cardiac surgeries.

Aims & Objectives:

The study aims to understand the consumption of blood and blood components during CTVS surgeries. It highlights the need to implement PBM for better patient care and avoid burden on transfusion services.

Materials and methods:

A retrospective study was conducted in the Department of Transfusion Medicine, Government Medical College and Hospital, Chandigarh from September 2022 to July 2023 to estimate the blood and blood components utilization in CTVS department. Study data was collected from hospital information system (HIS) and patients records from CTVS department.

Results:

Of total 138 CTVS surgeries performed, 74% (n=102) were major (81 routine; 21 emergency) and 26% (n=36) minor (12 routine; 35 emergency; 1 abandoned). Out of major surgeries, cardiac surgeries constituted 64% (65/102) while pulmonary and vascular were 28% (29/102) and 8% (8/102) respectively. Total 681 blood and blood components were utilized during these major CTVS surgeries. Of these 681 units, maximum utilization was observed in cardiac surgeries (84%; n=575) followed by pulmonary (12%; n=83) and vascular (4%; n=23). Valve repair surgeries (31/65) constituted major transfusion indication, consuming 271/575 blood/blood components followed by CABG (15/65) which was 161/575.

Conclusion:

The idea of PBM is based on combination of interventions and practices which when implemented effectively reflects in appropriate utilization of blood and blood components. Dedicated multidisciplinary team consisting of cardiothoracic and vascular surgeon, cardiothoracic anaesthesiologist, perfusionist and transfusion medicine specialist is required for sustainability of PBM program.

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RETROSPECTIVE AUDIT TO EVALUATE RATIONAL USE OF FRESH FROZEN PLASMA TRANSFUSION AT A TERTIARY CARE HOSPITAL

Dr. Manimozhi M, Co author Ravishankar J

Introduction:

Every blood component carries inherent risk of adverse transfusion reactions and transfusion transmitted infections (TTI). As Fresh frozen plasma (FFP) is one of the commonly used blood component, appropriate and rational use is necessary for patient safety.

Aims And Objective:

The aim of the study was to evaluate the rational use of FFP in clinical practice.

Materials & Methods:

This retrospective study was conducted at the Department of Immunohematology and Blood Transfusion, Tirunelveli Medical College and Hospital, Tirunelveli, Tamilnadu, India in July, 2023. Blood Request Forms for FFP transfusion between January 2023 and June 2023 were analyzed. Data entry and statistical analysis was performed using Microsoft Excel sheet.

Results:

642 patients received 1828 FFP units (mean=2.85 units),maximum utilization 16.4% of transfusions were in the age group of 31- 40 years (n=301/1828) followed by 14.1% of transfusions in the age group of 0-2 years (n=259/1828).53.6% were in males (n=981/1828),46.4% were in females (n=847/1828).Among the clinical specialties, department of general medicine received highest units of FFP (27.5%,n=502/1828).65.1% of transfusions were considered appropriate (n=1191/1828), the most common indication being therapeutic plasma exchange (9.7%, n=116/1191), that was performed in the department of General medicine. Inappropriate transfusions were common in O&G department (37.5%, n=90/239). Most common inappropriate indications were to improve wound healing, fever with thrombocytopenia and prophylactic use during surgeries. 2 patients developed allergic adverse transfusion reactions (0.31%, n=2/642). All of the FFP transfusions were ABO identical.

Conclusion:

As FFP is involved more in adverse transfusion reactions like allergy and Transfusion related acute lung injury, inappropriate indications can be reduced significantly with continuous education of end users by regular CMEs, interactive sessions, discussion in Hospital Transfusion Committees and prospective audits, to ensure the optimal use of scarce resource and to reduce transfusion related adverse events.

Theme

Platelet & Granulocyte Immunobiology

HPA - 1 GENOTYPING IN NORTH INDIAN BLOOD DONOR POPULATION USING IN - HOUSE SSP-PCR

Dr. Mridula Pathak, Dr. Dheeraj Khetan, Dr. Jai Shankar Shukla, Dr. Rajendra Chaudhary

Introduction:

Studies on the frequency of different HPA's genotypes in different countries have shown that these antigens vary among races and ethnicities. There is limited data from India on prevalence of HPA alleles. To fulfill the purpose of active treatment with platelet products, we need to have a reliable and fast method for genotyping of platelet antigens.

Aim:

Development of SSP-PCR for genotyping of HPA 1

Materials and Methods:

This prospective study was conducted over a period of six months Left over Buffy coat were taken from random donors of O group. DNA extraction was performed using commercially available kit (Blood mini kit , QIAmp, Germany) as per manufacturer's instructions. Primer designing for PCR assay was done as per published protocols. SSP PCR was done on study samples as per the standardized protocol using automated Thermal cycler (Prima Duo, Hi Media, India) . Briefly, amplification of both the alleles of HPA 1 was done in one PCR reaction including one forward primer (common for both the alleles) and two reverse primers. A set of primers for detection of housekeeping genes (Human Growth hormone) was used in each reaction as Internal control.

Results:

total 54 samples were included during the study period of six months. Out of total samples tested 49/54 (90.7%) positives for HPA 1a while frequency of HPA 1b was found to be 16/54 (29.6%) . Genotype frequency of different alleles of HPA 1 was found to be 71 %,21 % and 8% for HPA 1aa, 1 ab and 1bb respectively.

Conclusion:

Genotyping of HPA 1, using SSP-PCR showed a high consistency result as compared with global allele frequencies of HPA – 1 a and HPA – 1 b alleles were found similar in most populations . It has been useful for potential clinical implications.

Theme

Quality issues in Transfusion Medicine

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COMPARISON OF LEUCOCYTE COUNT BY NAGEOTTE CHAMBER AND FIVE PART DIFFERENTIAL HAEMATOLOGY ANALYSER AS A QUALITY EVALUATION OF LEUCOREDUCED BLOOD PRODUCTS

Prof. Bharat Singh, Dr Simran Ghilotra, Dr Hanisha Jain, Dr Anita Mittal

Introduction :

Transfusion of leucoreduced blood Products is used to prevent transfusion side effects like non hemolytic febrile transfusion reactions, human leukocyte antigen (HLA) allo-immunization, platelet refractoriness etc. Quality control of such products is being done by counting rWBC with Neogette Chamber or by Flowcytometer. As counting with Neogette chamber is cumbersome process and subjective to manual error of the observer, whereas flowcytometer availability and expertise is at limited places. The five part differential haematology analyser can be the alternative method.

Aims and Objectives:

1. To compare the rWBC count in leukoreduced products by Nageotte chamber and five part differential Haematology Analyzer.

2. Use of Five part differential Haematology Analyserforr Quality Control of Leucoreduced Blood Product.

Material and Methods:

The study was performed on 50 leucoreduced PRBC prepared by integral filter method and blood collected from healthy donors in the department of Immunohematology and Blood Transfusion of ESI Model Hospital and PGIMER, Basaidarapur, Delhi. Counting for rWBC count was done on the day of preparation of component using Neogette Chamber, Five part differential Haematology Analyser and Flowcytometer. The results were recorded and analyzed.

Results:

A total of 50 leucoreduced PRBC were analyzed for rWBC count. Mean rWBC count by Neogette Chamber is ranging from 15-50 rWBC/micro litre and 2-3 per micro litre by Five part differential haematology Analyser. The rWBC count in these units with gold standard was 1.6 to 2 rWBC/cu.mm. This study demonstrated a good correlation between rWBC count by Five Part differential Haematology Analyser & Flowcytometer.

Conclusion:

Five part haematology Analyser can be used as tool for Quality Control of leucoreduced blood products as the counting by Neogettes Chamber method is cumbersome and subjective to manual error of the observer.

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ANATOMIZING HORIZONTAL AND VERTICAL AUDITS IN QUALITY MANAGEMENT SYSTEM OF A BLOOD CENTRE

Dr. Sri Anuja, Dr. Upadhyay Shweta, Dr. Vachhani Jitendra

Introduction:

Quality is consistent and reliable performance of a product or service against specified standards. Audit is the official examination of the quality and operation of a product or service. Quality Audits form the backbone of Quality Management System, which ensure that the intentions and directions of an organization's quality program are met and the quality of a product is ensured .Horizontal audits asses the same process across various sections, where as Vertical audit asses all the activities in a given section .

Aims And Objectives:

1) To analyze the role of Horizontal and Vertical audits in intensifying Quality Management system, individually and integrated with each other.

2) To determine the effectiveness in implementation of Horizontal and Vertical audits.

Materials And Methods:

The study was conducted in a tertiary blood center from January'22 to December'22. Horizontal audits were conducted annually clause wise according to NABH standards. Vertical audits were conducted monthly, 1% of the total monthly donation were evaluated. Non conformities were identified, analyzed for taking reparative measures.

Results:

300 donor units were audited in Vertical audit from a total of 26,393 donors. Out of 107 non conformities 29(27.10%) were documentation related, followed by 25(23.36%) operator related, 20 (18.70%) software system, 11(10.28%) technical and rest 22 (20.56%)were other non conformities.

Horizontal audits had 8(61.5%) major non conformities and 5(38.5%)minor conformities of total 13 non conformities reported. Procedural non conformities amounted to 11(10.28%),4(30.7%) were others;

documentation, software, operator non conformities were 1(7.7%) each.

Conclusion:

Vertical audit helps reassure traceability of a product. Horizontal audit allows standardization of audits performed. Both audits collectively are helpful in bringing about continuous quality improvement.

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DEVELOPING AND VALIDATING KEY PERFORMANCE INDICATORS OF MASSIVE TRANSFUSION – AN ATTEMPT AT CONTINUOUS QUALITY IMPROVEMENT

Dr. Ancy Ninan, Dr Vimal Krishnan S, Dr Ganesh Mohan, Dr Shamee Shastry, Dr Chenna Deepika

Background:

Massive transfusion protocols (MTP) are developed to improve patient outcomes following exsanguination. However, the process control of MTP is not routinely practised.

Aims and objectives:

This study was intended to develop and validate key performance indicators (KPIs) of MTP as a continuous quality improvement tool.

Methods:

This was a retrospective study conducted over 18 months. All adult patients who received massive transfusions were included in the study. The data captured goal-directed massive transfusion details such as age and gender of the patients, diagnosis, clinical outcome and laboratory investigations. Key performance indicators developed were appropriateness of MTP, Time since activation of MT to time of issue of blood component (TAT 1) and time since activation of MTP till components are ready to be issued (TAT 2 – Lab TAT). Appropriateness- A was defined as >4 PRBCs transfused in one hour, and appropriateness-B was >10 PRBCs in 24 hours. Activation and cessation of massive transfusion, the clinical outcome of the patients within 24 hours of MTP and after 24 hours of MTP was captured and analyzed.

Results:

We had 92 patients and 92 events of MTP during the study period. The average age was 39.9±17.5 years. MTP was activated most commonly for trauma (48/92). Of 92 events, only 23.91% met appropriateness-A, and 28.26% met appropriateness-B. The average TAT-1 was 16±10 minutes and the TAT-2 was 13±10 minutes. Adherence to goal directed MTP was observed in 66.3%. Lab investigations were sent within half an hour of activation in 100% of MTP. Blood utilisation was more in patients who underwent appropriate massive transfusion ($P<0.0001$). The wastage rate was 3.5%. Overall mortality was 39%, and mortality within 24 hours was 36%.

Conclusion:

The KPIs were easy to capture and identify the scope for continuous quality improvement in routine massive transfusion practice.

