GUJTRANSCON 2022

ISBTI
(GUJARAT CHAPTER)

3rd & 4th September 2022
Ahmedabad

SOUVENIR BOOK

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(GUJARAT CHAPTER)

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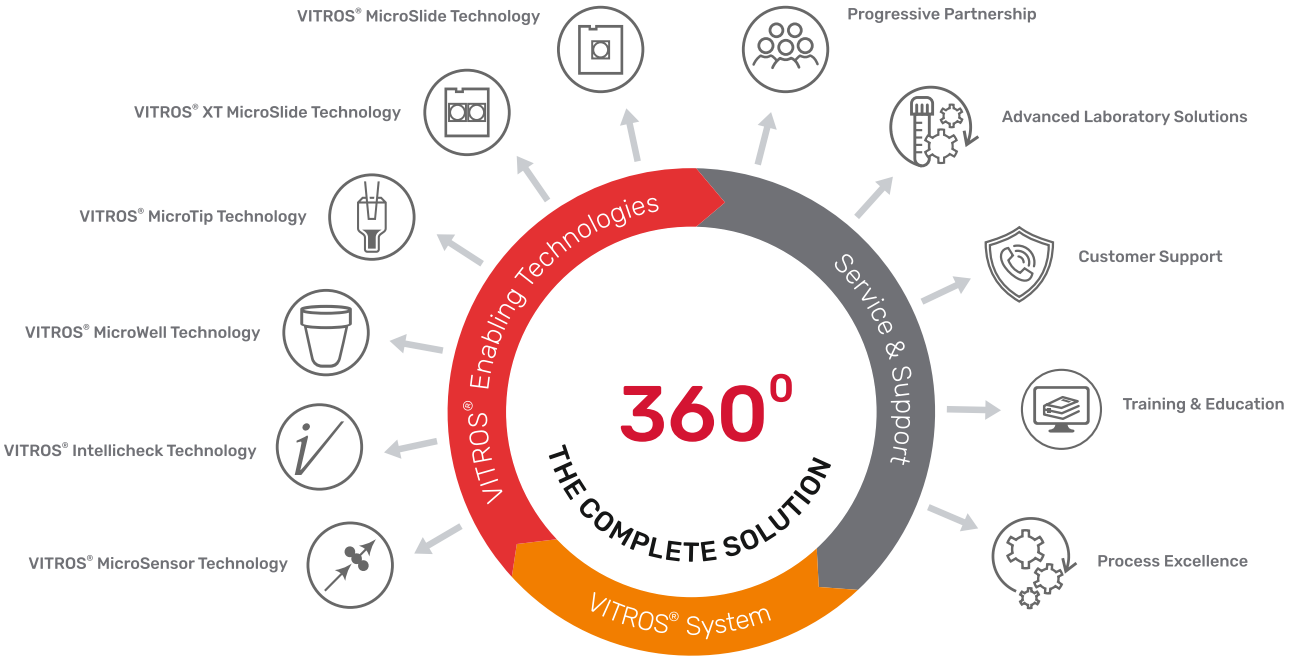

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Content

MESSAGES

Letter No. 57/149/2022
Date: 23/08/2022

Message

I am pleased to note that GUJTRANSCON, 2022 is being organized at Ahmedabad, Gujarat. I hope that this initiative of having State Conference with deliberations on the subject of Transfusion Medicine will lead to upgradation of knowledge of health care professionals, doctors, medical officers and technicians and all others who related to the subject and participating in the conference.

I congratulate the organizers for the initiative and wish GUJTRANSCON, a big success.

ઋષિકેશ પટેલ
મંત્રી,
આરોગ્ય અને પરિવાર કલ્યાણ, તબીબી શિક્ષણ, જળ સંપત્તિ અને પાણી પુરવઠો
ગુજરાત રાજ્ય

191

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

D.O. 30-08/22/DGHS-GUJTRANSCON/2022
Dated: 30th August, 2022

Dear Drs Nidhi and Ripal,

I congratulate the Gujarat Chapter of ISBTI for organizing the GUJTRANSCON 2022. I would have loved to be physically present at the event, more so after a pleasant and positive interaction with the Gujarat Blood Banking Association representatives in Ahmedabad last week.

It is our collective responsibility to ensure adequate supply of safe blood for every needy individual of our great Nation.

For this; we require an increasing degree of cooperation between all stakeholders. However, this cooperation will have to be have multiple pre-requisites for all stakeholders. Some of these requisites will be an enhanced sensitivity, flexibility and a single minded concern for patients.

I am sure, we will be able to move forwards towards our common goal in terms of achieving excellence in the field of Transfusion Medicine and Immunohematology.

I wish the event is a complete success.

Best regards,

Yours sincerely,

(Atul Goel)

Dr. Nidhi Bhatnagar
Organizing Chairperson &
Dr. Ripal Shah
Organizing Secretary, GUJTRANSCON – 2022
Prathama Blood Centre, B/H Jivraj Mehta Hospital
Near Lavanya Society, Dr. C.V. Raman Marg
Vasna, Ahmedabad – 380 007 (Gujarat).

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

Manoj Aggarwal, I.A.S.
Additional Chief Secretary

सत्यमेव जयते

No.
Health & Family Welfare Department
Government of Gujarat
7/7, Sardar Bhavan, Sachivalaya,
Gandhinagar-382010.
Date :

August 25, 2022

MESSAGE

I am happy to know that Indian Society of Immunohematology and Blood Transfusion (ISBTI) - Gujarat chapter is organizing a State level conference, GUJTRANSCON 2022, for the Blood Centres of Gujarat on 3rd and 4th September 2022 at Ahmedabad.

It is the need of the day and I sincerely hope that the conference will be of great help in promoting good practices in Blood Transfusion Services across the state, through collaborative research and deliberations.

I am sure that the sharing of knowledge and experience by delegates would be highly beneficial to all the participants.

My best wishes on the occasion and congratulate the organizers.

(MANOJ AGGARWAL)

सत्यमेव जयते
Remya Mohan, IAS

राष्ट्रीय स्वास्थ्य मिशन
Mission Director
National Health Mission
Gujarat

Message

I am extremely happy to know that GUJTRANSCON 2022 is being held on 3rd and 4th September 2022 in Ahmedabad. It is the need of the day to create awareness regarding rational use of blood and promoting voluntary blood donations.

I extend my warm greetings and felicitation to the organizers and participants and wish the conference all success.

Remya Mohan,IAS
Mission Director
National Health Mission
Gujarat

GUJARAT STATE COUNCIL FOR BLOOD TRANSFUSION
Established by the Health & Family Welfare Department, Government of Gujarat
5th Floor, Bahumali Bhavan, Manjushree Mill Compound,
Near Girdharnagar Bridge, Asarwa, Ahmedabad-380004
Phone: 079-22680211-12-13 Fax: 079-22680214
Email: btsgujarat.gov@gmail.com Website: www.gscbt.net

Message

The critical role of Blood Transfusion Services in the overall healthcare management is immense and cannot be emphasized more. Transfusion of blood plays a pivotal role in medical emergencies as well as in the treatment of several diseases.

Gujarat has been a role model in Voluntary Blood donations as well in ensuring that a desired number of blood donation camps are organized frequently.

We have dedicated personnel working in the Blood Centres, both in the public as well as the non-governmental/ charitable sector.

It is very delighting that there is no patient in Gujarat who loses life due to nonavailability of blood.

I congratulate ISBTI -Gujarat Chapter for organizing state level conference, GUJTRANSCON 2022, which is the need of the day in ensuring capacity enhancement of different cadres of personnel working for quality management in blood transfusion services- right from the vein of the blood donor to the vein(and beyond also) to the vein of the recipient of blood/ blood components.

There are sessions to be taken by the eminent faculty from across India.

I hope that during the conference, the participants would exchange and share the latest ideas and findings in the field of Transfusion Medicine.

My best wishes for the entire endeavour.

Dr. Rajesh Gopal
Director
Gujarat State Council for Blood Transfusion

Indian Society of Blood Transfusion & Immunohaematology
Gujarat Chapter

Secretariat: Prathama Blood Centre, Dr. C V Raman Marg, B/H Dr. Jivraj Mehta Hospital, Vasna, Ahmedabad-380007.

Message

Blood Transfusion & its implications in patient management will definitely take us to the goal of Health Care for All. After going through the COVID -19 Pandemic, the whole world realized the importance of medical research. Hence, ISBTI- Gujarat Chapter decided to give an update on the subject, to all the Blood Centres of Gujarat.

It gives me immense pleasure to present before you, a one and half day conference dealing with the nitty gritty of Blood Banking as well latest cutting edge developments in the field.

The delegates will be thrilled to experience a plethora of academically enriched topics from our national and international guest faculty.

Our organising team has left no stone unturned to make this conference interesting, informative, enjoyable and pleasant.

I hope you all will enjoy the deliberations and discussions by eminent faculty. Let us share knowledge and network with others to increase our potential.

I extend a warm welcome to all faculty, delegates and exhibitors.

Warm Regards,

Nidhi Bhatnagar

Dr. Nidhi Bhatnagar
Chairperson
ISBTI - Gujarat Chapter

Indian Society of Blood Transfusion & Immunohaematology
Gujarat Chapter

Secretariat: Prathama Blood Centre, Dr. C V Raman Marg, B/H Dr. Jivraj Mehta Hospital, Vasna, Ahmedabad-380007.

Message

It gives me immense pleasure to invite you to the GUJTRANSCON - 2022, a state level academic feast organised by the ISBTI – Gujarat Chapter. It is going to be organised on 3rd and 4th September 2022 in Ahmedabad.

The Organising Committee of GUJTRANSCON - 2022 is proud to offer you an exciting scientific programme aiming to take Transfusion Medicine to next level. The organising committee especially scientific committee has taken tremendous efforts to put together a scientific programme encompassing all aspects of transfusion medicine.

Over the last two decades, there has a tremendous growth in the field of voluntary blood donation and Transfusion Medicine and the diversity and depth of knowledge has captured the interest among the young medical professionals to pursue a career in this field. Rapid improvements in the field have made blood transfusions not only safer than ever before but also available to right patient in right quantity at the right time. I am confident that the conference will provide a common platform to the participants to share their experiences and update their knowledge.

We, the organizers will make all possible efforts to bring to use the state of art facilities and offer a memorable academic festival.

The conference will promote knowledge, awareness, and goodwill among transfusion specialists, postgraduates, technologists, and blood donor motivators of blood centres across different parts of Gujarat. We hope you all will have a memorable experience.

I appreciate the overwhelming response by all the delegates for this first state level conference. I would like to express my deepest respect to all the delegates of this one and half day event and I sincerely thank my team who took efforts despite their busy schedule to host this conference.

We the members of the Organising committee are pleased to welcome you all to the state level conference.