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QUALITY INDICATORS ARE THE ESSENTIAL TOOL FOR CONTINUOUS QUALITY IMPROVEMENT IN BLOOD TRANSFUSION SERVICES

Dr. Vinay Kumar CH, Dr Shanthi B, Dr Mahesh kumar K

Introduction:

Quality indicators (QI) are the measurable, objective indicators of the efficiency of the key segments of a system. Quality indicators are one of the tools of Quality Management System (QMS) used to measure the level of quality, to identify potential quality problems and areas that need further analysis and investigation, and to monitor changes over time. The data collected provide a basis for the implementation of corrective measures and continuous quality improvement in Blood transfusion services (BTS).

Aim and Objectives:

To measure key Quality indicators of various sections in our Blood centre.

Materials and Methodology:

This was a retrospective study conducted in department of Transfusion medicine, NIMS, Hyderabad, for a period of 2 years (Jan 2021 – Dec 2022). Based on the departmental statistics, Quality indicators (defined by NABH) were calculated monthly. The collective data was used for implementing necessary corrective action.

Results:

The overall TTI% was found to be 2.2% and Adverse transfusion reaction rate was 0.06%. Wastage rate of blood units (especially FFP and PC) and donor deferral rates were higher in the initial months of 2021 due to COVID-19 pandemic. Average TAT for blood issues was 39.87 mins. The overall Component QC failure rate was 6.34%. Adverse donor reactions rate was 2.3 %. The overall percentage of components issued were 98.9%.

Conclusion:

Quality indicators provide much needed proof of the level of quality performance. Analyzing the findings of Quality indicators and by implementing necessary corrective actions, continuous quality improvement is possible in BTS.

CLINICAL AUDIT IN TRANSFUSION MEDICINE: AN ANALYSIS ON APPROPRIATE CLINICAL USE OF PACKED RED BLOOD CELL TRANSFUSIONS AMONG HOSPITALIZED PATIENTS

Dr. BANDI SURESH BABU, Dr. Sreedhar Babu KV

Background:

There is no legislative framework in India at the moment, which would enable collating data from hospitals on standard indicators of quality of patient care. National Accreditation Board for Hospitals and Healthcare providers is the one which insists on the importance of clinical audit in their chapter number six- patient safety and quality improvement.

Aim & Objective:

To analyze on appropriate clinical use of packed red cell (PRBC) transfusions among hospitalized patients. To improve the rationale usage of PRBC transfusions among hospitalized patients by analyzing the appropriateness of blood component request for PRBC by hemoglobin values.

Method:

The study has been carried out by Department of Transfusion Medicine. It was a prospective observational study conducted from September, 2022 to December, 2022. Information regarding transfusion was collected from the blood requests received by blood centre from treating physicians/surgeons. The pre- and post-transfusion hemoglobin values were taken from HIS. The appropriateness of PRBC transfusion was assessed as per guidelines from the American Association of Blood Banks.

Results:

The total number of requests received during the study period was 166 and the number of requests received with Hb <7g/dL were 53.61% (89) and Hb >7g/dL were 46.39% (77). About 53.61% (89) requests were observed to be inappropriate. Post sensitization, the data was collected from November, 2022 – December, 2022 to assess the appropriateness of transfusion. During this period total number of requests received were 160 and the number of requests received with Hb <7g/dL were 78.75% (126) and Hb >7g/dL were 21.25% (34).

Conclusion:

There was a statistically significant increase in the appropriateness of PRBC transfusions. Clinical audits were helpful to find out if healthcare is being provided in line with standards and let's care providers and patients know where their service is doing well, and where there could be improvements.

EFFECT OF DELAYED LEUKOREDUCTION ON RBCS AFTER PROLONG STORAGE BY USE OF INLINE FILTER

Dr. Harleen Kaur, Dr Rajesh Kumar, Dr Sonia Gupta

Introduction:

Leukoreduction is removal of leukocytes from blood components. Few complications arise due to presence of leukocytes in donor's blood. Leukoreduction is widely practiced and established strategy for reducing incidence of transfusion associated adverse event.

Aim:

To evaluate efficiency ,quality of pre storage leukocyte reduction of whole blood following delayed storage at ambient temperature.

Materials And Methods:

Blood collected from random voluntary donors into quadruple bag with inline filter for whole blood. Collected bags divided into 3 groups of 30 units each. Group A (indoor collection) which kept for 12-18 hours at 4-6°C. Group B and C contain collected blood units from local and distant camps, kept for 12-18 hours at 4-6°C before filtration and processing, these leukocyte depleted RBC stored at 4-6°C for 28 days. Aseptic samples assessed for CBC (Hb, RBC count, hematocrit, leukocyte), plasma Hb, serum electrolytes (K+) at pre and post filtration stages and during storage fortnightly.

Results:

Volume of whole blood (including 63 ml of CPD) similar in both control and test groups taken fortnightly. Volume reduction due to filtration was 35± 10 ml. RBC's volume was 240 ml± 20 ml. Pre filtration WBC didn't differ in test and control groups. Leukocyte count in whole blood after filtration wasn't significantly different in any group, counts of WBC were lower than 105/ unit in indoor collection compare to camp collection (107/ unit), serum potassium increased in camp collection (42.8 mmol/l) with prolong storage compare to indoor collection which remain almost normal (3-5.5 mmol/l) Hemolysis increased with prolong storage in camp collection (43.75 mg/dl).

Conclusion:

Whole blood filtration before component preparation seems useful alternative method for obtaining leukoreduced RBC, plasma with minimal whole blood loss and reduce adverse reactions in transfused patients.

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BLOOD CENTRE EXTERNAL QUALITY ASSESSMENT SCHEME: 12 YEAR EXPERIENCE AS PARTICIPATING LABORATORY

Dr Garima Thakkar, Dr Nidhi Bhatnagar, Dr Sangita Shah, Dr Mamta Shah, Dr Kamini Gupta, Dr Rahul Rajvanshi

INTRODUCTION:

Quality assurance in blood centre includes active participation in the external quality program. Such a program offers benefits to patient care, their safety, and an overall quality of laboratory practices. The BEQAS program is a valuable management tool designed to improve the efficiency and service of a laboratory. The program provides an opportunity to the participating organizations to compare activities and modify their own practices. In a transfusion service, BEQAS evaluates the performance of procedures, equipment, materials, and personnel, and suggests areas for improvement.

AIMS AND OBJECTIVES:

- Stimulate performance improvement to promote higher standards of practice in Blood centre.
- Ensure credibility of blood centre.
- Identify common errors.

MATERIALS AND METHODS:

- In the current study we evaluated our BEQAS test result of the past 12 years, from 2010 to 2022.
- We performed all the prescribed tests by strictly following the departmental SOP and manufacturer's instruction, considering each lot as routine working samples.
- Test results of all blood samples such as ABO & Rh typing, direct agglutination test, antibody screening, antibody identification, Hemoglobin estimation and transfusion transmitted infection (TTI) testing were analyzed and documented.

RESULTS:

Discordant results in one or more instances were observed with Hemoglobin estimation, antibody screening and tests for HBsAg and syphilis. All other results were concordant and matching with the referral laboratory. Root cause analysis was done for each and every discordant result found in our lab and proper corrective and preventive actions were taken regarding procedures, equipment, materials, and personnel wherever needed.

CONCLUSION:

All the discordant results in the last 12 years have helped us to significantly improve our transfusion service in terms of performance evaluation, patient care and safety issues, and overall quality of laboratory practices. We therefore recommend all blood centres to participate in the BEQAS program for continuous quality improvement.

CASES WHICH REMIND THE IMPORTANCE OF ROOT CAUSE ANALYSIS (RCA)!

Mrs. Pallavi Bhabal, Dr Rajeshwari Basavanna, Dr Anand Deshpande

Importance of root cause analysis as a quality improvement tool in Blood banking is known from the beginning. This helps in analyzing the process and rectifying the problem for quality outcome. Here we discuss two cases with blood group discrepancy with spurious results.

Methodology:

29 year old female patient, blood group was A positive on forward grouping and on reverse grouping weaker (1+) reaction was noted with A cells. In view of this, anti-A1 was used to confirm the subtype of A group and the 1+ reaction noted with anti-A1 sera. Our 2nd case was 63 years old female patient with A positive blood group on forward grouping and on reverse grouping unexpected reaction with A cells. Reaction with anti-A1 sera showed mixed field. In view of two patients showing mixed field and weaker reaction with Anti-A1 and considering A2 is the common subtype which is not known to react with anti-A1, further investigation was done. Anti-A1 Quality control was repeated with A1 cells, which showed 4+ reaction and reaction with A2 cells which was supposed to be negative, showed mixed field reaction. We also tested with patient's A cells with another lot of anti A1 sera of the same company and noticed similar mixed field reaction. Tests with A2 and patients' cells with another two companies' anti-A1 sera, showed clear negative reactions. RCA revealed during quality control of anti-A1 testing, reaction with A2 cells was missed in our hospital and company was informed about the spurious results. These cases highlight the importance of using both positive and negative controls before using antisera and reagents and importance of RCA.

Conclusion:

Root cause analysis in blood banking is of utmost importance to improve the process of safe transfusions.

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QUALITY ANALYSIS OF RBC COMPONENTS RETURNED TO THE BLOOD CENTRE AFTER ISSUE: A DATA OF 78 MONTHS

Mrs. Pratiksha Dalekar, MS Minal Rane, MS Ujwala D'mello, Mr. Raees Ahmed Shaikh, Dr. Tanvi Yardi, Dr. Rajesh B. Sawant, Dr. Varsha Vadera

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Introduction:

Approximately 0.5 to 1% blood components are returned to the blood centre after issue. It is advisable to define definite quality parameters for assessment of RBC components returned after their issue from blood centre.

Aims & objective:

To analyse utility of plasma free hemoglobin and bacterial screening by culture method as quality parameters for assessment of suitability of returned RBC components.

Material and Methods:

All returned components were accompanied with a pre- designed document with reason for return and other relevant clinical parameters documented. The blood centre technologist recorded temperature and integrity of returned component and quarantined the same. A sample from the RBC component was collected for plasma free Hb estimation and bacterial screening.

Based on percentage hemolysis result, the medical officer decided fate of the quarantined RBC component. Data was analysed separately for units returned within 30 minutes and those returned beyond 30 minutes after issue.

Results:

Total 134801 components were issued including 41226 RBC units. 776 (0.57%) components were returned, of which 428 (1.03%) were RBC components.

176 (41%) RBC units were returned within 30 minutes of issue while 252 (59%) units were returned after 70 + 20 minutes after issue. 22 (5.4%) RBC units were discarded due to hemolysis >0.8%. Two of these units were returned within 30 minutes whereas the remaining 20 were returned after 90 + 30 minutes after issue. None of the returned RBC components tested positive for bacterial growth.

230/428 (53.7%) returned RBC units could be considered for acceptance into inventory based on above quality control parameters.

Conclusion:

RBC hemolysis may reach significant level when stored at temperatures between 6 to 10 degree Celsius for more than 60 minutes. Bacterial growth does not seem to be a major possibility at this temperature and time range in case of RBC components.

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IMPLEMENTING RECEIVE BACK POLICY: ARE WE COMPROMISING ON QUALITY?

Dr. BRAJA SUNDAR HAJIRA, Dr. Dheeraj Khetan, Dr. Indranil Das, Dr. Anupam Verma, Dr. Priti Elhence, Dr. Rajendra Kumar Chaudhary

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Introduction:

Blood transfusion services often face shortage of red cell concentrates (RCCs) with high demand-supply ratio which may affect patient care. One of the strategies to minimise this problem is to reduce wastage of RCCs by implementing receive back policy of un-transfused RCCs.

Aims & Objectives:

To assess whether the returned RCC units are suitable for transfusion, based on quality control (QC) testing.

Materials and Methods:

Retrospective data of QC testing of RCCs returned unused (RU) was compared with QC results of RCCs in inventory (RI) over a period of three years (2017 to 2019). QC parameters including volume (ml), haematocrit (Hct), haemoglobin (Hb) content and white blood cells (WBC) content was compared across different type of RCCs prepared during the study period; RCC prepared from 350 ml whole blood by platelet-rich plasma method (RC350), RCC prepared by buffy coat method in additive solution from 350 ml (RCC350-AS) or 450 ml whole blood (RCC450-AS). For units returned beyond one-week of issue, percentage haemolysis and bacterial contamination were also analysed.

Results:

During the study period a total of 126,652 RCC were issued of which 21531 (17%) were RU. QC testing record of 291 RU and 1072 RI were included in analysis. Overall, all the QC parameters tested were found to be comparable between RU and RI units. More than 75% of the tested RU was compliant with reference QC criteria. Ninety percent (n=69) of RU returned beyond one week of issue had percentage haemolysis within acceptable limits and none of these units tested positive for bacterial contamination.

Conclusion:

Receive back based on visual inspection may be safely implemented for RU in an institutional setup where cold chain maintenance can be ensured. RU beyond one week, however, should be additionally tested for % haemolysis and bacterial contamination before re-issue.

QUALITY INDICATOR MONITORING AT AN ACCREDIATED BLOOD CENTRE: A RETROSPECTIVE STUDY

Dr. Anu Patel

Introduction:

Blood transfusion service is an important part of modern healthcare system

Blood transfusion service can reach the highest level of efficiency through implementation of Quality Management System (QMS) in all phases of blood collection, processing, and storage.

Quality indicators are QMS tools which :

- Provide proof of the level of quality performances.
- Utilize the information gained to seek improvements in the quality.

Aims And Objectives:

To evaluate and analyse quality indicators as performance improvement tools of our Blood Transfusion Services

Assessment of the QMS conformity with the set benchmarks

Materials And Methods :

The present study was a retrospective study, where the performance indicator (PI) data of our blood centre was analyzed for over five years (JULY 2017 - JUNE 2022). The yearly data were collated from monthly data.

At the end, outcomes of the analysis were charted.

Result:

On analysing the outcomes of the quality indicator parameters, we found that overall TTI% was found to be 1.6 % and Adverse transfusion reaction rate was 0.01%. Overall, wastage rate was 4.8%. The highest average component QC failure rate in our study was seen in Cryo precipitate (14.36 %) ,followed by FFP (5.28 %) , platelets (6.5%) and PCV (4.44%)

Adverse donor reaction rate was found to be 0.26%, while Donor deferral rate was 3.43%.

The highest percentage of component issued was PCV, followed by FFP , platelets , Cryo precipitate ,Whole blood and SDP.

Conclusion:

For the smooth functioning of blood transfusion services, it is of utmost importance that quality indicators are constantly monitored. The ultimate goal is to provide safe transfusion to the patients.

Thus, this study provides a basis for the implementation of corrective measures and continuous quality improvement by means of QI's.

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IMPACT OF QUALITY IMROVEMENT PROJECT IN BLOOD TRANSFUSION SERVICES: AN AUDIT BASED STUDY

Dr. Sanooja Pinki. S

Introduction:

Quality indicators are performance measures designed to monitor and evaluate the quality of transfusion process. We have identified four quality indicators which needs improvement in our Centre. This study focuses on the impact of quality improvement project by implementing certain process or practice changes in the existing system

Aims and Objectives:

To study the impact of process and practice improvement of four identified performance indicators in our Centre

Materials and Methods:

Retro-prospective quantitative design

Descriptive time motion study-Audit based data

The performance indicators taken for the study are 1. Platelet concentrates discards due to expiry 2. Return back of blood components after release 3. Transfusion reactions to single donor platelets 4. Blood donor reactions. Pre-intervention one-year retrospective data were taken from records and analyzed. Process and procedural changes were implemented and assessed

Results:

Platelet discard due to expiry: Brought down to 0.79 % in 2023 from 21.4% in 2020. The strategies implemented were converting multiple RDP requirements to SDPs, preparation only against demand by checking the blood component requisition form, issuing platelets free of cost on the day of expiry to nearby hospitals, release of across the group platelet concentrates as per FIFO policy

Return of blood components: Brought down to 0.8% from 3.2% by repeated orientation and refresher trainings

Donor reaction: Brought down to 0.4 % from 1.3%. Strategies implemented to reduce donor reactions are pre donation hydration, donor diversion by implementing television and music system in donation area. Also, First time donors were given special attention during counselling and donation.

Transfusion reaction to SDPs: Brought down to 0.38% from 2.8% by implementing platelet additive solutions to 100% of the SDP prepared in our blood Centre.

Conclusion:

Quality improvement enable an organization to attain higher level of performance by creating a new or better standard or removing deficiencies

INTERNAL QUALITY CONTROL OF PLASMA COMPONENTS: A RETROSPECTIVE STUDY AT TERTIARY CARE CENTRE IN NORTHERN INDIA

Dr. Kailash Kumar, Dr Brijesh Kumar Yadav, Dr Aparupa Sengupta, Prof. Anupam Verma, Prof. R.K Chaudhary

Introduction:

Quality control (QC) of blood and its components ensures the availability of high-quality product with maximum efficacy and minimal risk to recipients.

Aims and Objectives:

To analyse internal QC of plasma components, including fresh frozen plasma (FFP), cryoprecipitate (CRYO), and cryo-poor plasma (CPP).

Methodology:

This 12-month (July 2022 to June 2023) retrospective analysis. A fully automated coagulometer, was used for PT, aPTT, fibrinogen, and Factor FVIII. Bacterial culture, visual inspection and measure volume measurement (by routine method) of product was also carried out. DGHS standards was used to compared.

Results:

A total of 27470 units of whole blood were collected , out of which 25756 (93.7%) components were processed; 533 (2.06%) units of FFP, 25 (1.9%) units of cryoprecipitate, and 25 (1.9%) units of CPP used for QC . Out of the 533 FFP units, 356 were produced from 450 ml of whole blood bags and 177 were prepared from 350 ml of whole blood. FFP from 450 ml of blood bag had volume 223.8±63.7 ml, PT was 25.5±45.9 sec, aPTT 33.3±4.18sec, and fibrinogen was 464.9±102.5 mg/bag ml. The FFP which were prepared from 350 ml of whole blood had lower volume (165.1±21.1ml) than FFP derived from 450 ml of blood volume (ml) 165.1±21. 1ml.While other parameters are similar. Mean of factor VIII and fibrinogen in cryoprecipitate unit were 222.6±75.9 IU/bag and 434 mg/bag respectively. While fibrinogen level in CPP was 97±82.3 mg/bag. Statically significant (<0.05) difference found between the coagulation parameter of cryoprecipitate and CPP.

Conclusion:

The quality of plasma component prepared at our blood centre was found to meet the requirements set by the national standard (DGHS). Regular updating of quality assessment with respect to standard guidelines is important for effective production of blood components.

Keyword:

Plasma component, quality control, Factor VIII, Fibrinogen.

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Analysis of Quality indicators in blood transfusion services- A study in a tertiary care centre

Dr. Anupa Jacob

Introduction:

Over the past two decades transfusion services play an important role in patient healthcare management.To provide a high standard of quality in all aspect of transfusion service is a need of the hour. Monitoring quality indicators can improve quality standards and support patient safety through setting priorities and process improvement.

Aims and Objective:

Monitor and analyse the Quality indicators

Method:

Retrospective study over the past 6 months. Data was collected and 8 parameters (defined by NABH) were analysed.

Results:

The overall percentage of transfusion reaction was 0.53 % and donor reaction was 0.97%

The overall percentage of outdated WB/ PRBC was 0.24% and the percentage of TTI was 0.35%

Average time taken for the cross matching was 59 min. The overall donor deferral was 9.7% and the overall percentage of voluntary blood donations were 59.7 and the percentage of QNS collection was 0.89.

Conclusion:

Quality indicators are tools for continuous improvement and will help the blood centres to achieve its standards of the highest quality. Quality indicators should be established and monitored regularly in each blood centre .

TITLE: A UTILITY OF BACTERIAL SCREENING IN BLOOD COMPONENTS- AN EXPERIENCE IN TERTIARY CARE ONCOLOGY CENTRE

Mr. Amol Tirlotkar, Dr. Shashank Ojha, Dr. Sumathi H, Dr Suryatapa Saha

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Introduction:

Bacterial contamination of blood components remains the most common cause of transfusion associated morbidity and mortality. To improve blood safety with regard to bacterial infections, bacterial screening can be incorporated as an additional quality control measure in transfusion services.

Aim:

To investigate requirement of bacterial screening in blood components by BacT/ALERT system.

Materials & methods:

Retrospective study of bacterial screening of blood components collected from January 2021 to December 2022 were analyzed by BacT/ALERT system as per manufacturer's instructions. 3-5 ml of sample from single donor Platelet (SDP) and Leucodepleted Packed red blood cells (LD-PRBC) were inoculated post 24 hours of preparation. Positive units were gram stained and sub-cultured for bacterial identification. Positive reports were checked for correlation of risk factors like donor comorbid infection, time of component preparation, double prick, storage temperature and rate of false positivity.

Results:

Total 1717 (100%) LD-PRBC and 2474(100%) SDP underwent bacterial screening by BacT/ALERT system. Among them, 8 (0.46%) LD-PRBC tested positive, out of which 5 (62.5%) LD-PRBC tested positive for organism identification. The organisms identified were 2 (40%) Enterobacter, 2 (40%) Contaminants and 1 (20%) Coagulase negative staph (CONS). Among SDP, 15 (0.6%) tested positive, out of that 9 (60%) tested positive for organism identification. The organisms identified were 3 (33%) CONS, 2 (22%) Acinetobacter, 1 (11%) K. Pnuemoniae, 1 (11%) Staph. 1 (11%) Aureus, 1 (11%) E.coli, 1 (11%) Cheyseobacterium. Out of positive tested units, 1 (11%) SDP and 2 (40%) LD-PRBC were suggestive of donor related bacteraemia. 0.17% false positivity were seen in LD-PRBC whereas 0.2% in SDP. No septic blood transfusion reaction was reported in this period.

Conclusion:

Pre-transfusion detection of bacteria in blood components can prevent transfusion associated sepsis. Newer strategies need to adopt to identify the sources of bacterial contamination of stored blood and its components.

Theme

Transfusion & Transplantation

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RETROSPECTIVE ANALYSIS OF FLOW CYTOMETRIC CROSS-MATCH RESULTS IN PRE-TRANSPLANT TESTING

Dr. Soumee Banerjee, Dr Ankit Mathur, Mr Santanu Chakroborty

Introduction:

Pre-transplant tests help predict and potentially reduce the incidence of antibody mediated rejection. However analyzing and correlating patient history and results of multiple tests help obtain a complete clinical picture.

Aims & Objectives:

To correlate results from flow-cytometric cross-match (FCXM) with Single antigen bead(SAB) tests and analyse donor specificity of any antibodies identified therein, between January- December 2022.

Materials and Methods:

Results from all pre-transplant FCXM were analysed. In all FCXM+ cases, SAB results to identify the implicating antibody(ies) and their comparison to the donor's HLA type was done to determine their clinical significance.