Thank you,

Ripal

Dr. Ripal Shah
Secretary
ISBTI – Gujarat Chapter

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SCIENTIFIC AGENDA

3rd September, 2022 (Saturday) | Scientific Agenda

08:00AM - 09:00AM	**Registration**	
09:00AM - 10:15AM	**Session 1 - Immunohematology made Easy**	Chairpersons: **Dr. Jitendra Vacchani, Dr. Ripal Shah**
09:00AM - 09:20AM	Warm AIHA	**Dr. Susan T. Johnson**
09:20AM - 09:40AM	Resolving ABO Discrepancy	**Dr. Aseem Kumar Tiwari**
09:40AM - 10:00AM	ABD Pad - New kid on the Block	**Dr. Tulika Chandra**
10:00AM - 10:15AM	Discussion	
10:15AM - 11:30AM	**Inauguration**	
11:30AM - 11:45AM	**Tea / Coffee Break**	
11:45AM - 01:00PM	**Session 2 - Blood Donation**	Chairpersons: **Dr. Yudhbir Singh, Dr. Narendra Vasavada**
11:45AM - 12:05PM	Innovative techniques in Donor Motivation	**Dr. Suchet Sachdev**
12:05PM - 12:25PM	Critical Control Points in the Donor Lab	**Dr. Pragnesh Shah**
12:25PM - 12:45PM	Donor Counseling and notification	**Dr. Farzana Kothari**
12:45PM - 01:00PM	Discussion	
01:00PM - 02:00PM	**Lunch**	
02:00PM - 03:15PM	**Session 3 - All you need to know about component preparation**	Chairpersons: **Dr. Milind Dighe, Dr. Ankita Shah**
02:00PM - 02:20PM	GMP in component lab	**Dr. Aikaj Jindal**
02:20PM - 02:40PM	How to manage Platelet Refractoriness?	**Dr. Priti Desai**
02:40PM - 03:00PM	Ways to manage Platelet shortage	**Dr. Rahul Katharia**
03:00PM - 03:15PM	Discussion	
03:15PM - 04:30PM	**Session 4 - It's all about Management**	Chairpersons: **Dr. Hansa Goswami, Dr. Nidhi Bhatnagar**
03:15PM - 03:35PM	How to Interpret Calibration Report ?	**Dr. Sanjay Gupta**
03:35PM - 03:55PM	Internal Audit - Step by step guide	**Dr. Amit Agrawal**
03:55PM - 04:15PM	Errors in Blood Bank - How to manage?	**Dr. Rima Kusumgar**
04:15PM - 04:30PM	Discussion	
	High Tea	
04:30PM - 05:30PM	**Session 5 - National Programs**	Chairpersons: **Dr. Yazdi Italia, Dr. Cherry Shah**
04:30PM - 04:50PM	Thallassemia Prevention Program - Blood bank perspective	**Dr. Manoj Kahar**
04:50PM - 05:10 PM	Hepatitis Control Program - Relevance for the Blood Banker	**Dr. Rajesh Gopal**
05:10PM - 05:25PM	Discussion	
05:25PM - 5:45PM	**ORAL PAPERS**	Chairpersons: **Dr. M D Gajjar, Dr. Dilip Shah**
07:30PM - 10:30PM	**Gala Dinner with entertainment program**	

4th September, 2022 (Sunday) | Scientific Agenda

08:30AM – 09:00AM	**ORAL PAPERS**	Chairpersons: **Dr. Amrish Pandya, Dr. Mamta Shah**
09:00AM – 10:15AM	**Session 6 – Clinical Transfusion**	Chairpersons: **Dr. Kulbir Kaur, Dr. Rajul Desai**
09:00AM – 09:20AM	The Nitty gritty of Neonatal Transfusions	**Dr. Satyam Arora**
09:20AM – 09:40AM	Inhibitor Work up in Hemophilia	**Dr. Tarak Patel**
09:40AM – 10:00AM	Therapeutic Plasma Exchange in various scenarios	**Dr. Mohit Chaudhary**
10:00AM – 10:15AM	Discussion	
10:15AM – 11:30AM	**Session 7 – Infectious Disease Testing**	Chairpersons: **Dr. Nailesh Shah, Dr. Paresh Vyasa**
10:15AM – 10:35AM	How to Interpret and trouble shoot based on L J Charts	**Dr. Ankit Mathur**
10:35AM – 10:55AM	TTI testing techniques: ELISA versus Chemiluminescence	**Dr. Aruna Poojary**
10:55AM – 11:15AM	Tackling window period: best available option	**Dr. Gautam Wankhede**
11:15AM – 11:30AM	Discussion	
11:30AM – 11:45AM	**Tea Break**	
11:45AM – 01:00PM	**Session 8 – Recent Advances**	Chairpersons: **Dr. Jayashree Sharma, Dr. Dilip Dave**
11:45AM – 12:05PM	Automation in Blood Group serology	**Dr. Meenu Bajpai**
12:05PM – 12:25PM	Transfusion Support in Transplant patients	**Dr. Bhargav Prajapati**
12:25PM – 12:45PM	Patient Blood Management	**Dr. Archna Bajpayee**
12:45PM – 01:00PM	Discussion	
01:00PM – 01:15PM	**Valedictory Function**	
01:15PM – 02:00PM	**Lunch**	
02:00PM – 2:30PM	**AGM**	

SPEAKER WRITE UPS

1. WARM AUTOIMMUNE HEMOLYTIC ANEMIA

Sue Johnson, MSTM, ML (ASCP)SBBCM
Director, Clinical Education, Versiti, Inc. | Blood Center of Wisconsin
Director, Transfusion Medicine Program, Marquette University
Milwaukee, WI USA

Warm autoimmune hemolytic anemia (WAIHA) is the most common type of autoimmune hemolytic anemia and with this presents the most complex serologic evaluation in the immunohematology lab. It is characterized by the presence of an IgG warm autoantibody (WAA) present in the patient's plasma that binds to the patient's red cells.[1] These warm autoantibodies can cause mild to fulminant hemolysis.

WAIHA is often first suspected after a request for blood transfusion is made when a patient is admitted with a hemoglobin of <6 g/dL. Typical pretransfusion testing shows a positive antibody screen (antibody detection test) in the indirect antiglobulin test (IAT). Column agglutination tests such as gel or beads will be positive using IgG cards. Solid phase methods such as solid phase red cell adherence (SPRCA) will also be positive because this method is designed to detect IgG. Reactivity in test tube methods is dependent on the amount of warm autoantibody and if enhancement solutions are added to the test. The autocontrol (patient's plasma + patient's red cells) is generally strongly positive (≥2+) in the IAT.

A positive autocontrol leads to performance of a direct antiglobulin test (DAT). There are three questions to answer when evaluating patients with warm autoantibodies. The first, is warm autoantibody coating RBCs?

The DAT is almost always strongly positive (≥2+) due to both IgG and C3.[1] A DAT result by itself (positive or negative) is not diagnostic and should always be correlated with the patient's clinical condition. To confirm warm autoantibody is coating the patient's red cells an elution should be performed on initial presentation.[2] In WAIHA the eluate contains IgG autoantibody that shows positive reactivity with all reagent red cells tested. Whereas with a negative eluate, a drug-dependent antibody would be suspected. Performance of an elution and testing the eluate answers the first question.

The second question has warm autoantibody spilled into serum/plasma is answered with the positive antibody screen, antibody identification panel and crossmatches all showing positive IAT reactivity.

To answer the third question, is underlying alloantibody present in the serum/plasma, requires the most challenging aspect of the serologic evaluation, performing adsorptions to remove autoantibody. This is an important question to answer in that up to 40% of patients with warm autoantibodies have underlying alloantibodies.[3]

Rarely WAA reactivity can be avoided by using a saline (no additive) IAT test tube method. If autoantibody reactivity remains adsorptions are required, either autologous (using the patient's own red cells) or allogeneic (using other donor's red cells) to remove autoantibody. First it must be determined if the patient has been transfused and when. If transfused within the last 3 months, allogeneic (using donor cells of known phenotypes) adsorption is performed over autologous (using patient's own red cells) adsorption. Even a small number of transfused RBCs in the patient's sample can adsorb alloantibodies.[4] Another factor for use of alloadsorption is the patient's anemia. For patients with hemoglobin <5 g/dL or small pediatric patients, it is unlikely that an adequate quantity of patient red cells can be collected to successfully perform autoadsorptions.

Autologous or autoadsorptions require the patient red cells to be chemically treated with ZZAP or a protease to remove autoantibody to free antigen sites for additional autoantibody to be bind. After treatment, the patient's serum/plasma is added and warm autoantibody binds to open antigen sites. Several autoadsorptions are typically required. This process takes 4-6 hours to complete.

Allogeneic or alloadsorptions are the most complicated immunohematology tests to perform and confusing to interpret. They are labor-intensive, generally requiring 4-8 hours to complete. Warm autoantibody will bind to any donor's red cells. The challenge is to identify three different donor RBCs with an antigen make-up that will reveal any clinically significant alloantibody. If an alloantibody is present, it will bind to donor RBCs that express the corresponding antigen but remain behind if donor RBCs lack the antigen. Typically, two or three rounds of adsorptions deplete the autoantibody. Either the autoadsorbed or alloadsorbed plasma must be retested to determine if an underlying alloantibody is present.

As these procedures are time consuming it is imperative that communication is ongoing between the transfusion medicine physician, the clinical team and medical technologist performing the testing. It may be necessary for the patient to be transfused before testing is completed.

In asymptomatic patients, a restrictive transfusion strategy (i.e., Hgb <7 g/dL) is favored.[5] Bed rest and supplemental oxygen in patients with severe anemia (i.e., Hgb <6 g/dL) could help defer transfusion until testing is complete. The patient's clinical status, co-morbidities and symptoms should guide the decision to transfuse. RBC transfusion should occur if the patient has symptoms of significant hypoxia, confusion, angina, or hemodynamic instability. The risk for a transfusion reaction in patients with AIHA appears to be no higher than in other patients requiring transfusion. One recent study found reactions occurred in 1.6% of patients with WAIHA.[6]

It is important to remember that even after immunohematology testing has been performed to determine if alloantibodies are present, the crossmatch will be incompatible in the IAT/AHG with unadsorbed serum/plasma.[7]

Extended phenotyping of the patient's red cells beyond ABO/RhD can be done relatively quickly in some laboratories with adequate resources. Phenotyping or in well-resourced settings genotyping is often being performed on initial presentation of a patient with WAIHA. Once the initial serologic evaluation is completed to determine if underlying alloantibodies are present future transfusions may include prophylactic antigen-matched blood at a minimum RH (C, c, E, e) and K, where there is also an adequate inventory of phenotyped/genotyped donor RBCs.[8]

WAIHA presents a unique challenge for pretransfusion testing. Patients with acute WAIHA are the most difficult, requiring complicated, lengthy procedures that may not be completed prior to needing transfusion. Frequent communication with the patient's physician and transfusion team is essential to guide the best approach for current and future transfusions.

References

1. Petz LD, Garratty G. *Immune Hemolytic Anemias*. 2nd Ed. Philadelphia (PA): Churchill Livingstone; 2004.

2. Johnson ST, Judd WJ, Storry JR. *Judd's Methods in Immunohematology*, 4th edition, AABB Press; 2022.
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7. Cohn CS, Delaney M, Johnson ST, Katz LM. *AABB Technical Manual*, 20th ed. Bethesda, MD; 2020, Chapter 14.
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2. ABO BLOOD GROUP DISCREPANCIES AND THEIR RESOLUTION

Dr. Aseem K Tiwari
Medanta Medicity, Delhi

Landsteiner's law

The Landsteiner's law states that when an antigen is present on the red cell surface, the corresponding antibody is absent from the plasma of an individual.

ABO blood group system

Based on this concept, forward and reverse grouping is routinely performed to determine the ABO status of donor/patient. Forward grouping determines A and B antigens by testing with known commercial antisera (anti-A, anti-B and anti-AB), while reverse groping determines ABO antibodies by testing with reagent red blood cells with a known ABO phenotype. ABO blood group system is the only system where "expected antibody" is present as follows:

Blood Group	Antigen present on RBC	Expected antibody present in plasma
A	A	Anti-B
B	B	Anti-A
AB	A, B	None
O	None	Anti-A, Anti-B

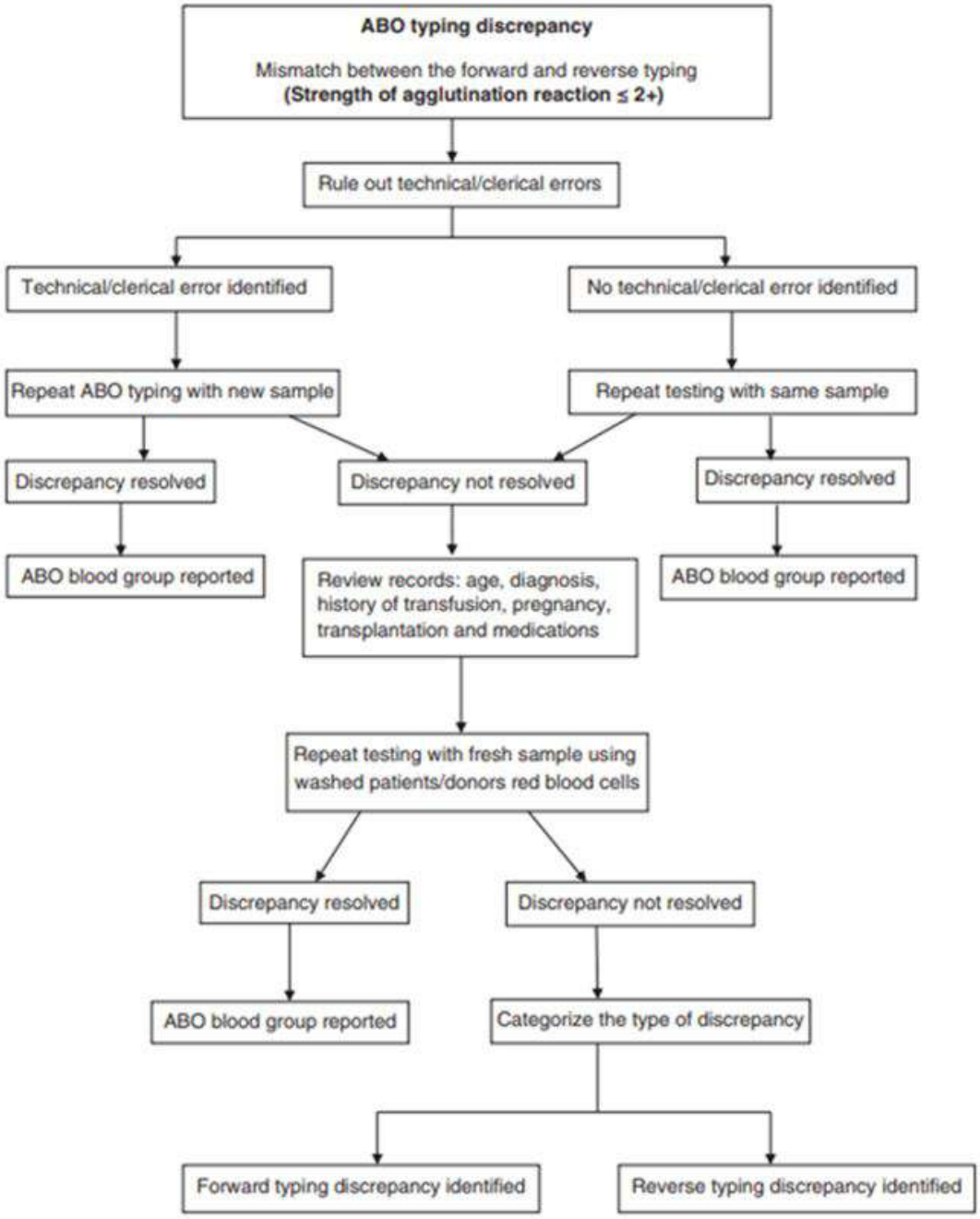
Therefore, in ABO system, both “forward/cell grouping” and “reverse/plasma grouping” is performed and these results tally with each other. When the results of both these tests do not tally, it is called ABO grouping discrepancy. Resolution of such a discrepancy is essential to confirm the blood group of an individual as it may lead to mismatched transfusion if not resolved. The risk of haemolytic transfusion reaction (HTR) due to transfusion of ABO-incompatible blood is 100–1000 times higher than the risk of transfusion-transmitted infections (TTI), and such a transfusion may lead to serious consequences in the recipient. To give a perspective, in an Indian study the incidence of ABO discrepancy among patients and blood donors was found to be 0·1% (138/135853) and 0·02% (14/62080), respectively. [1]

Resolution of ABO group discrepancies

Initial work-up

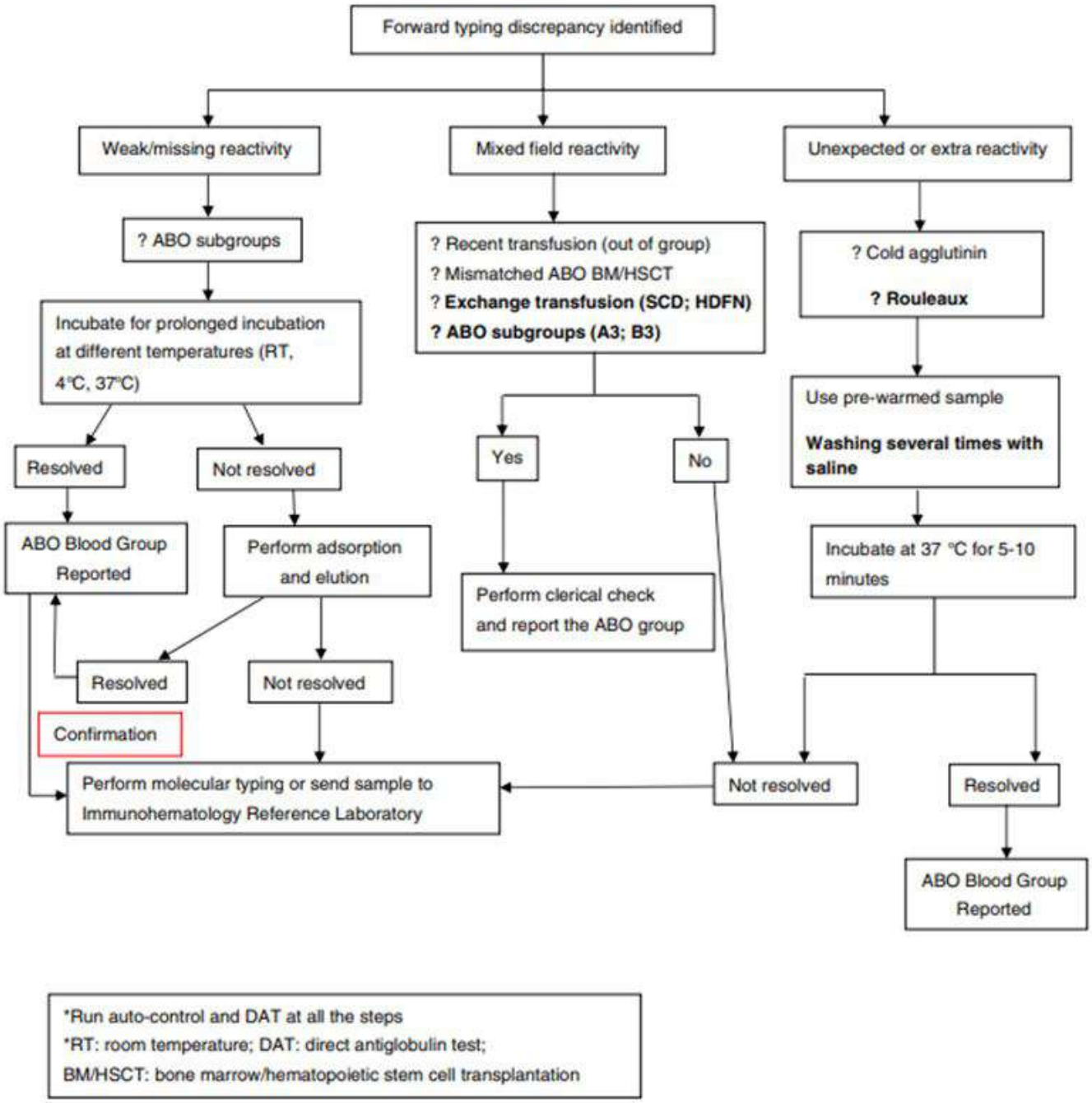
The discrepancy may be due to “technical issues” or it may be “true discrepancy”. Therefore, initial workup may be done according to the following algorithm (Figure 1)

Figure 1- Algorithm to resolve ABO typing discrepancies



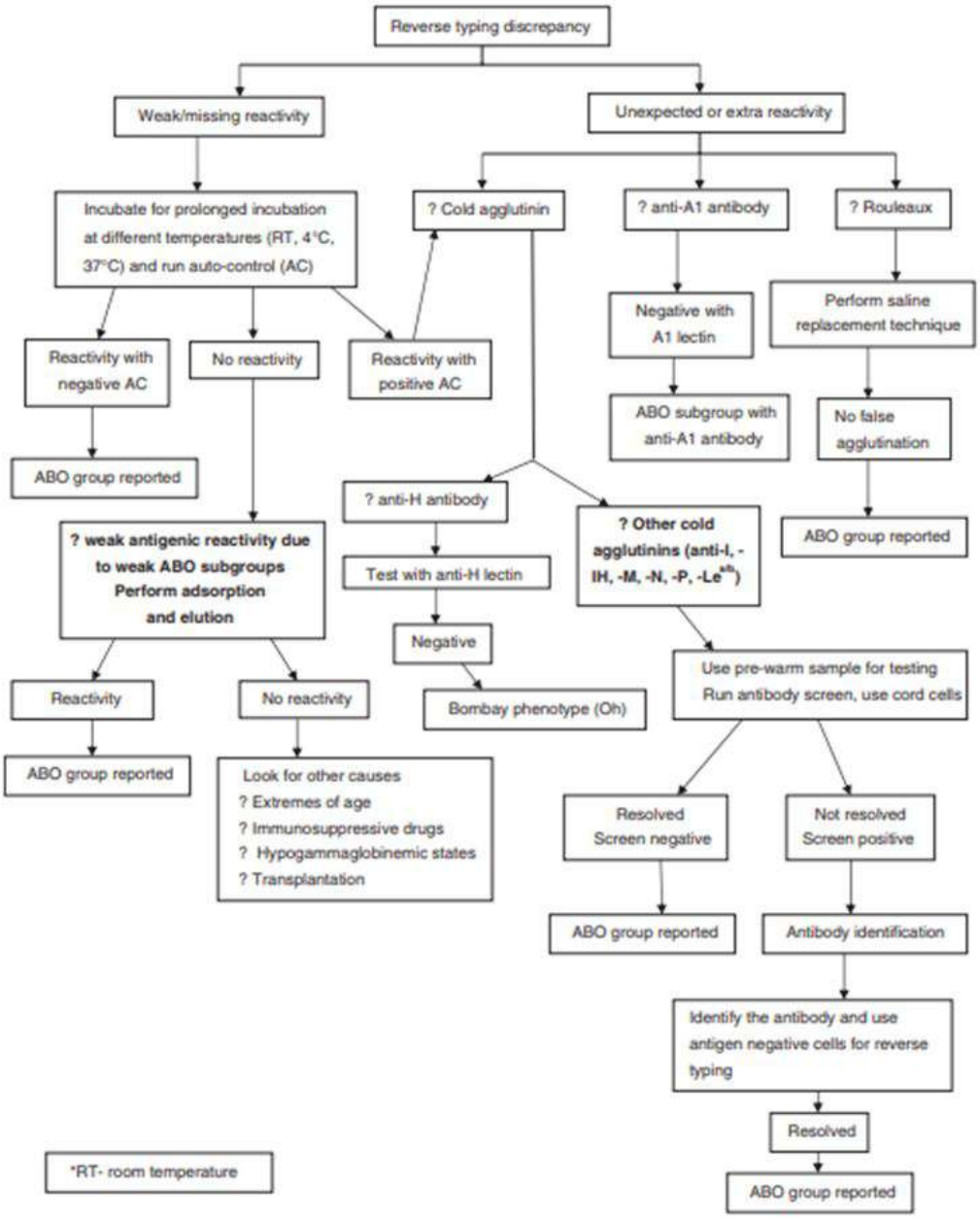
As shown in figure 1, discrepancy may be resolved by identifying the technical issue and correcting it. At times, the discrpancy is resolved by repitition of the entire process of forward and reverse grouping. If the discrepancy is not resolved by these methods, the records like age, diagnosis, history of transfusion, pregnancy, transplantation, and medications is reviewed. Additionally, repeat testing with fresh sample using washed patients/donors red blood cells and using supplementary reagents like, anti-AB antisera, anti-H lectin, anti-A1 lectin, pooled O cells at room temperature, unexpected antibody screening panel, the discrepancy may be classified into either forward typing discrepancy or reverse typing discrepancy.