Results:

Total FCXM=416, FCXM+SAB= 41 (all renal transplant). Total FCXM positive= 23.

(FCXM+, SAB+ = 21): FCXM+ with antibodies also identified by SAB, explains the positive cross-match. Donor specific antibodies=10 (class I+II=2 , class I only =3,class II only=5). Non-donor specific antibodies = 8 (low specificity of FCXM). In 3 cases donor's HLA typing was not done so donor specificity cannot be established.

{B+T FCXM+ : 7 (SAB: Class I+ class II= 7). Only B- cell FCXM +: 14 (SAB: class I+ II=6, only class I=2 , only class II=4 , class II + class I not tested= 2)}.

(FCXM+,SAB-=2): FCXM+ but no antibodies in SAB, indicates false positive FCXM (B+T FCXM +: 1 , BFCXM +: 1).

(FCXM-, SAB+= 11): FCXM - but SAB + (only class I=4, only class II=4 , class I+II= 3) shows presence of non-donor targeted antibodies (10 cases) or a low sensitivity of FCXM (1 case, class I antibody).

(FCXM-,SAB-=7): no antibodies detected despite clinical suspicion.

Conclusion:

No single test can definitively predict outcome of a transplant. For a more complete risk- assessment, a logical sequence of multiple tests should be requested and interpreted in the context of each other during individualization of Pre-transplant testing methodology.

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EFFICACY OF THERAPEUTIC PLASMA EXCHANGE IN HIGHLY SENSITIZED PATIENTS UNDERGOING RENAL TRANSPLANT: A SINGLE CENTRE EXPERIENCE

Dr. aashna gupta, Dr Mohit Chowdhry, Ms Ayushi Yadav

Introduction:

Renal transplantation remains the gold standard for the treatment of End stage renal disease (ESRD). Highly sensitized patients with pre-existing donor specific antibody (DSA) poses a unique set of obstacles, including a higher risk of antibody mediated rejection (AMR) and reduced chances of finding a suitable donor match.

Aims & Objectives:

The primary outcome of this study measures the reduction in DSA levels, the rate of successful desensitization, and the incidence of acute rejection episodes during the follow up period after transplantation.

Materials & Method:

In this single-center study, all adult patients who underwent renal transplant in the time frame of 1 year(Jan 22 to Jan 23) were included. The desensitization protocol involved in this study included combination of therapeutic plasma exchange(TPE) and immunomodulatory therapies. We compared graft survival rates between the group with pre-existing DSA of >5000 MFI and control group of patients with DSA (MFI<5000) and HLA compatible(No DSA) transplants.

Result:

A total of 15 highly sensitized patients (DSA of >5000 MFI) were included in the study. The total number of TPE performed was 81 in 15 patients. Equal number of HLA incompatible (MFI<5000) and HLA compatible(No DSA) control group was taken. A total of 25 TPE was performed in HLA incompatible (MFI<5000) group. Transplantations were performed successfully in these 15 patients without hyperacute rejection. The graft survival rate in the HLA incompatible(MFI>5000) was comparable to the HLA-incompatible (MFI<5000) and HLA compatible(NO DSA) group indicating the efficacy of the desensitization protocol.

Conclusion:

TPE plays a pivotal role in reducing donor specific antibodies in highly sensitized patients. It enhances the success rates of transplantation and offers hopes for patients who previously faced limited options due to their immunological status.

IMPLEMENTATION OF FACT COMPLIANT QUALITY MANAGEMENT SYSTEM (QMS) IMPROVES PERIPHERAL STEM CELL COLLECTION SERVICE IN INDIA

Dr. Rizwan Javed, Dr Rajat Pincha, Dr Arijit Nag, Dr Dibakar Podder, Dr Debranjani Chattopadhyay, Dr Jeevan Kumar, Dr Saurabh Bhave, Dr Reena Nair, Dr Deepak K Mishra, Dr Sanjay Bhattacharya, Prof Mammen Chandy

Introduction:

Hematopoietic stem cell transplantation (HSCT) is a specialised treatment modality for various benign and malignant diseases. Standardized strategies of mobilizing PBSC, timing of leukapheresis and the quality of graft are crucial to transplant outcomes. The measure and improvement of care lies in selection and analysis of quality indicators. Accreditation bodies like FACT-JACIE (The Foundation for the Accreditation of Cellular Therapy-the Joint Accreditation Committee of ISCT-EBMT) recommend validation and monitoring of procedures through frequent audits.

Aim:

o assess the effectiveness of implementing a FACT-JACIE mandated QMS at the PBSC service

Material and Methods:

An audit of all patients/donors who underwent PBSC from January'2021 to December'2022. All patients/ donors eligible for PBSC collections underwent medical examination, mobilization and PBSC collection as per the Institutional protocol.

Audit & calculation of Quality Indicators: Based on FACT-JACIE standards, all records pertaining to allogeneic donor screening, testing and eligibility were reviewed. Quality Indicators (such as mobilization failure,etc) for the apheresis service were calculated.

Results:

PBSC collections were performed in 2021 and 2022 were 78 and 83 respectively. The target CD34+ cell dose achieved in the year 2022 was 7.9% higher than the year 2021. There was 6% decline in use of Prelixafor in addition to G-CSF in the year 2022. Mobilization related adverse effect (backache) showed a decline of 6.2%. No procedure-related adverse reaction (Grade 3 & 4) was observed. And Microbiological culture positivity rate declined to zero from 3.5% in the preceding year.

Conclusion:

Quality indicators are useful for objective assessment, analysis and corrective action in PBSC collection. Implementation of QMS in resource constraint settings has improved quality indicators related to donor/patient care and quality of product. We are among the first in the region to have successfully standardized the HSCT program as per International standards and record an improvement in quality indicators

CAN WE PREDICT OPTIMAL TIMING OF PERIPHERAL BLOOD STEM CELLS(PBSC) HARVESTING BASED ON PRE HARVEST TOTAL WBC, MONONUCLEAR COUNT, PLATELET AND CD34 COUNT-STUDY FROM TERTIARY CARE CENTRE FROM WESTERN INDIA

Dr. Rajeshwari Basavanna, miss Sangeeta Kalgutkar

Introduction:

PBSC harvesting, is most commonly used and preferred approach for stem cell collection for bone marrow transplant. Many factors can influence stem cell mobilization and post-harvest CD34 yield, these are pre harvesting WBC count, platelet count, mononuclear cell and CD34

Aim:

To correlate the predictive value of pre-harvest total WBC, MNC, platelet count and CD34 count in obtaining sufficient post-CD34 cell yield.

Method:

In this prospective study, 152 stem cell harvesting procedure were carried out on 117 donors/ patients. Out of 117 donors/patients, 40(34.2%) were females and 77(65.8%) were males. Age of donor/patient ranged from 2-65 years with a median age of 43 years. Autologous and allogeneic procedures were 112 and 40 respectively. Stem cell harvesting was performed for various diseases mainly for multiple myeloma 40(36%) Hodgkin's lymphoma 29(26.1%), and AML 14(12.6%). Out of the 152 procedures, Post-CD34 count of >3.0 x 106/kg CD34 were obtained in 93 patients/donors by one procedure only. 14, 6 and 3 patients required 2, 3 and 4 procedures respectively to obtain the yield of >3.0 x 106/ yield. Pre harvest total WBC, MNC, platelet and CD34 co relation was performed with post CD34 yield.

Results:

Weak Correlation between pre-harvest, total WBC, mononuclear cells, platelets with that of post CD34,however, a moderately strong correlation was noted between pre-harvest and post CD34, with a correlation coefficient of 0.63 which was statistically significant with p value of <0.0001. In patients with pre CD34 of less than 30 /µl only 7(14.9%) achieved a post CD34 count of >3X106 /kg compared to 89 (94.7%) patients with a pre CD34 count of >30/ µl (Sensitivity: 92.71%, Specificity: 88.89%).

Conclusion:

Pre-CD34 has a good correlation with post CD34 yield and can be used to decide the timing of the stem cell harvesting as well as to predict post CD34 yield.

IMPACT OF SEROLOGICAL ISOAGGLUTININ ABO TITRE ON TRANSFUSION DEPENDENCE IN ABO INCOMPATIBLE HAEMATOPOIETIC STEM CELL TRANSPLANT

Dr. Archana C C, Dr. Shashank Ojha, Dr. Sumathi S.H, Dr. Suryatapa Saha, Mr. Nagaraju P, Mr. Amol Tirlotkar

Introduction:

Although ABO incompatibility between donor and recipient does not represent a barrier to successful Hematopoietic Stem Cell Transplant, however less studies exist about the involvement of antibody titre on transfusion dependence.

Aims & Objectives:

To investigate the role of change in IgG and IgM ABO antibody titre on transfusion dependency in case of allogeneic ABO incompatible HSCT

Materials and Methods:

A retrospective evaluation of all the patients with allogeneic ABO incompatible transplants were analysed from Jan 2016 to May 2023. The demographic characteristics were reported in mean ± standard deviation. Spearman correlation coefficients were calculated using the bivariate correlation procedure to measure how variables are related. The primary endpoint for analysis was 90 days. $P<0.05$ was regarded as statistical significant.

Results:

Among 56 ABO incompatible allogeneic HSCT, 35 (62%) were major ABO incompatible and 21 (38%) were minor ABO incompatible respectively. The number of RBC transfusion support in both the groups were not statistically significant whereas there was a statistically significant difference ($p=0.01$) in platelet transfusion with more platelet transfusion in the major incompatible group. The recipient derived isoagglutinins against donor type RBCs had disappeared by (median) day 87 post-transplant (Range d28 to d169) in case of major incompatible ABO HSCT with a significant positive correlation of Anti B IgG ($p=0.03$) and IgM ($p= 0.04$) antibody titre with the achievement of RBC transfusion dependency till 28 days. In case of minor incompatible ABO HSCT, the median time for appearance of donor derived isoagglutinins against recipient RBC was (median) d 119 post-transplant (Range 55 to 265) with significant correlation ($p=0.02$) of Anti A IgM antibody with RBC transfusion dependency till 90 days.

Conclusion:

Our study showed that isoagglutinin titre might have significant correlation with the requirement of RBC and platelet transfusion support thereby playing a role in engraftment.

ROLE OF DOUBLE VOLUME EXCHANGE TRANSFUSION IN NEONATAL SEPSIS: A CASE SERIES

Dr. Subha P, Dr. Muthukumaravel P.J, Dr. Siddharth Mittal, Dr. Archana Bajpayee, Dr. Neeraj Gupta

Introduction:

Neonatal sepsis is a leading cause of morbidity and mortality worldwide. Early diagnosis, timely administration of appropriate antibiotics, and proper supportive therapy are crucial to improve survival and reduce long-term sequelae. It is considered that Exchange Transfusion is an adjunctive treatment for neonatal sepsis and has the ability to reduce mortality.

Aim and Objective:

To study the effect of double volume exchange transfusion (DVET) among neonates with sepsis

Method:

We present a case series of five patients with Neonatal Sepsis who underwent DVET procedure between January 2022 to December 2022 at a tertiary care hospital.

Result:

Five patients with neonatal sepsis underwent one cycle of DVET each. Three neonates who weighed < 1000 g at birth and had a gestational age (GA) of < 32 weeks did not survive the DVET procedure and expired within two weeks. In contrast, two neonates with a birth weight of > 1000 g and a GA of > 32 weeks who underwent DVET procedure fared better in the haematological and cardiovascular systems and ultimately survived. Also, infants weighing > 1000 g and those born at a GA of > 32 weeks showed a declining trend in early death and mortality by discharge.