Figure 2- Algorithm for resolving forward ABO typing discrepancies



As shown in Figure 2, weak/missing reactivity, mixed field reactivity, unexpected or extra reactivity can be resolved in an algorithmic fashion.

Figure 3- Algorithm for resolving reverse ABO typing discrepancies



Likewise, as shown in Figure 3, weak/missing reactivity or unexpected or extra reactivity can be resolved in a step-wise algorithmic manner.

Indian perspective

Blood donors

In the study by Makroo et al, in 62,080 (56,440 males, 91%; 5640 females, 9%) donor samples that were analysed for ABO typing discrepancy, 14 (0·02%) had discrepant results. Overall mean age for blood donors with ABO typing discrepancy was 29·2 years (19–39 years). All 14 blood donors with discrepant results were male donors. Most discrepant results were noted with the reverse typing (10; 71%) followed by forward typing (4; 29%). The mean age of blood donors with reverse typing discrepancy

was 33 years, whereas 27·8 years was noted for blood donors with forward typing discrepancy.

Patients

In case of patients, 135, 853 patient samples were analysed for ABO typing discrepancies, of which 138 (0·1%) had discrepant results. Of these 138 discrepant cases, 82 (59%) were males, and 56 (41%) were females. Overall mean age for patients with ABO typing discrepancy was 48·4 years (7–87 years). Majority of discrepant results were noted with the reverse typing (87·7%) followed by forward typing (12·3%). Of the 35 patient samples with weak antibody reactivity, 27 had age more than 65 years, 6 were post-renal transplant recipients on immunosuppressive drugs, and 2 had weak antibody reactivity; however, the cause for the same could not be determined. Of three patient samples with warm-reacting autoantibody reactivity, two patients were diagnosed with warm autoimmune haemolytic anaemia, and the other was diagnosed with relapsed non-Hodgkin lymphoma. One patient sample with rouleaux was a diagnosed case of multiple myeloma.

Reference

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3. ABD PAD: THE NEW KID ON THE BLOCK

Dr. Tulika Chandra
KGMU, Lucknow

ABD PAD are in vitro diagnostic medical devices (IVDMD) used by blood bankers. The use of ABD PAD allows the control of the ABO/Rh blood group (confirmation or pre-donation control), by determining the presence of the A, B and D erythrocyte antigens on the surface of human red blood cells.

It works on the principle of M-TRAP technology. It allows, from a sample of blood, the detection of a reaction between an erythrocyte antigen and an antibody directed specifically against this antigen.This technique is based on an immunoblotting test, using spots. The tested red blood cells, carrying an antigen, interact with the corresponding antibodies, revealing a red color spot. The red blood cells which do not carry the antigen, do not interact with the antibodies and cross the membrane. The spot will appear light green or white.

The devices are prepared with reagents containing monoclonal antibodies. These monoclonal antibodies are coming from in vitro supernatants cultures of hybridoma lines of murine or human origin. These reagents are deposited and dried in the corresponding wells of the bracket. These reagents contain sodium azide (<0.1%). A, B and D specificities are indicated above the respective wells.

It is advisable to wear gloves, goggles and to handle human samples with care. All brackets that have been in contact with these samples should be handled as potentially infectious products. Special protective measures, elimination and disinfection conditions must comply with local regulations.

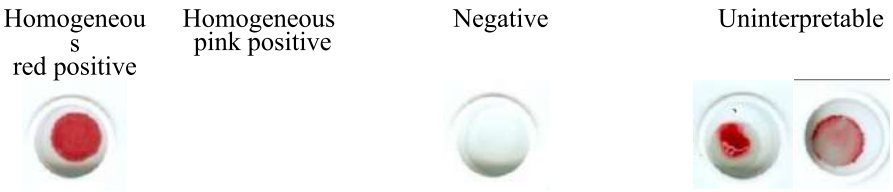
The devices have to be stored between 2°C and 25°C. These devices should not be used beyond their expiry date indicated on the label. After opening the packaging, the devices can be used for 30 days at room temperature. The devices must be put back in their packaging at the end of the day.

READING AND INTERPRETATION

- The reactive zone is homogeneous and red or pink: the reaction is positive and the antigen corresponding to the reagent used is present on the red blood cells tested. The intensity of the color in the reactive zone will depend on the amount of blood deposition and globular concentration.

- The reactive zone is green to white: the reaction is negative and the antigen corresponding to the reagent used is absent on these red blood cells.

- The results of the ABO/Rh group confirmation must be compared to those of the previous tests. The results of the control tests (pre-donation) should be monitored and compared with ABO/Rh determination group tests. Discordant results must be investigated.



-A pink reaction after two revelations is a positive reaction. It can mean a weak reaction.

-If a group AB appears (positive reaction on the spots) for a whole blood sample, it's imperative to perform a second revelation.

Homogeneous	red	positive
Homogeneous	pink	positive
Negative	Uninterpretable	

-An uninterpretable result will be observed when the reaction obtained is not homogeneous. In this case, it will be necessary to repeat the test.

LIMITATION OF THE METHOD

- Only qualified staff can use this device.
- Reactions should be read immediately after the revelation.

Re-reading of results is possible up to 24 hours. However, a pink spot may be observed for some reactions; in this case, only the first reading is interpretable.
The re-reading of the results up to 24 hours is not recommended for samples from bags (1.4% of the reactions have become uninterpretable).

- Storage conditions, the expiry date and the procedure should be strictly respected.
- Uninterpretable results (non-homogeneous reaction) can be observed if :
  - The sample tested has a significant cloudiness, fibrin traces or hemolysis,
  - The sample tested is taken from another type of anticoagulant than those recommended,
  - The subject has high-titer cold agglutinins,
  - The subject is sickle cell or thalassemic
- It is imperative to not use a damaged device. The loss of sealing may lead to a rehydration of the reagents and thus a degradation of their performance.
- Do not use the device if the anti-A is not blue, if the anti-B is not yellow or if the anti-D is not green.
- Do not use the device with another revelation solution than the one provided by DIAGAST.
- Wells tested should not be reused.

Implementation of ABDPAD at Transfusion Medicine, KGMU- Lucknow (U.P.)

In the Blood Bank

Replaced slides with ABDPAD.
We had performed 90,000 blood grouping using ABDPAD till now.
It is implemented in Donor Screening, Blood Donation area and serology lab.

Donor Screening Area

•Technicians are easily doing blood grouping specially rush hours. They are marking the patient ID on the ABDPAD which was not possible in the slides.

Blood Donation Area

•In the donation area, they manage blood grouping register for record purpose. Using the ABDPAD , they can crosscheck the results anytime to reduce the clerical error.

Serology Lab:-

•In serology, each and every blood grouping is recorded for 24 hours for verification anytime.

•Donor ID and Patient ID is mentioned on each blood group to avoid any mistake.

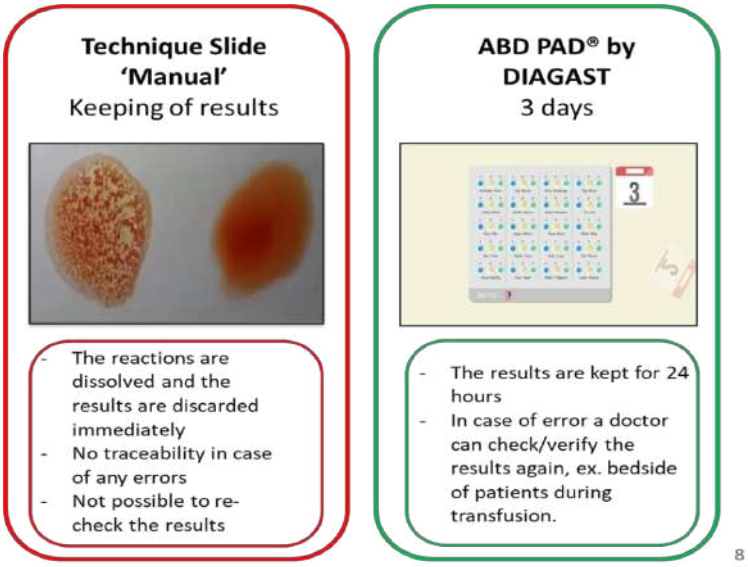
In the Blood Donation Camps:

- We are using ABDPAD in the blood donation camps.
- We can use this up to 40°C and 90% humidity. So it is very beneficial for donation camps.
- We don't require to carry slides, Antisera, View box, discard tub etc. We carry only ABDPAD and PAD buffer.

Comparison between Slide technique and ABDPAD

Using ABDPAD, we are doing blood grouping in quicker than slide method. Blood Grouping using M-trap technology takes only 30 sec.

It improves TAT in the whole process which helps us to supply blood in less time than before.



4. INNOVATIVE TECHNIQUES IN BLOOD DONOR MOTIVATION

Dr. Suchet Sachdev
PGIMER, Chandigarh

Introduction

The blood transfusion service (BTS) is unique from all other branches of medicine in terms of the reliance of its input in form of a donation only from a healthy human volunteer. As the generation of population changes, the BTS need to adapt to the techniques of motivation that are suited to the generation of blood donors in that period. The potential blood donor population of tomorrow, would require, innovation in blood donor motivation to suit their tech savvy lifestyle and this would be the best way forward for the BTS in order to sustain voluntary blood donations.

Motivation – in blood donor scenario [1]

The "essence of donor recruitment is the donor and their motivation, and not the technology". It is of paramount importance to understand the donor in order to plan the strategies for motivation using messages and the technology to augment the motivation.

Types of blood donor motivation

There are two types of donor motivation, extrinsic and intrinsic.

Extrinsic motivation: The donors' motivated extrinsically are the ones who respond to incentives. The incentives may range from psychology to impress others (peers etc.), fulfilling social obligations (towards family, friends, organization etc.), call for donation in catastrophic events, or items of non-remunerative values such as t-shirts, coffee mugs, badges, certificates and or time off from work, remuneration for travel and any such incentives. Such donors normally would not seek opportunities to donate on themselves, take more time to recruit and may donate less frequently.