Conclusion:

Our limited data set on DVET procedures among patients with neonatal sepsis suggests that DVET is linked with a tendency towards a decrease in mortality in neonates weighing > 1000 g and GA > 32 weeks. Both gestational age and birth-weight can influence outcome in patients with neonatal sepsis. Patients with neonatal sepsis can benefit from DVET as an alternate therapy option especially in those not responding to conventional therapy. However, more extensive studies particularly randomized controlled trials are required for effective evidence-based practise.

Theme

Transfusion Transmitted Infectious Diseases

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ACCEPTANCE TESTING OF CHEMILUMINESCENCE IMMUNOASSAY (CLIA) EQUIPMENT FOR TRANSFUSION TRANSMITTED INFECTION (TTI) SCREENING IN BLOOD BANKS

Dr. Manoj Kahar

INTRODUCTION :

As per guidelines on laboratory quality systems, all installed TTI testing equipment must be evaluated for their performance before commissioning into use.

This paper describes the use of 3rd party quality control material & Sero panels to verify the performance qualification of Fully Automated (CLIA) Analyser, Electra FA.

AIMS AND OBJECTIVE :

To evaluate the performance of Electra HIV Ag/Ab 4.0 CLIA kit on the CLIA system Electra FA for specificity, precision, limit of detection for the detection and carry over for the detection of antibodies to HIV 1/2 & HIV - 1 P24 antigen in donor serum.

MATERIAL AND METHODS :

1)10 HIV reactive & 190 HIV non-reactive samples by HIV Ag/Ab 4.0 CLIA Kit assayed on Electra FA were reassayed on earlier validated Qualisa HIV 40 (Qualpro Diagnostics, India) kit using semi automated ROBONIK ELISA plate Analyser & results were compared.

2)3rd party control Virotrol I, was assayed 20 times in a single batch as well as in different batches. The Electra cutoff index (E.C.I) was determined and interassay & intraassay precision was determined.

3)HIV 1 & HIV 2 positive serum procured from SS serum were appropriately diluted & ECI obtained were compared required with specifications.

4)Carryover was check by placing strong positive samples besides negative control.

RESULTS :

No false positive or false negative results were obtained in the comparison studies between two systems at our blood centre.

Intrassay & Interaasay Co efficient of variation using Virotrol I were 1.7 % & 1.8 % respectively.

Appropriate dilutions of sero-positive panels for HIV gave results meeting the required specifications. No carryover was detected using Electa FA.

CONCLUSION :

Seropositive panels & 3rd party controls from commercial sources must be used to verify the performance qualifications of all newly installed TTI screening equipments in blood centres.

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PREVALENCE OF TRANSFUSION TRANSMITTED INFECTIONS AND THEIR ASSOCIATION WITH ABO AND RH(D) BLOOD GROUPS: A RETROSPECTIVE ANALYSIS FROM A TERTIARY CARE CENTRE IN BIHAR

Dr. Shweta Ranjan, Dr. Bankim Das, Dr. Rakesh Kumar, Dr. Neha Singh, Dr. Saurabh Lahare, Dr. Nishith Nayan

INTRODUCTION:

Ensuring safe blood transfusion is the most important duty of blood transfusion services. Ethnicity and geographical factors can affect the distribution of various infectious and non-infectious diseases in a population. ABO and Rh(D) blood groups have also been studied for their association with such diseases.

AIMS AND OBJECTIVES:

This study aimed at determining the distribution pattern of various TTI markers as well as their association with ABO and Rh(D) blood groups.

MATERIALS AND METHODS:

Study included 31,705 whole blood donors from September 2020 to June 2023. Forward and reverse blood grouping was performed by column agglutination technique. Screening for TTI markers (HBsAg, HIV 1&2, HCV and Syphilis) was performed on fully automated chemiluminescence immunoassay platform. TTI prevalence was presented as percentages. Chi-square test was used to determine the correlation between ABO and Rh(D) blood groups with TTI markers. P-value less than 0.05 was considered statistically significant.

RESULTS:

Overall TTI prevalence was 3.35% out of which the most common infection was HBsAg (1.62%) followed by syphilis (1.05%) while HIV 1&2 and HCV had same prevalence (0.34%). Although not significant, blood group O had the highest prevalence of HBsAg (0.57%) and HIV 1&2 (0.11%) while blood group B had the highest prevalence of HCV (0.13%) and syphilis (0.37%). Rh(D) positive group had higher prevalence of all the infections as compared to Rh(D) negative group. AB Rh(D) negative blood group had the highest sero-reactivity rate (07 donors reactive out of 157) while A Rh(D) negative blood group had the lowest (09 donors sero-reactive out of 332). There was no significant association of ABO or Rh(D) blood groups with TTIs.

CONCLUSION:

O and B blood groups had the highest prevalence of TTIs probably due their higher distribution in our population. However, they were not significantly associated with each other.

BLOOD DONATION SCREENING OF TRANSFUSION-TRANSMISSIBLE VIRAL INFECTION USING TWO DIFFERENT NUCLEIC ACID TESTING (NAT) PLATFORMS: A SINGLE TERTIARY CARE ONCOLOGY CENTRE EXPERIENCE

Dr. Amardeep Pathak

Background:

Nucleic acid testing (NAT) is used to screen transfusion transmittable infections (TTIs) in donated blood samples and provide an additional layer of blood safety. In this study, we describe our experience in screening viral TTIs using two formats of NAT: cobas® MPX2 polymerase chain reaction- based minipool NAT (PCR MP-NAT) and Procleix Utrio Plus transcription-mediated amplification based individual donor-NAT (TMA ID-NAT).

Materials & Method:

Data routinely collected as a part of blood bank operations were retrospectively analysed over a period of 70 months for TTIs. Blood samples were initially screened for HIV, HBV, HCV, syphillis by chemiluminescence and malaria by Rapid card test. In addition to serological testing, all samples were further screened by TMA-based ID-NAT (Procleix Ultrio Plus Assay) during Jan 2015–Dec 2016, and by PCR-based MP-NAT (Cobas® TaqScreen MPX2) during Jan 2017– Oct 2020.

Results:

A total of 48,151 donations were processed over 70 months, of which 16,212 donations were screened by Procleix Utrio Plus TMA ID-NAT and 31,939 donations by cobas® MPX2 PCR MP-NAT. Replacement donors and male donors outnumbered voluntary donors and female donors respectively. The overall NAT yield rate of MP-NAT was 1:2281 compared to 1:3242 with ID-NAT, during the respective time period. ID-NAT detected 5 HBV infections missed by serology, whereas MP-NAT detected 13 HBV infections and 1 HCV infection missed by serology. The proportion of donations that were both seroreactive and NAT reactive was higher with MP-NAT (59.8%) compared to ID-NAT (34.6%).

Conclusion:

Cobas® MPX2MP-NAT had higher overall NAT yield rate compared to ProcleixUtrio Plus IDNAT and confirmed a higher proportion of seroreactive donations. Due to the ease of operation, simple algorithm, cobas® MPX2 PCR based MP-NAT can be an effective solution for blood screening in India.

Keywords:

NAT, Minipool, Transfusion Transmitted infection

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A RETROSPECTIVE ANALYSIS ON ELISA YIELD IN A TERTIARY CARE BLOOD CENTRE: " TOO RAPID, TOO RISKY?"

Dr Amit Kumar, Dr. Pandeep Kaur, Dr. Davood Bava, Dr. Amit Chatterjee, Dr. Akarshan Gupta

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Introduction:

The Blood centre requires highly sensitive tests for Transfusion Transmissible Infections (TTI) testing of blood components. Nonetheless, many blood centres in India still depend on less sensitive, rapid card tests.

Aims and Objectives:

To calculate the ELISA yield (Rapid negative, ELISA positive tests) in our blood centre.

To study the diagnostic characteristics of rapid tests, and to see if they fulfil the claims in their user manual.

Materials and Methods:

This is a retrospective study on TTI test results on whole blood donors in our blood centre over a period of 6 months. Data were collected from the blood centre software database and manual records. The sensitivity (SN), specificity (SP), Positive Predictive Value (PPV), and Negative Predictive Value (NPV) of rapid tests for screening Hepatitis B, Hepatitis C, and Human Immunodeficiency Virus (HIV) were calculated by making a 2*2 table in Microsoft Excel, keeping ELISA test results of the same as the reference standard.

ELISA yield was calculated by the formula = and expressed as 1 in "n" number of tests.

Results:

A total of 3920 TTI tests were done over 6 months. The rapid test was positive for 58 samples & ELISA was positive for 83 samples, thus the ELISA yield was 1 in 157 tests. The calculated diagnostic specifications of the rapid tests were as follows: SN (98%), SP (99%), PPV (69.3%) and NPV (100%) which were corroborated with the user manual SN, and SP claims of 98% and 99% respectively.

Conclusions:

Although the Rapid screening tests live up to the diagnostic specifications they claim in the user manual, the ELISA yield detected in our study was too high to ignore. Regulatory authorities should take adequate legislative steps to address these concerns.

A STUDY OF THE PREVALENCE OF HEPATITIS B VIRUS CORE ANTIBODY AND CORRELATION WITH THE ANTI-HBS TITER FOR THE FURTHER MANAGEMENT OF BLOOD DONORS: AN EXPERIENCE FROM MEGHALAYA

Dr. LUTIKA NEPRAM

Introduction:

Hepatitis B virus is the most frequent transfusion transmissible infection detected amongst blood donors and remains a global health concern. Detection of anti-HBc is a crucial marker for past or ongoing infection and further testing for the hepatitis B virus profile including anti-HBs helps in guiding the management of blood donors by Transfusion Medicine physicians.

Aims and Objective:

To study the sero-prevalence of antibody to Hepatitis B core antigen (Anti-HBc) in blood donors and testing for hepatitis B profile for the further management of blood donors.

Materials and Methods:

Blood donors attending Department of Transfusion Medicine and Blood Centre, NEIGRIHMS, between January 2022 to June 2023 were tested for Anti-HBc besides HIV 1&2, Hepatitis C, Syphilis and Malaria. Those found to be reactive for anti-HBc were further tested for the hepatitis B virus profile including anti-HBs. All the assays were performed on our Chemiluminescence system in the department.

Results:

A total of 9372 donors were screened of which 564 (6.01%) were found to be TTI reactive. Anti-HBc was detected in 332 cases accounting for 58.86 % of all reactive cases. The overall percentage of prevalence stood at 3.54% in the donor population. The anti-HBc reactive donors were tested for the HBV profile and based on the interpretation of Hepatitis B serologic test results, donors were categorized as immune, acutely or chronically infected etc. and managed accordingly.

Conclusion:

Blood safety is enhanced by the testing of anti-HBc on all donated units. Subjecting such donors for further testing for Hepatitis B virus profile helps Transfusion Medicine physicians further guide the management of donors who otherwise are left in the lurch.

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ANALYSIS OF TRANSFUSION TRANSMITTED

Dr. Jasmine Sultana

The study aimed to assess the seroprevalence of transfusion-transmitted infections (TTIs) among 8,816 healthy blood donors over a 5-year period in a tertiary care hospital. Out of the total screenings, 116 cases of TTIs were detected. Hepatitis B virus (HBV) had the highest prevalence (71 cases), followed by Hepatitis C virus (HCV) with 35 cases, HIV with 9 cases, and only 1 case of Syphilis; no Malaria cases were reported. The annual prevalence of TTIs remained relatively consistent, peaking in 2019. HBV consistently ranked as the most prevalent TTI, followed by HCV, while HIV had a lower seroprevalence rate, and Syphilis had the lowest. Malaria was not found in any screenings.

Comparing seroprevalence rates with other studies in India, HBV and HCV rates were comparable, but HIV showed a slightly higher rate in this study. Syphilis had a low seroprevalence rate. In international comparisons, Ethiopia and Saharan Africa had higher TTI rates than India, while Iran had lower rates. Namibia showed higher HBV and Syphilis rates but lower rates of HCV and HIV compared to India.

In summary, the study suggests the Blood Centre's screening program was effective in identifying and preventing TTIs. However, continuous efforts are needed to improve the screening program's effectiveness and address new or emerging infectious diseases that may pose risks to the blood supply.

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TRENDS OF CO-INFECTIONS AMONG BLOOD DONORS AT BLOOD CENTRE OF A TERTIARY CARE HOSPITAL IN WESTERN INDIA

Dr. Ujjwal Ahuja, Dr. Mamta Shah, Dr Nidhi Bhatnagar, Dr. Sangita Shah, Dr. Rahul Rajvanshi, Dr. Kamini Gupta

INTRODUCTION:

Blood transfusion saves lives but it also exposes people to transfusion transmitted infections (TTIs). Infections transmissible through parenteral administration of blood/blood products are known as TTIs. Testing for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis and malaria is mandatory for blood donors in India which has led to a dramatic reduction in TTI.

AIMS & OBJECTIVES:

This study was conducted to determine the rate of co-infections and various combination of infections observed among blood donors.

MATERIALS & METHODS:

All blood donors (404,148) during the period, January 2014 to December 2022 were screened for anti HIV -1,2 antibodies and HIV p24 antigen, hepatitis B surface antigen (HBsAg), anti HCV antibody and anti-Treponema palladium antibody by using enzyme-linked immunosorbent assay (ELISA) method. Screening for malarial parasite was performed on peripheral smears.

RESULT:

404,148 donors were screened during the study period. A total of 5,315 donors (1.32%) were found to be TTI reactive. Among these 5315, 77 donors (1.45%) were reactive for different combination of infections. The various combination of infections seen were : HIV + syphilis (34/77), HBV + syphilis (19/77), HIV + HBV (12/77), HCV + syphilis (5/77), HIV + HCV (4/77), HBV + HCV (1/77). 1 donor each was found to be reactive for three infections HIV + HBV + syphilis and HIV + HCV + syphilis respectively.

CONCLUSION:

Many factors influence the rate of co-infections among blood donors which include similar routes of transmission and other epidemiological similarities. Individuals with co-infections will have higher risk of morbidity and mortality. Stringent screening, notification and counselling of reactive donors will help in reducing the overall rate of TTIs as well as co-infections.

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EXPERIENCE WITH MINIPOOL NUCLEIC ACID AMPLIFICATION TECHNOLOGY IN BLOOD DONOR SCREENING FOR HBV, HCV & HIV AT A TERTIARY CARE MEDICAL INSTITUTE OF ROHILKHAND REGION.

Dr Milan Jaiswal, Dr Aakriti Baijal, **Dr. Pragya Bhardwaj**

Introduction:

Approximately 11 million blood units are collected annually in India. Despite mandatory serological screening of blood donors, cases of viral transmission during the serological window period have been detected. The ability of detecting infectious markers in the window period through Nucleic acid amplification technology (NAAT) ensures a higher level of safety in transfusion recipients.

Aim and Objectives:

The present study was undertaken to evaluate the NAAT yield of HBV, HCV and HIV in seronegative blood donors, overall and with respect to various donor variables such as age, gender, residence(urban/rural) and donor category (Voluntary/Family replacement/ Replacement)

Materials and Methods:

This retrospective cross- sectional observational study was conducted in the Department of Transfusion Medicine at a tertiary care medical institute of Rohilkhand region during the period January 2018 to December 2022. Sample population included were 28318 sero-negative blood donors, subjected to minipool NAAT testing (Cobas Taqscreen MPX v 2.0). NAAT yield rate of HBV, HCV and HIV was evaluated overall; and with respect to donor variables.Z test for proportion was used to compare difference between proportions. Results were considered statistically significant at $P<0.05$ at 95% confidence interval.

Results:

The overall NAAT yield rate among 28138 seronegative blood donors was 1:629; 1:28318, 1:885 and1:2360 for HIV, HBV and HCV, respectively. NAAT yield was higher in replacement than voluntary (1:584 vs 1:716) and in urban than rural blood donors (1:608 vs 1:767). The NAAT yield rate was lowest in age group 18-25 (1:890) and highest in in 56-65 (1:150) with a statistically significant difference in proportions between the two groups ($Z=1.9322$ $p=0.027$). No NAAT reactive cases were detected among females.

Conclusion:

Blood donor screening through widespread adoption of NAAT across the country is a crucial and significant stride towards blood safety through minimizing viral transmission risk in the serological window period.

SEROPREVALENCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG VOLUNTARY BLOOD DONORS AND RESPONSE RATE OF NOTIFICATION OF SEROPOSITIVE RESULT: A 5-YEAR STUDY IN OUR REGIONAL BLOOD CENTRE

Dr. ARUNAGIRI SELLAPPAN, Dr. Hamsavardhini Swathandran, Dr. Arumugam Pothipillai

Introduction:

Transfusion transmitted infections (TTIs) can cause threat to Blood safety. Blood transfusion is an important mode of transmission of TTI to the recipient. Hence, to prevent transmission of these diseases, screening tests is an important step for Blood safety. The responsibility to refer seropositive donors for further management is fulfilled only by notification response rate of these donors.

Aim:

This study was undertaken with the aim of determining the seroprevalence of TTI in healthy blood donors and analyse the response rate of notification of reactive result in our regional blood centre.

Materials and Methods:

A retrospective study was carried out over a period of 5 years from July 2018 to June2023. Serum samples were screened for Hepatitis B surface antigen (HBsAg) with Enzyme-Linked Immunosorbent Assays (ELISA) , Malaria using slide method, antibodies to Human Immunodeficiency Virus (HIV) Type 1 and 2 with ELISA 4th generation kits, Hepatitis C Virus (HCV) with ELISA 3rd generation kits and Syphilis using venereal disease research laboratory test (VDRL) respectively. Data collected from seropositive record for response rate of notification of reactive result.

Results:

A total of 7693 healthy donors were included, out of which majority of donors were males. The number of seropositivity of HIV, HBsAg, HCV, Syphilis and Malaria were 0, 25, 3, 1 and 0 respectively. The corresponding seroprevalence of HIV, HBsAg, HCV, Syphilis and Malaria were 0%, 0.32%, 0.03%, 0.01% and 0%, respectively. Out of total 29 seropositive donors, 25 donors responded for follow up and the corresponding response rate 86.20%.

Conclusion:

The seroprevalence among voluntary blood donors reflects the efficiency of donor selection process and adherence to screening methods prescribed. The blood centre personnel need to give equal importance to donor notification and follow-up.

COMPREHENSIVE SYPHILIS SEROPREVALENCE AND ACTIVE INFECTION RATES AMONG SEROREACTIVE BLOOD DONORS AT A TERTIARY CARE CENTER

Dr. Nayana Vk

Introduction:

This study investigates syphilis prevalence in whole blood donors via Electrochemiluminescence Immunoassay (ECLIA) and identifies active infections using VDRL. Analysing results aims to improve diagnostic accuracy, unveil detection rate variations, and enhance blood transfusion safety.

Aims and Objectives:

1) To estimate the overall prevalence of syphilis among whole blood donors using Electrochemiluminescence Immunoassay (ECLIA)

2)To estimate the rates of active infection among ECLIA-reactive donors using VDRL.

Materials and Methods:

Over a span of 8 months, a total of 10,698 whole blood donors were screened for syphilis using ECLIA. Samples that tested positive using ECLIA were subsequently subjected to RDT and VDRL tests to determine the rates of active infection.

Results:

The study found that out of the 10,698 donors, 113 tested reactive for syphilis using ECLIA, with 98 of these donors also reactive using RDT (accounting for 86.72% of ECLIA-positive samples). Moreover, 67 donors were positive using the VDRL test (59.29% of ECLIA-positive samples and 68.36% of RDT-positive samples). The calculated overall prevalence of syphilis infection among blood donors was 1.05% for ECLIA (Electrochemiluminescence Immunoassay)

Conclusion:

The study's findings revealed significant disparities in positivity rates across the three platforms. Furthermore, among ECLIA-reactive donors, only 59.29% exhibited active infections requiring treatment, highlighting the importance of accurate diagnostic methods.

This study underscores the necessity of selecting appropriate diagnostic platforms after syphilis sero reactivity in blood donor screening. The observed differences in detection rates emphasize the significance of employing reliable serological techniques to ensure the safety of blood transfusions and effective disease management.

TREND ANALYSIS OF SYPHILIS PREVALENCE IN BLOOD DONORS

Dr. Mohammed Asif

Background:

The study determines the demographic characteristics and risk factors of syphilis positive blood donors. Post-donation blood donor notification and counselling of syphilis positive blood donors aids timely treatment and minimizes disease progression.

Objectives:

To determine the seroprevalence and trend of Syphilis among blood donors.

Materials and methods:

A retrospective study was conducted in the Department of Transfusion Medicine, Government Medical College and Hospital, Chandigarh from January 2013 to December 2021. Blood donor samples were screened for antibodies to syphilis using Rapid Plasma Reagin test as per the manufacturer's guidelines. Seroreactive donors were notified telephonically and a letter was dispatched. Donors who didn't respond were termed non-responders. Maintaining confidentiality throughout the process, responders were counseled and referred to Integrated Counselling and Testing Centre (ICTC).

Results:

Out of 162378 blood donors during the study period, 0.16% (n=258) were positive for syphilis. Ninety-two (92%) were voluntary. Forty-nine (49%) were repeat donors. Eighty-six (86%) were males. Two hundred and fifty of 258 (96.9%) were contacted and responders were referred to ICTC. Forty (15.5%) gave history of high risk behavior: 10 practiced homosexuality, Sixty (23.26%) had sex with commercial sex workers while Eighteen (6.9%) were having multiple sexual partners. Forty-five (17.5%) were already aware of their positive status and taking medications. Seventy-seven (29.8%) do not have proper history.

Conclusion:

Donor notification and counseling is important in preventing transmission of Syphilis and maintaining safe donor pool.

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A STUDY OF SEROPREVALENCE OF HEPATITIS DELTA VIRUS (HDV) IN HEPATITIS B REACTIVE BLOOD DONORS AT A TERTIARY CARE HOSPITAL IN WESTERN RAJASTHAN, INDIA

Dr. Neha Malik, N.L.Mahawar, Prem Parihar

Introduction:

Blood transfusion carries a risk of transmitting major infections such as Hepatitis, HIV, Syphilis etc. Hepatitis Delta Virus is a co-infection of Hepatitis B Virus. The present study was done to evaluate the seroprevalence of Hepatitis Delta Virus among Hepatitis B reactive blood donors. WHO recommends that all blood donations should be screened for evidence of infection.

Aim and Objective:

To find out the seroprevalence of Hepatitis Delta Virus in HBV reactive blood donors.

Material & Method:

A prospective study was conducted at our Blood Centre to find out blood donors reactive for HbsAg during routine screening for transfusion transmitted infections from January 2020 to December 2020. HbsAg seropositive samples were further screened for Anti Hepatitis D Antibody.