Intrinsic motivation: The donors motivated intrinsically donate on their own, because they donate to help others and not for any rewards, and in due course of their donor cycle they develop and maintain a 'self-identity of a donor". The usually develop their own goals and commitment towards blood donation and the blood services. These donors are the ones who would normally continue regular blood donation.

Strategies to motivate voluntary blood donations [2, 3, 4]

Worldwide it universally accepted that collection of blood from low-risk volunteers is the best measure to ensure blood safety. The most desired profile of the voluntary blood donor is an individual who; has the capacity and competence to decide to be a blood donor; knows that she/he is healthy and wants to remain healthy, is well informed on the measures to maintain her/his health, on how to avoid unhealthy behaviour and risks, knows what the need, requirements, process and risks of blood donation are, is positively motivated to donate blood, decides voluntarily to donate blood; and donates blood repeatedly.

The approaches to motivate donations are either direct or indirect

Direct approach: Individual level or in target groups

Personal/individual approach such as letters, telephone call, face to face discussion and personal requests

Group/target approach such as awareness campaign in school and colleges, work places - factory worker, general population. uniformed services - paramilitary, police, religious and community leaders

Indirect Approach (Mass approach)

Media campaign using print media - newspapers, stickers etc., or electronic media - Television, Internet, FM Radio

Other mechanisms such as

- Banners / Hoardings
- Posters / stall in local fair or exhibition
- Slogans on day-to-day item such as water / electricity bills, railway tickets, milk pouches / food packing

Innovative strategies to motivate voluntary blood donations [2, 3, 4]
PAHO has adopted the slogan "Share life, give blood" “Partnership for life”, to draw attention to the roles that BTS play in encouraging people to care for one another and promote community cohesion.

Other innovative strategies to involve the community with tangible benefits towards the blood donation in the present and continues motivation for tomorrow include

- “Club 25” – to pledge 25 donations by the attainment of age of 25
- Voluntary blood donation on occasion of the “Parents Teachers meetings” in schools. The “Catch them young” campaign.
- Rural blood donation campaigns
- Tagging the concept of “Voluntary blood donation” in various extracurricular activities in colleges and universities, such as with the National Service Scheme (NSS), National Cadet Corps (NCC).
- Tagging the concept of “Voluntary blood donation” in various societal clubs like Bikers club, Walkers club, Runners Club, Sports and Gymnasium clubs among others.
- Tagging the concept of “Voluntary blood donation” in various non-governmental organizations (NGOs) such as Rotary International and Lions international among others
- Tagging the concept of “Voluntary blood donation” in various corporate social responsibility (CSR) events in banking institutions, industry and corporate houses such as pharmaceutical and others
- Month long voluntary blood donation campaigns to celebrate the World Blood Donor Day all over the World in WHO member states (14th June) and National Voluntary Blood Donation Day in India (1st October)

Innovative online strategies to motivate voluntary blood donations

The basic motivation of the potential blood donor is brought about using the time-tested strategy of information, education, communication and motivation towards blood donation and constant engagement to retain the blood donor; however, the techniques of marketing may be used to bring the change in the era of information technology. The donor should be thanked for her/his donation, greeted on special occasions such as birthday, anniversary and reminded of the next due date of donation. The various methods that could be employed may change with advent of never technology and a few available at present are exceptionally described as “15 innovative ways to recruit blood donors online” [5]

- Tele-calling
- Texting
- Email
- Press release
- Social media
- Mobile Apps
- Streaming services
- Live chat
- Video Ads
- User generated content
- Podcasts
- Blogging
- Retargeting
- Google Adwords
- Display Ads
- Ad content in mobile apps

Conclusion

In order to keep pace with the demand for blood and blood components the blood transfusion services need to innovate the strategies of reaching out to the potential blood donor base, using the modalities that is in vogue in the generation of blood donors, and taking everyone on board, all generations of blood donors, donors from all walks of life to make it all inclusive in nature as a composite step towards the motto that "safe blood should wait for the patient and not the patient for the provision of safe blood" of the Indian Society of Blood Transfusion & Immunohaematology.

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3. Voluntary Blood Donation Programme - An Operational Guideline "Safe Blood Starts With Me" DONATE BLOOD: SAVE A LIFE; 2007. National AIDS Control Organization, Ministry of Health & Family Welfare, Government of India. Available from: http://naco.gov.in/sites/default/files/29%2C%20voluntary%20blood%20donation.pdf

4. Pan American Health Organization Stories of voluntary blood donation as key role for strengthening social cohesion. Available from: https://www.paho.org/en/stories/stories-voluntary-blood-donation-key-role-strengthening-social-cohesion

5. 15 innovative ways to recruit blood donors online. Available from: https://www.inceptsaves.com/blog/2016/4/30/15-innovative-ways-to-recruit-blood-donors-online

5. CRITICAL CONTROL POINTS IN DONOR LAB

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Blood transfusion services is a vital part of Health care system, but transfusion of blood and blood components is not risk free, so should only be prescribed when it is in the patients' best interest to do so.

The process steps that have the highest potential for error and are most likely to have an impact on quality or safety if they are not controlled adequately are called "**CRITICAL CONTROL POINTS**."

i. SELECTION OF BLOOD DONORS

DONOR ASSESSMENT: Use standard recent donor questionnaire based on prevailing guidelines issued by regulatory authorities which donor are required to complete and sign.

- Predonation counselling
- Once the donor is eligible based on their health status, life style and travel histories etc, the final screening includes a haemoglobin check, weight and blood pressure using validated method with use of calibrated equipment. Equipment must be checked for performance on daily basis.
- Use controls for CuSO4 method of Hb estimation and change after every 25 samples.
- Tests used for pre-donation screening of routine blood-transmitted infections should be quality assured and checked regularly.

ii. COLLECTION OF BLOOD

- Selection of bag with proper integrity, sample pouch and anticoagulant are a must.
- Venepuncture site must be sterilized by a disinfectant, which is pre-validated for efficacy, and regular swab from applied site should be sent for culture.
- For collection, BCM should be used to ensure following:

1. Detection of continuous flow of blood
2. Proper mixing of anticoagulant with blood
3. Duration of collection (to process for blood components)
4. Collection of predefined volume of blood.

- Do not leave the donor unattended at anypoint of time, with adequately trained staff to recognise and handle any unfortunate adverse reaction as earliest as possible.

iii. HANDLING AND STORAGE OF THE DONATION

Maximum processing time from collection is 6 hours, with utmost care to be ensured, as there are high chances of infection and wastage of blood.

Ideal cool environment should be maintained essentially, depending on the blood components that are dealt with.

In outdoor setting, a mobile refrigerator is preferred for achieving above goals.

iv. TRANSPORT OF DONATION TO THE PROCESSING CENTRE

Use validated method with continuous temperature monitoring preferably with date logger or use mobile BBR.

- Development in technology, the implementation of underpinning quality system programs based on GMP has also played a key role in improving safety and quality of blood and blood components.

6. DONOR COUNSELING AND NOTIFICATION

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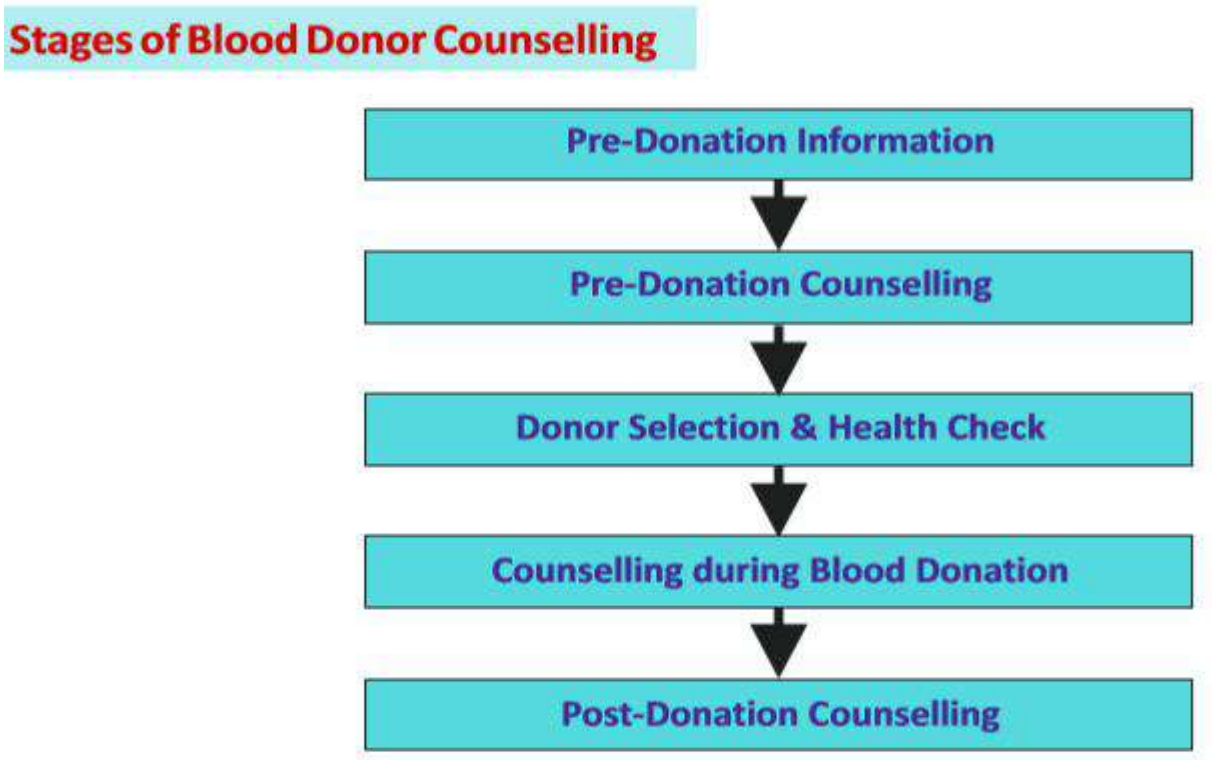
Medical College, Baroda

Definition of counseling

- "the means by which one person helps another to clarify his or her life situation and to decide further lines of action"- Philip Burnard
- "A confidential dialogue between a blood donor & a trained counselor about issues related to thedonor's health & the donation process" (WHO, 2005).

A qualified skilled counselor should use various counseling skills like positive listening, information gathering, supportive techniques during counseling.



Pre- donation Information

- To increase donor's awareness
- To increase donor's trust in blood centre
- To encourage individual to **self defer (means to make a choice not to donate blood on this particular visit)**

➢ Is general information, similar for all prospective donors
➢ Can be provided-verbally, printed, graphic, audio-visual & online materials
➢ May be provided individually/ group
➢ Should be presented in a simple & clear format

Confidential Unit Exclusion (CUE): A system which permits donors the opportunity to inform the Blood centre immediately after donation or subsequently if they consider that their blood may be unsuitable for transfusion.
This may be useful if donors have been persuaded or coerced to donate.

Objectives of pre donation counseling

- Ensure the donor understands the donor questionnaire and responds accurately to all questions.
- Ensure the donor understands that his/her blood will be tested for blood group serology and markers of TTI and the test results will be given to the donor.
- Ensure the donor is in a position to give informed consent to donate and recognizes that his/her signature affirms that responses provided to the questionnaire are accurate.
- Ensure the donor is willing to be informed of his/her test results.