Results:

Out of total 27450 blood donors 240 were found reactive for HbsAg. These 240 HbsAg reactive donors were further investigated for Anti Hepatitis D Antibody. Out of them 2 cases were found positive for Anti Hepatitis D Antibody showing prevalence of HDV among the Hepatitis B reactive blood donors to be 0.83%.

Conclusion:

The study shows that the prevalence of Hepatitis D among the Hepatitis B reactive blood donors is very low. Therefore, every blood donor should be screened carefully to avoid recruitment of Hepatitis B Virus infected donors and ultimately reducing the chances of Hepatitis D Virus transmission.

Key Words:

Hepatitis B Virus, Hepatitis Delta Virus, Blood donors

SEROPREVALANCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG BLOOD DONORS AT A TERTIARY CARE TEACHING INSTITUTION IN NORTH INDIA

Dr. Rajbir Kaur Cheema, Dr. Abhitesh Badhan

Introduction:

Transfusion transmissible infections (HIV, HBV, HCV, syphillis and malaria) are among the major threats to the safe blood supply for the patients requiring blood transfusions. Seropositivity rate of TTIs among blood donors is a useful source of information to check their seroprevalance in a community which can give us accurate estimates of risk of TTIs, essential for monitoring safe transfusion services.

Aim:

To estimate the seropositivity of Human Immunodeficieny virus (HIV 1 & 2), Hepatitis B surface Antigen (HBsAg), Hepatitis C virus (HCV), Syphilis and Malaria among blood donors of a tertiary care teaching institution in north India.

Materials and methods:

This retrospective study was done from January 1, 2022 to March 31, 2023 in Department of Transfusion Medicine at a tertiary care teaching institution in north India. The results of serologic markers for TTIs of all blood donations (both voluntary and replacement) were collected retrospectively from departmental records. Collected data was tabulated in Microscoft Excel and results were expressed as percentage.

Results:

Out of total 6505 blood donos, 6452 were male, while 53 were female donors. 4213 donors out of 6505(64.76%), were repeat donors. There were total 160 seropositive donors, all male (100%) and 136 (85%) were replacement donors. There were no female reactive donors (0%). 50 donors tested reactive for HBV, 48 for HCV, 11 for HIV, 51 for Syphilis and none for malarial parasite. The highest number of TTIs were seen in 26-35 age group (41.87%) followed 36-45 years old (26.87%). The overall seropositivity rate of TTIs was 2.46% (160/6505).

Conclusion:

The current study found a low level of TTI seroprevalence in donor pool, indicative of a low overall level of TTIs in the population. Stringent donor screening and recruiting more of voluntary blood donors is need of hour for providing safe transfusion services.

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NOTIFICATION OF REACTIVE DONORS AND THEIR RESPONSE TO COMMUNICATION: EXPERIENCE AT BLOOD CENTER OF TERTIARY CARE HOSPITAL

Dr. Arifa Bano, Dr. Har Govind Meena, Dr .Rashmi Parashar

Introduction:

The strategy of notifying and counseling of TTI reactive blood donors has been incorporated in the 'Action Plan For Blood Safety' published by NBTC (2007). However the process of notification and counseling is challenging because of logistic and socio-demographic reasons. The study was done to assess the response of the blood donors to notification and analyze the reason for non-response to communication.

Aims and Objective:

- To estimate the percentage of sero- reactive blood donors.
- To analyze the response of sero- reactive donors to communication.
- To analyze the causes of non-response to communication.

Materials and Methods:

This is a retrospective observational study, performed at Department of Immunohematology & Transfusion Medicine, Government Medical College and attached hospitals, Kota, from 1 December 2022 to 1 august 2023. The records of TTI reactive donor , their notification and response rate were reviewed and analyzed.

Results:

Total blood donations over a period of 8 month was 10072. TTI reactive donors = 272 (2.70%). Reactive donors contacted telephonically= 123(45.2%). Reactive donors could not be contacted because of wrong contact details, not receiving calls possibly due to fear of social stigma.= 149 (54.70%). Out of 123 contacted donors, 80 reported for post donation counseling i.e. response rate is 65.04%. Out of 123 contacted donors, 43 did not report for post donation counseling because of variations in geographical locations.

Conclusion:

Challenges faced in Communication failure were mainly due to wrong contact details of donors, fear of social stigma and variations in their geographical location. Emphasize on pre-donation education, counseling and recruitment of outreach workers will help in overcoming the challenges.

PREVALENCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG BLOOD DONORS AND THEIR RESPONSE TO NOTIFICATION: INSIGHTS FROM A TERTIARY CARE HOSPITAL IN CENTRAL INDIA

Dr. Alaka Vijayan C, Dr Ramesh Chandrakar

Introduction:

Transfusion Transmitted Infections (TTI) pose a significant concern in the context of blood donation. In order to ensure the safety of blood supply, blood donors in India are screened for HIV, Hepatitis B, Hepatitis C, Syphilis, and Malaria. Donors are offered the option of knowing their TTI reactive status at the time of taking consent for blood donation. Reactive donors are requested to visit the blood centre for further counselling and referral.

Aims & Objectives:

To study the seroprevalence of TTI and to evaluate the response rate of reactive donors to notification.

materials and Methods:

This retrospective observational study was conducted in a tertiary care hospital in Central India. Data on TTI reactive donors from July 2020 to June 2023 were collected from departmental records and registers. Reactive donors were notified through three telephone calls immediately after test result, after 48 hours, and on day seven as per departmental Standard Operating Procedure. Responses were analysed.

Results:

From 19341 donations, 338 (1.74%) were TTI-reactive. HbsAg had 134 cases (0.69%), Syphilis 109 (0.56%), HIV 55 (0.28%), Hepatitis C 46 (0.23%), and Malaria 2 (0.01%). 333 of 18975 males (1.7%) and 5 of 366 females were reactive (1.3%). Of 2115 voluntary donors, 44 were reactive (2.08%) compared to 294 among 17226 replacement donors (1.7%). Out of all the reactive donors contacted over the telephone, only 219 (64.79%) responded, and only 99 (29.28%) attended counselling in the blood centre.

Conclusion:

TTI prevalence of 1.74% in our study is similar to other studies in Central and North India. The low response rate of 29.28% to counselling shows poor healthcare awareness and social stigma regarding TTI. Donors unaware of their reactive status results in secondary transmission of infections. Strict pre-donation counselling and proper notification is crucial to improve response rate and ensure blood safety.

VARIOUS ERRORS ENCOUNTERED DURING TTI TESTING ON ECI VITROS LEADING TO WASTAGE OF TESTS AND OTHER REAGENTS AND THEIR POTENTIAL RESOLUTION

Dr. Puneet Sachdeva

Introduction:

ECI Vitros is the most widely used CLIA based platform for TTI testing of blood donors in India. Predominantly performed assays are those of anti HIV 1 and 2, anti HCV and HbsAg. Few centres perform syphilis serology and very few perform malaria testing. We here present data of various errors encountered during the running of assays on this equipment leading to wastage of tests and reagents. Not only there is delay in provision of transfusion services to patients but also there is a financial loss to the centre as the reagents of the equipment are quite costly. In fact TTI screening by an automated CLIA platform is the costliest step involved in processing of collected blood.

Aims and Objective:

Our aim here was to analyze the various errors causing wastage of reagents so as to take appropriate measures to prevent these in future.

Materials and Methods:

Wastage data over past 4 years was analyzed and various errors including equipment and technical were observed. Each and every error causing the wastage of test was noted down in a register. Resolution of same was done either in house, by BME dept or by technical personnel from service provider.

Results:

The types of errors encountered changed over the period of time. Initially when the equipment was newly installed and the staff less trained, most of the errors were technical. Later technical errors reduced and equipment related errors became more frequent.

Conclusion:

We conclude that a variety of errors can occur during the processing of samples on ECI Vitros leading to wastage of costly reagents. Though not all but some of these can be prevented causing less loss of revenue and less delay in transfusion services.

PREVELENCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG BLOOD DONARS OF HADOTI REGION

Dr. Anand Prakash Pandey, Dr. Rajesh Kumar, Dr. Shailendra Vashistha, Dr. Hargovind Meena

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Introduction:

Though the blood transfusion is life saving, it is never risk free. Blood transfusion is having potential risk for transfusion transmitted infections(TTIs) . Aim of the present study is to find out the seroprevalence of HIV, HBV, HCV, SYPHILIS and MALARIA.

Materials and Methods

A Retrospective review of donors record covering the period from January 2022 to July 2023 was done in present study. All samples were screened by 4th

Generation ELISA methods for HIV and 3rd generation ELISA for HCV and HBSAG. Screening for Syphilis was done by rapid (RPR and TPHA) and Malaria screening was done by rapid test.

Result:

Out of total 17072 donors ,over all sero prevalence was 751(4.4%) donors. Out of 751sero reactive donors, 55(0.32%) were reactive for HIV, 423 (2.4%) were reactive for HBSAG, 50(.29%) for HCV,219(1.2%) for Syphilis and

4(.02%) were reactive for Malaria .

Conclusion:

1) Pre-donation counselling and donors self exclusion will be effective in decreasing the Transfusion Transmitted Infections.

2) Public health education program will b beneficial to prevent vaccine preventable diseases like HBV by giving adult Hepatitis B vaccination.

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TREND ANALYSIS OF SYPHILIS PREVALENCE IN BLOOD DONORS

Dr. Mohammed Asif, Dr. Kshitija Mittal, Dr. Paramjit Kaur, Dr. Ravneet Kaur, Dr. Gagandeep Kaur, Dr. Tanvi Sood

Background:

Post-donation blood donor notification and counselling of reactive blood donors aids timely treatment and minimizes disease progression.

Objectives:

To determine the seroprevalence, response rate and high risk activity among seroreactive donors of Syphilis.

Materials and Methods:

A retrospective cross-sectional study was conducted in the Department of Transfusion Medicine, Government Medical College and Hospital, Chandigarh from January 2013 to December 2021. Blood donor samples were screened for syphilis using Rapid Plasma Reagin test as per the manufacturer's instructions. RPR reactive donors were notified telephonically (three attempts at an interval of 1 week each) and a letter was dispatched. Confidentiality was maintained throughout the process, responders were counselled and referred to department of dermatology and venerology. The Donors who didn't respond were termed as non-responders. The results of further testing-Treponema Pallidum Hemagglutination assay (TPHA) was confirmed telephonically from the blood donors after referral

Results:

Out of 162378 blood donors during the study period, 258 (0.16%) were found RPR reactive. The majority of RPR reactive donors were voluntary n=224 (87%), males n=243 (94%), and less than 30 years of age n=143 (55%). Of 258 RPR reactive donors, 154 (60%) donors reverted back, 72 (27%) donors were both RPR and TPHA positive. Of 72 true positive donors, 67 (26%) donors gave high risk history and 5 donors were known syphilis positive and were undergoing treatment.

Conclusion:

Donor notification and counselling is important in preventing transmission of Syphilis and maintaining safe donor pool.

PREVELENCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG BLOOD DONARS OF HADOTI REGION.

Dr. Anand Prakash Pandey, Dr. Hargovind meena, Dr. Rajesh Kumar, Dr. Shailendra Vashistha

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Conclusion:

1) Pre-donation counselling and donors self exclusion will be effective in decreasing the Transfusion Transmitted Infections.

2) Public health education programmes will b beneficial to prevent vaccine preventable diseases like HBV by giving adult Hepatitis B vaccination.