Objectives of counseling during donation

To reduce anxiety, give post donation advice, secure donor's co-operation in CUE, foster donor's trust and confidence for retention

Post donation notification

A mechanism be present to notify donors of any clinically significant abnormalities detected during pre donation evaluation or during laboratory testing (AABB)

Objectives of post donation, post test counseling

To explain the test results and the need for the confirmation of the test results, to alleviate anxiety, to clarify doubts raised by the donor, to encourage donors to provide all relevant information including possible source of infection, provide information on precautions for preventing the transmission of infection to others, refer donors for further investigations, treatment and care, if necessary.

Conclusion: In spite of strict donor screening and self-exclusion option, donors conceal their high-risk behaviors and continue to donate blood. It reflects the need to implement predonation counseling to extract the history of high-risk factors from the donors. Maintenance of privacy during donor screening, predonation education and counseling and postnotification counseling of reactive donors are recommended. National guidelines for notification of reactive donors need to be formulated.

7. GOOD MANUFACTURING PRACTICES IN BLOOD COMPONENT LAB

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Ludhiana, Punjab

World Health Organisation defines Good Manufacturing Practices (GMP) as "that part of quality assurance which ensures that products are consistently produced and controlled to the quality standards appropriate to their intended use and as required by the marketing authorization. To keep it up to date with the dynamic and evolving nature of practices, GMP has grown into the Current Good Manufacturing Practices (cGMP). These terms shall be used interchangeably in the following text.

The basic tenet of cGMP is that quality is "built in" to a product, and not just tested in a finished product. This is to guarantee that not only the end product meets all the quality requirements as stipulated, but the entire manufacturing process has been standardized and repeated the same way for each and every product.

Although as mentioned in Schedule F, Part XII B, Section G: Good Manufacturing Practices (GMPs) / Standard Operating Procedures (SOPs) of The Drugs and Cosmetics Act (DCA) 1940 and Rules 1945, GMP in blood center must rely on robust standard operating procedures, GMP encompasses a comprehensive overview of the various elements of the manufacturing process. The Schedule M, Part I: GMP (Good Manufacturing Practices) and Requirements of Premises, Plant and Equipment of DCA deals exclusively with GMP of pharmaceutical industry. We have observed cases where some issues have been raised by the drug inspectors in the Blood Bank Inspections citing the Schedule M. While debateable, knowledge of such GMP shall prove beneficial eventually.

As alluded to before, GMP is an umbrella term which encompasses a wide horizon of activities, checks, process controls which ultimately help to achieve a common goal – assurance of quality of the product. Each part of the GMP shall be discussed individually keeping in mind the perspective of blood component preparation

Quality Management

The GMP is a concept that derives its roots from industry. For ensuring quality, it works on the prevention model (where manufacturing variations are avoided by rigidly controlling the manufacturing process) rather than detection model (where quality check and testing is used to discover deviations or defects). This model focuses on preventing

Standard Operating Procedures (SOP)

These are the backbone of any successful quality assurance program and vital for the Good Manufacturing Practices compliance. As mentioned before, the Drugs and cosmetics act categorically states the minimum requirement of SOPs required for the blood center. They ensure work in a standardized manner and traceability of all steps. They must describe specific tasks in a stepwise fashion, with clear mention of the person responsible for those tasks. The blood component area SOPs should be detailed so that a qualified technical person even with minimal training should be able to follow them and manufacture products to meet the stipulated quality requirement. The SOPs must be periodically reviewed and revised to reflect any change in process flow or equipment. All the older version of the SOPs must be promptly removed, and only latest, in-use sops should be available to avoid any confusion.

Personnel

This part of GMP requires the most effort to standardise. Sufficient number of qualified personnel should be available. There should be clear delineation of their duties and responsibilities. The staff should be educated in Good Manufacturing Practices by qualified trainers. They should be trained adequately regarding the tasks they are required to perform through initial and continued training. They must undergo periodic examination to assess their continued competency, with an evaluation of their work done including record keeping and their specific tasks. The blood centres where blood components are manufactured must have a dedicated Technical Supervisor and technicians fulfilling the criteria as laid down in in Schedule F, Part XII B Sub heading C. Personnel, Clause(b) & (d).

Documentation

The documentation consists of the records that are generated during the preparation of blood components. As per the drugs and cosmetics Act all blood centres are required to maintain the blood components record. The records maintained should be indelible, accurate and legible. There should be clear recording of the details of process that was followed including the temperature and speed of the centrifuge, the date and time at which the components were prepared, the signature of the person who made them. The records must be updated in a timely manner preferably on the same day of the activity so as to avoid any error. The records must be authorized by technical supervisor and the Medical Officer/ Blood Transfusion Officer and preserved for 5 years. Any change made in the records should be in such a way that original entry should also be visible, and all such changes must be authenticated with signatures of the person making them. The records are the most important line of defence in case of any medicolegal or regulatory requirement and follow the old adage, “whatever is not documented is not done.”

Premises

In addition to the existing area of blood center, the component preparation requires fifty square meters (or 538.2 square feet) of clean, airconditioned area maintaining a temperature of 20°C - 25°C. The workflow should be designed in such a way that allows the logical flow of staff, products. The surfaces should be monitored for microbial contamination and sterility of critical surfaces should be maintained. Unauthorized entry of personnel and exposure to biohazard waste or unhygienic supplies should be avoided. There must be a quarantine/untested area where the components are stored after preparation while waiting for the testing results for Transfusion Transmitted Infections and from where reactive blood products are promptly discarded. Storage areas and quality control lab must have adequate space for storing the components.

Equipment

The equipment must be appropriate design, adequate size and suitable located in the component area that facilitates its intended use and allows proper cleaning and maintenance. At the level of blood center, all equipment must have qualification namely, Installation Qualification (IQ), Operational Qualification (OQ), and Performance Qualification (PQ) specifying the critical test parameters, operating ranges, and acceptance criteria. They must be calibrated periodically as per the Schedule F, Part XII B Sub heading E. Equipment of the The Drugs and Cosmetics Act (DCA) 1940 and Rules 1945. Each equipment should have a unique Identification number or code on it. There should be clear instructions regarding the procedure to use the machine and personnel who are authorized to use it. The electricity backup for critical machines should be there to ensure smooth functioning. The refrigerated centrifuge, plasma expressor and other equipment must be thoroughly cleaned in accordance with the hospital spill management protocol after any blood spill. The equipment and the processes must be validated, meaning that there should be established documented evidence that provides a high degree of assurance that a specific process will consistently produce a product meeting its pre-determined specifications and quality attributes. There should a schedule for equipment maintenance and an alternative equipment should be available during that time to make sure that there is continuity of work.

The software and the computers must also be validated for their use and should be protected from unauthorized use and access or alteration. There should be a backup alternative available to ensure continuous operation in case of unavailability of computer data or access.

Manufacturing

The ideal good manufacturing practice for the blood component starts from the initial donor registration and donor questionnaire. For the purpose of this text, we shall limit our discussion so as to initiate it from the blood bag that has been received in the component preparation area after donation. The starting material, the blood bag must be stored or transported in specified temperature. The process must ensure that it is adequately filled with specified volume and must be accepted in the component area after meeting the set criteria. The traceability of the blood bag should be ensured, and the closed system should be maintained to ensure sterility at all times. The critical parameters of centrifugation rpm and temperature, the operator must be reflected in the documentation.

Labeling

Label is used to identify the product and also inform the user regarding the content of the container. In Blood center the label contains all the important information regarding the type of product, blood group, TTI status, date of collection and Expiry date. It serves as a final check regarding the suitability of the blood product for use. The labels should be colour coded as per the Drugs and Cosmetics Act

Complaints And Recalls

There should be a system and process that handles the complaints regarding quality defect in the blood component. As per the hospital's protocol it may warrant a recall. These complaints could be limited to the quality of product, any adverse event associated with the product or even in response to information about the testing status of the donor. There should be a prompt decision to recall any other associated product or even initiate a look back for other components that might have been prepared earlier. All investigations, review must be completed in a time bound manner while making sure that the other product separation is not affected.

The importance of Good Manufacturing Practices in blood component preparation cannot be over emphasized. It not only guarantees a high quality that is built in the product but also improves the standard of patient care to whom this product is transfused.

For Further Reading

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2. WHO guidelines on good manufacturing practices for blood establishments. WHO Technical Report Series, No. 961, 2011
3. The Drugs and Cosmetics Act (DCA) 1940 and Rules 1945.
4. NABH Standards for Blood Banks/ Blood Centres and Transfusion Services, 3rd Edition
5. GSR 166(E), Ministry of Health and Family Welfare (Department of Health and Family Welfare), 11th March, 2020

8. HOW TO MANAGE PLATELET REFRACTORINESS?

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INTRODUCTION:

Platelet refractoriness can represent a significant clinical condition that complicates the platelet transfusion support in such patients. It remains a challenge associated with an increased bleeding risk, longer hospital stays and increased morbidity and mortality. Platelet refractoriness is simply defined as less than expected post transfusion platelet count increment and is due to the shortened survival of the transfused platelets in the recipient's circulation. It is also defined as a lack of adequate response in post-transfusion platelet increments after two or more consecutive platelet transfusions of an adequate dose of allogeneic platelets [1].

Platelets are a crucial component for maintaining vascular integrity. Thrombocytopenia (low circulating platelets) can lead to bleeding symptoms like bruising, petechia, nose bleed, bleeding gums, intracranial hemorrhage and death. Maximum platelet life span of 10.5 days and a fixed requirement for 7.1 platelets per microliter of blood per day, or about 18% of the normal rate of platelet turnover is required to maintain vascular integrity [2]. Hence, larger proportion of the platelet pool is required to support vascular integrity for thrombocytopenic patients. Many patients have an adequate platelet count increment after platelet transfusions but unsatisfactory post-transfusion platelet increment can be observed in about 30% of refractory patients [3-5]. This inadequate response to platelet transfusion leads to an increased risk of morbidity and mortality, as well as increased hospital stays.

ETIOLOGY:

The causes of platelet refractoriness are often multifactorial and can be grouped into non-immune and immune causes [6]

I **Non-immune causes:** Approximately two-thirds of refractory episodes are due to non-immune causes which includes:

A. Clinical Conditions:
1. Sepsis: Association of sepsis with thrombocytopenia is well known.
2. Fever: In hematological malignancy cases, the triad of fever, infections and medications is the most common cause of refractoriness
3. Disseminated Intravascular coagulation (DIC): Consumptive coagulopathy activates and immobilizes platelets leading to poor CCIs following platelet transfusion
4. Bleeding: Persistent external or internal bleeding after platelet transfusions can be considered as a potential indicator of platelet refractoriness
5. Splenomegaly
6. Hematopoietic stem cell transplantation (HSCT), graft-versus-host disease (GVHD) and venoocclusive disease (VOD):
7. Drugs: Thrombocytopenia caused by drugs is relatively common, with many drugs implicated in this process

B. Platelet characteristics like platelet dose, platelet age, leucocyte reduction, ABO incompatibility

II. **Immune causes**: 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.

DIAGNOSTIC APPROACH:

1. Measuring response to platelet transfusion by calculating CCI. Platelet refractoriness due to immune cause is defined as a CCI less than 7500/microL for at least two sequential platelet transfusions [6].
2. Determining the cause of refractoriness i.e., immune or non-immune cause of platelet refractoriness and treat the underlying condition accordingly.
3. Panel reactive antibody (PRA): It determines percentage of HLA antigens recipient antibodies are directed against. PRA of greater than 20% - 30% suggests probable HLA alloimmunization [6].
4. Platelet antibody screening assay: Antibody screen to HLA Class I and platelet specific antibodies can be detected by Solid Phase Red cell adherence assay (SPRCA) and Enzyme Linked Immunosorbent Assay (ELISA), Platelet Immunofluorescence Test (PIFT), Flow Cytometry etc.
5. Platelet crossmatch: Donor platelets with recipient serum/plasma can be tested by SPRCA, ELISA and Flow cytometry crossmatch. Incompatible crossmatch indicates presence of antibodies and hence platelet refractoriness.

MANAGEMENT OF THE ALLOIMMUNIZED PATIENT:

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.
Furthermore, given the transient nature of antibody production, patients diagnosed with refractoriness need to be regularly reassessed (approximately monthly) for the presence/specificity of antibodies.

Platelet selection: Once antibodies to HLA or human platelet antigen (HPA) are identified, compatible platelet products need to be made available.

ABO matched platelets: The initial approach of managing platelet refractory patients should be to select ABO identical/ ABO compatible fresher platelet units [7].

HLA-matched platelets: The traditional management of patients with HLA antibodies is to provide platelets from donors HLA-matched for the HLA-A and HLA-B loci. HLA-matched donors can be found either among family members or via a registry of HLA typed unrelated individuals if available.
CREG matched platelets: Selection of platelet donors with antigens in the same "cross-reactive groups" (CREGs) as the patient's antigens, has been

demonstrated to be nearly as successful in supporting alloimmune platelet refractoriness as HLA-matched transfusions.

Crossmatch-compatible platelets: Another possible approach is to identify aphaeresis platelet units compatible by crossmatching with the patient's plasma. The solid phase red cell adherence test (SPRCA) is the most widely used method for platelet cross-matching [50]. Compared with HLA matching strategies, crossmatching can be both more convenient and economical. Crossmatching allows for a quick and effective selection of units from the available inventory and can be performed in a few hours as opposed to the days it may take to perform patient testing, and to identify, recruit, collect, and test an appropriate HLA-matched donor. It is also of benefit to patients with uncommon HLA types where it would be very difficult to find an HLA-matched donor. Additionally, it avoids exclusion of HLA mismatched but otherwise compatible donors thereby increasing the number of potentially compatible units.

Epitope matched platelets:

Alternative computerized matching techniques are now emerging; example, the HLA Matchmaker is a software algorithm that predicts HLA compatibility including acceptable mismatched options. Eplets are considered as essential components of HLA epitopes recognized by antibodies. Therefore, the eplet version of HLA Matchmaker represents a more complete collection of HLA epitopes and provides an elaborate assessment of HLA compatibility. HLA epitope matching approach in immune refractory patients can have impressive 1 hour CCI results [8].

Other treatment aspects in platelet refractoriness include: Immunosuppression, rituximab, IVIG, plasma exchange, antifibrinolytic agents, recombinant factor VIIa etc.

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9.MANAGING SHORTAGE OF PLATELETS

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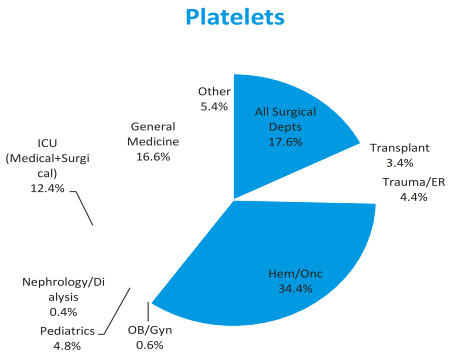
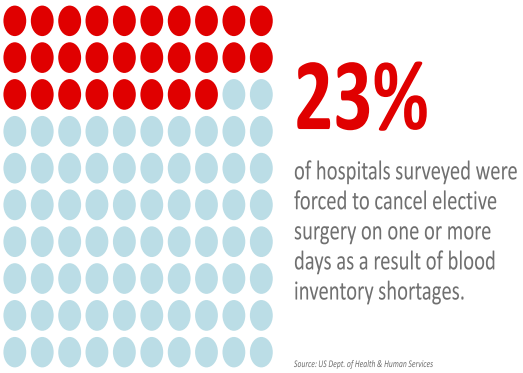
Platelet transfusions are required for treatment of patients with blood disorders as well as a variety of other clinical treatments Platelets (PLTs) have a short life span ; although various methods to increase PLT shelf life in vitro have been investigated, the shelf life of PLTs remains at 5 days. This leads to a supply-demand mismatch, as it takes 1.5–2.0 days to complete the actual blood screening test after a blood donation. This has led to increased efforts by clinicians to retain more PLTs for transfusions, leading to increased PLT discard rates. Maintaining adequate PLT supply to meet demands is hindered by the short shelf life of PLTs. Additionally, PLT discard rate needs to be reduced to prevent resource waste and patient endangerment owing to PLT deficiency.





Numerous efforts—"up-to-order" rule, automatic dashboard, cooperation with blood supplier, etc.—have been made to reduce PLT discard rates by as much as 1–5%. however, PLT expiration continues to be an important cause of PLT discard.

Determining the ordering quantities at the hospital involves managing a trade-off between wastage and shortage costs over time. The shelf-life of units is fixed but there is uncertainty in the initial age, or equivalently the remaining shelf-life of the delivered units. Demand is satisfied according to the Oldest-Unit, First-Out (OUFO) allocation (issuing) policy, i.e., using the oldest units available.

Why is inventory management important

Good inventory management is vital for health providers holding blood and blood products to ensure appropriate utilisation of a precious resource. Not holding enough inventory can potentially put patients at risk or disrupt routine services.

By managing inventory efficiently, health providers will be aware of their usage patterns and can order blood and blood products accordingly.

Monitoring inventory patterns

Managing blood and blood product inventory is made up of two key factors:

1. Product Availability: Planning of inventory levels held, timing of deliveries and order volume; and
2. Product Integrity: Physical and process control of product in your facility, to ensure efficient and effective handling to maintain availability and minimise wastage.

Set appropriate Inventory level are based on

- daily usage rates
- supply patterns
- discards as a percentage of issues (dapi)

Common issues that create challenges for shortage:

- Seasonal shortages due to holidays and school schedules
- Acute spot shortages due to severe weather
- Product related shortages
- Hardware, consumable, or testing recalls (e.g., filters, bags, etc.)

Extreme Blood Product Shortages

- Unprecedented challenges: (Covid 19 like situation, Dengue epidemic)
- Long-duration product shortages caused by COVID-19 lockdowns
- Platelet shortage due to administrative implementation
- Unpredictable transfusion volumes (disaster)
- Cancelation of donation drives : Major blood supply is collected at high schools and universities, corporates
- Product availability disruptions due to issues in blood bank

Strategies:

- Flexible as possible regarding eligibility of to accept donor
- Anticipate blood products in advance of event: Dengue
- Active multi-source supply

Measures implemented to increase the voluntary plateletpheresis donors database

- Appeal to the voluntary blood donor organizers (VBDOs) and confidence-building measures
- Organization of platelet awareness drives
- Demonstration of the plateletpheresis and conversion of the whole blood donors to plateletpheresis donor
- Motivating the patient's attendants for plateletpheresis
- Steps to increase donor safety and confidence-building measures for the donors
- Implementation of a modified donor health questionnaire
- Education for Blood centre staff members
- Advice and instructions for the VBDOs and individual SDAP donors

Logistical measure

- Apheresis Kit and related disposables inventory management
- Troubleshooting and technical support for the apheresis equipment
- SDAP inventory management
- Preparedness plan for epidemics

Conclusion:

Policies should be in place to which can reduce the number if platelet units outdating while also reducing the number of units ordered. Measures to be implemented for sharing of inventory with surrounding hospitals in case of need.

10. CALIBRATION REPORT – HOW TO INTERPRET?

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Calibration of all equipments is mandatory requirement in blood centre as per statutory requirements as well as from accreditation purpose.

Various agencies have defined calibration, but in simple terms “Calibration is accepted as a performance comparison against a standard of known accuracy”.

Calibration in blood centres are considered as casual requirement only and the only important thing considered by blood centres is, date of calibration and due date of calibration. So most of blood centres give order for calibration to agency, get calibration certificates, note due date of calibration and file it.

Interpretation of calibration certificate is very important to ensure proper working of equipment. It becomes more important when matter comes to critical equipments like blood storage cabinets where slight malfunction of equipment may result in disaster.

Purchase order of calibration is very important to get proper calibration and its certificate. Purchase order should contain all terms and conditions for calibration and certificate.

Content of Calibration report – Following things are generally contained in calibration certificate issued by accredited, reputed calibration laboratory -

1. Name and other details of calibration agency – to contact in case of any discrepancy as well as to trace in case of need.
2. Title of document –whether it is calibration certificate or something else. This is to avoid unnecessary discussion with auditors
3. Accreditation symbol – like NABL
4. Unique identification number of calibration report
5. Page number on each page of calibration report including total number of pages
6. Customer (Blood centre) information like name, address, contact details etc.

7. Details of equipment under calibration –
   a. Name of equipment
   b. Identification details of equipment like make, model, serial number, identification number etc.
   c. Range of equipment
   d. Working range of equipment
   e. Resolution of equipment
   f. Validity of calibration of standard used
   g. Date and due date of calibration
8. Details of calibration standard(s) used –
   h. Name of standard used
   i. Identification details of standard like make, model, serial number, identification number etc.
   j. Range of standard
   k. Resolution of standard
   l. Validity of calibration of standard used
9. Calibration conditions – environmental conditions especially if it affects calibration
10. Measurement result of calibration –
    a. Measurement value of equipment under calibration
    b. Measurement value of standard
    c. Error observed during calibration
    d. Correction needed
    e. Uncertainty of Measurement
    f. Time of starting calibration and end of calibration (sometimes auditors ask)
11. Traceability – A calibration report should always present evidence of measurement traceability to international system of units (SI units).
12. Specifications given by customer like parameters to be calibrated, point of calibration, Acceptable Error/Tolerance, frequency of calibration etc. These may be mentioned in purchase order.
13. Calibration done by
14. Notes by calibration agency

Review of calibration certificate?