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CALCULATING NAT YIELD BY ADDING ADDITIONAL CO-INFECTION DETECTION IN COMPARISON TO THE SEROLOGICAL TESTING; A BETTER PICTURE OF THE EFFICACY OF THE TECHNOLOGY

Dr. Ashish Jain, Dr. Gita Negi, Dr. Daljit Kaur, Dr Aswin Mohan, Dr Joyisa Deb, Mrs Akansha Bhatt

Background:

Nucleic Acid Testing (NAT) has significantly diminished the residual risk of transfusion-transmitted infections (TTIs) by identifying asymptomatic donors in their window period. This study aims to establish the advantage of parallel testing by NAT and serology for detecting co-infections that would otherwise be missed.

Materials and Methods:

The study was conducted on all the whole blood donations collected at our Blood Centre for one year. TTI screening was performed by Chemiluminescence-based serology and Individual Donation NAT (ID-NAT). The number of samples reactive by both tests (concordant reactive) was analyzed.

Results:

The NAT yield rate in seronegative donors was 1 in 998, while that for individual infections was 1 in 1317, 1 in 4393, and 1 in 65895, respectively for HBV, HCV, and HIV, respectively. Considering the units that were sero-reactive for one marker while NAT detected additional infection marker as NAT yield, the NAT yield rate changed to 1 in 803 donors, while that for individual infections became 1 in 1176, 1 in 2745 and 1 in 32947, respectively for HBV, HCV, and HIV respectively. Additionally, HBV was detected in 5 donors (3 were serologically reactive for HCV, and two were for HIV only). HCV was detected in 8 donors (7 were serologically reactive for HBV and 1 for HIV only). Additional infection of HIV was detected in 1 donor who was serologically reactive for HCV only. One donor was reactive for both HCV and HBV by NAT, while serological tests were non-reactive for both.

Conclusion:

Parallel TTI screening by serology and NAT saves time and reveals co-infection. The estimation of NAT yield by analyzing all co-infections additionally detected by NAAT in comparison to serological testing will provide a better picture of the efficacy of the technology in terms of infection detection.

A NATIONAL SURVEY ON DONOR NOTIFICATION AND COUNSELLING STRATEGIES FOR HIV-REACTIVE BLOOD DONORS IN INDIA

Dr. Suvro Sankha Datta, Dr. Aikaj Jindal, Dr. Aseem Tiwari, Dr. Ankit Mathur, Dr. Lata Jagannathan, Dr. Rajesh Sawant, Dr. Deepa Bhuyan

Introduction:

Although the NBTC and NACO came up with a revised guideline addressing the responsibility of blood centres regarding recall and referral mechanisms for initial seroreactive blood donors and blood centre testing strategies for HIV, it still remains a matter of debate in India as different strategies are being followed on the ground by different blood centres.

Aims and Objectives:

To capture the real-world scenario of donor notification and counselling strategies for HIV-reactive donors in India by conducting a cross-sectional country-wise survey among blood centres.

Materials and Methods:

In this cross-sectional study, a structured, 26-question online survey was conducted from 2022–23 by a team of transfusion medicine specialists. Email invitations were sent, specifying that each institution should be represented by only one response in order to avoid duplication. A descriptive statistical analysis was performed along with the Fisher Exact Test.

Results:

The survey response rate was 123/300 (41%). The urban-rural divide in the method of testing showed a statistically significant difference (p =0.003). The rapid test was still being used either alone or in combination with other tests in 23/117 (19.6%) urban and 4/6 (66.67%) rural blood centres. The wrong phone number was the most common reason for non-contact of the blood donor. However, the error in phone numbers was found to be least prevalent in the blood centres where people were checking the Aadhar cards. The responses showed that nearly 53/123 (43.1%) of the centres that were doing NAT testing either had no idea of the tests being done at the ICTC (4/53 (7.5%)) or thought that their ICTC did rapid testing either alone or in combination with other tests (38/53 (71.7%)).

Conclusion:

There is a need to revisit donor notification and counselling strategies for HIV reactive blood donors in India along with the initiatives to increase the awareness.

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[1]Howard-Menk C, Crane JE, Doshi L, Papari M. HU5F9-G4 Monoclonal Anti-CD47 Therapy: A First Experience with Interference in Antibody Identification. Transfusion 2018; 58 [S2]:177A

[2]De Vooght KMK, Lozano M, Bueno JL, et al. Vox Sanguinis International Forum on [illegible] CD38 monoclonal therapy: summary. Vox Sanguinis 2018; 113:492-498.

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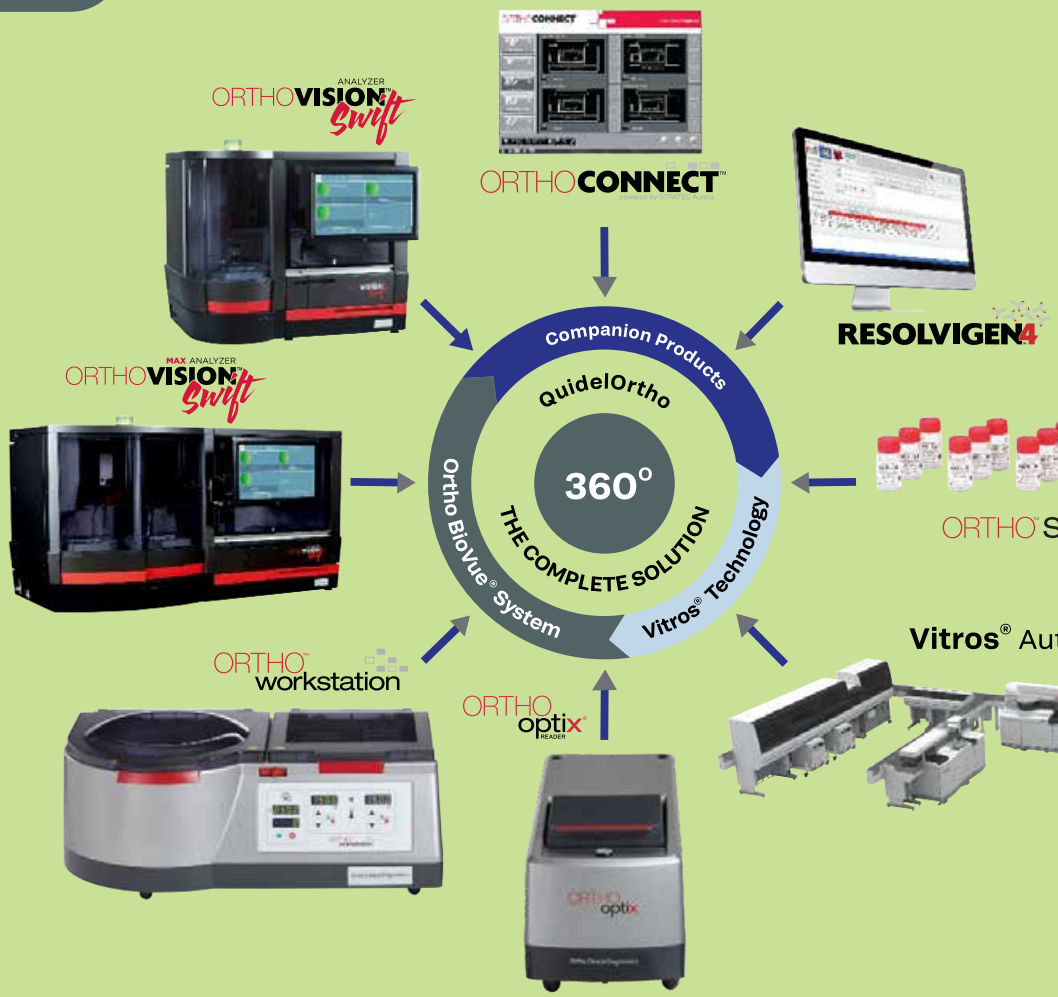

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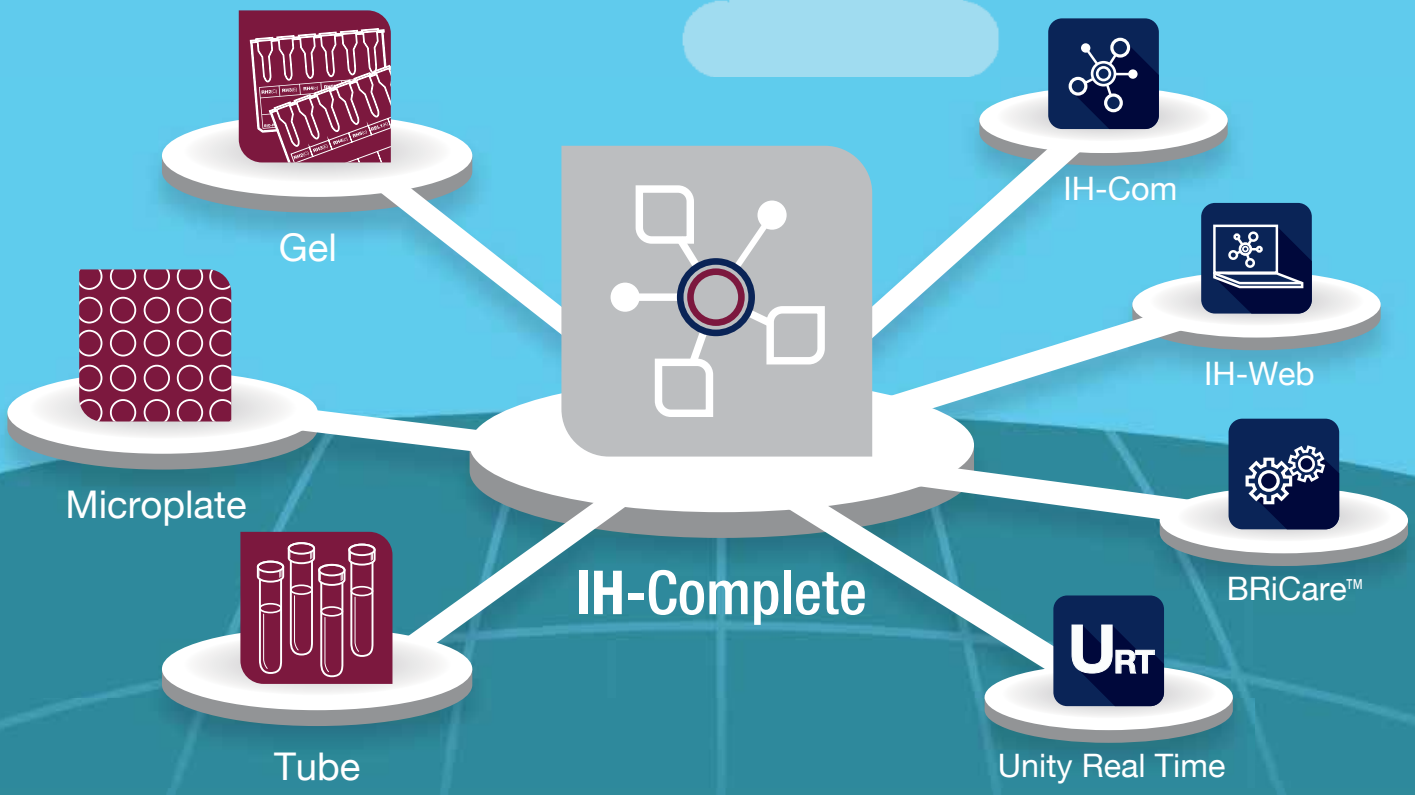

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