Following points (not limited to) should at least be reviewed by competent person just after getting calibration certificate. This is to ensure proper functioning of equipment. Appropriate actions should be taken in timely manner -

1. **Accreditation of calibration agency –** Most of the calibration agencies in India gets NABL accreditation. Calibration report should have symbol of NABL accreditation. Many times, calibration agency doesn't have NABL for some parameters. To avoid this condition, calibration agency should provide Scope of NABL accreditation, that ensures inclusion of all parameters of calibration in scope of NABL accreditation.
2. Inclusion of complete information as mentioned above
3. Resolution/Accuracy and range of standard should be more than equipment calibrated. Means if the resolution of blood bank refrigerator is 1^0C, resolution of standard should be less than 1^0C (may be 0.5^0C or 0.1^0C)

4. See date and due date of calibration of Standard used. Standard should have valid calibration on day of calibration of blood centre equipment
5. Certificate should have all Parameters to be calibrated. Parameters to be calibrated should be mentioned in purchase order. Following are the examples of parameters to be calibrated for few equipments –
   a. Refrigerated centrifuge – Speed, Temperature and Time
   b. Autoclave – Pressure, Temperature and Time (if timer is inbuilt)
   c. Laminar Air Flow – Dust particle count, air velocity, filter integrity
   d. Bench top centrifuge – speed and time
   e. Blood collection monitor – Weight/Volume and Time
   f. Blood bank Refrigerator – Temperature, mapping of temperature in all shelves to ensure uniformity of temperature, continuous temperature recorder.
6. **Working range of equipment –** Equipment can be calibrated at different points by calibration agency but always ensure calibration in working range at least. For example, BBR should be calibrated between 2-6^{0}C, that is the working range of BBR. Same way whatever speeds, temperature and time we use in different programs of refrigerated centrifuge, we should calibrate refrigerated centrifuge in this working range of minimum and maximum value of each parameter.
7. **Points at which equipment should be calibrated –**
   a. Always refer manufacturer instructions for points to be calibrated. For example, manufacturer of many micropipette companies mention volume at which calibration should be done. If manufacturer has not given point of calibration, blood centre/calibration agency may decide their own calibration points.
   b. Purchase order should mention points on which calibration should be done by calibration agency.
   c. These points can be decided on working range of each parameter of that equipment. Many times, we see calibration of BCM at 100 Gram/ml but we don't calibrate at 350-450 gram/ml.
8. **Measurement readings –** This is most important point to be seen while reviewing calibration report. Following are the example of mistakes –
   a. Deep Freezer measurement readings given are 0, -20, -40, -60, -80 (all in degree Celsius). When we see temperature recording chart, there is no recording of these temperature. It means, reports are falsely produced.
   b. Refrigerated centrifuge calibrated at 10000 and 15000 RPM. We have to ensure whether such a high speed is attainable in blood bank refrigerated centrifuge?
9. **Acceptable error/Tolerance –** Basic aim of calibration is to find error in measurement by equipment and correction of this error if needed. If needed means, if the error is minor and acceptable, there is no need of correction and if the error is exceeding acceptable limit, equipment should be managed to correct that error. This correction can be done either by calibration agency or by company engineer of that equipment.
   Most of the times, neither blood centre nor calibration agency defines acceptable tolerance, means how much error is allowed. Without acceptable error/tolerance, blood centre cannot take decision to make correction of error. For example, during calibration of BBR, if the error found is 1^{0}C and Uncertainty of Measurement is 0.5^{0}C, it means that if BBR is showing 2^{0}C, the actual temperature of BBR may be 0.5^{0}C. So it is always advisable to define acceptable error to make corrections when the error exceeds acceptable limit

10. **Uncertainty of Measurement –** It is very important parameter that tells about possibility of error with standard due to various factors.
11. **Traceability of calibration certificate –** Unbroken chain of calibration up to national/international standards is must as per regulatory standards. It means that we should have calibration reports of standard used at least up to the national standards.
12. **Inhouse Calibration –** If blood centre staff is doing calibration, they should have proper training/experience/competence and standard operating procedure for calibration.
13. **References –**
    a. ISO/IEC 17025 standards for details of calibration
    b. BIPM for international measurement systems

11. INTERNAL AUDIT- STEP BY STEP GUIDE

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Audit is defined as system of investigation, evaluation & measurement and means of continuous assessment & improvement. Audit is carried out based on set guidelines and predescribed method, consists of determining the difference between the directions given and what has actually been done.

Importance of Audit

1. Audit is a management tool for monitoring quality assurance system.
2. Systematic, independent & documented examination to determine whether activities comply with planned and agreed Quality standards.
3. Quality improvement (in health care) is a process to improve patient care services for better clinical outcome.
4. Audits are valuable with the intent to review thoroughly all the crucial systems within the centre.

Clinical Audit

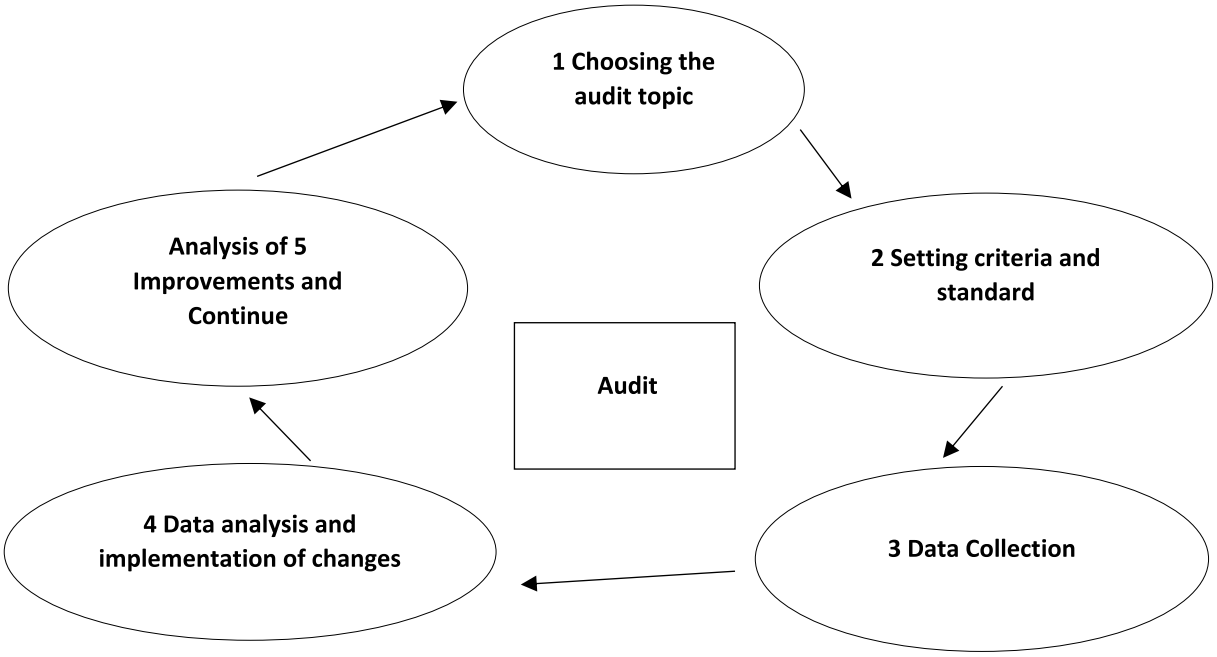
The clinical audit consist of measuring a clinical outcome or a process, against well-defined standards set on the principles of evidence based medicine in order to identify the changes needed to improve the quality of care.

Audit in Blood Centre is carried out

1. For surveillance and monitoring the quality of blood centre services
2. Regular audit needs to be initiated and the results needs to be discussed among the managements, colleagues, and staffs
3. Provide a good opportunity for finding strategies in improving services with appropriate and safe use of blood.

AIM

To highlight the discrepancies between actual practice and standard in order to identify the changes needed to improve the quality of care.



STEPS

1. Planning, execution, review with outliers
2. Analyze deficiencies (scope of improvement)
3. Corrective and preventive action(KAPA) including training
4. Implement actions
5. Again review (at said interval)

The audit should not be confused with data collection activities (i.e. benchmarking) or clinical research. It compares the current practice against well-defined and established standards. The final aim is always improving the care provided to the patient.

Audit in Transfusion Medicine

1. Directs the transfusion services from vein to vein.
2. Co-operating strategy required with treating clinicians to provide quality services for patients.
3. With specialized procedures practiced: PBSC, Exchange, ABO incompatible transplants, role of transfusion medicine practitioner is crucial.

Audit in Transfusion Medicine

1. Occur both in the blood centre itself and on the hospital wards and OT.
2. Help to focus novel initiatives to reduce wasteful practice.
3. Under HTC to regularly monitor the cross-match : transfusion (C:T) ratio.
4. Every hospital/blood transfusion center is expected to develop a system of audit that is appropriate to its needs in addition to audit by statutory bodies

Types of Audit

1. **Internal audit (first party)**
   - By staff from same organization
2. **External audit (third party)**
   - Audit by regulatory/ statutory body
   - Voluntary AUDIT by organizations : NABH, aaBB, ISO
   - Audit by specialized agencies mainly in corporate sectors

Key elements of audit programme

1. Written audit protocol
2. Audit plan : for next time, auditor, auditee
3. Audit process : preparation, performance
4. Audit report
5. Scheduled follow up of audit

Audit Standards

1. Audits are performed against standards
2. The standards have to be relevant for the organisation and the part of the organisation being audited
3. Appropriate BTS standards may include
   - FDA guidelines
   - DGHS guidelines
   - Quality standards such as ISO, NABH, AABB
   - State / Centre guidelines

Audit Preparation

1. Obtain background information to review
2. Fix date and time
3. Prepare a checklist
4. Set an agenda
5. Team efforts, if necessary
6. Opening / Closing meeting

Types of Audit

1. **Vertical Audit:**
   - Follow the flow of work, trace a blood unit from donation to issue
2. **Horizontal Audit:**
   - Review management system
   - Review QA system: SOPs , Records
   - Review Quality control system:
     - QC results, Equipment maintenance and calibration records (Documents, procedures, equipment)

Audit Do's and Don'ts

DO's

1. Make sure that the purpose of the audit is clear
2. Be open and polite
3. Be constructive
4. Thank the staff

DON'Ts

1. Make unnecessary criticism
2. Antagonise staff
3. Make inappropriate comments
4. Use personal beliefs instead of the agreed standards

Concluding An Audit with the auditee to

1. Thank the manager and staff
2. Reinforce the value of audits and the aim of audit
3. Review findings
4. Agree findings
5. Agree action
6. Agree timeframe for action
7. Agree re-audit date to check actions
8. Guide to close findings (if any)

Reporting

1. Document the audit findings
2. Audit report should include:
3. Findings : Objective, measured agreed standards
4. Summary : of quality status, highlight positive and negative findings
5. Recommendations for corrective action
6. Time frame : for corrective action and follow up
7. Should be shared with the auditee

Follow up

1. Monitor the corrective action that have been planned and the agreed time frame
2. When the corrective actions have been completed, the audit is complete (All non-conformances closed)
3. Re-visit the areas

Audit Benefits – Outcomes

1. Continuous quality improvement
2. Staff motivation
3. More efficient organization operations
4. Better services to patient

Summary

1. Audits are essential to maintain and improve quality.
2. Audits must be performed and received as positive events.
3. They should be viewed as 'improvement opportunities'.
4. Appropriate and relevant standards must be used.
5. All staff should become involved and be able to contribute to the audit and its outcome.

12. ERRORS IN BLOOD BANK - HOW TO MANAGE?

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Comprehensive management of errors, including near miss errors, can generate data on the functioning of transfusion services, which is a precondition for implementation of efficient corrective and preventive actions that will ensure further improvement of the quality and safety of transfusion services. Although no catastrophic outcome occurs, such incidences demonstrate an inefficient blood supply chain. Near miss event reporting can prevent potential transfusion associated mortality and morbidity caused by simple human ignorance.

A good error reporting not only helps in accurate collection and analysis of data but also makes recommendations that improve transfusion safety. Various major Clerical errors like wrong name & ID on blood requisition, sample vials wrong, on compatibility report and label, Wrong entry on issue register, wrong blood in tube (WBIT), failure to perform & interpret correct cross matching, Incorrect component issue. Minor clerical errors include sample vials with name or ID only samples without date, ineligible/overwritten labels. Non barcoded labels, sample and requisition mismatch, incomplete requisition, errors in component ordering failure to order special components. Technical errors like failure to perform reverse grouping, failure to perform cell washing, failure to use fresh reagent red cells, misinterpretation of result.

Various measures like automation, barcoding, computerisation and use of software, continuous education, RFID use, regular trainings of staff must be included in Blood Transfusion Services.

13. THALASSEMIA PREVENTION PROGRAM – BLOOD BANK PERSPECTIVE

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INTRODUCTION: The thalassemia syndromes are a heterogeneous group of inherited anemias characterized by defects in the synthesis of one or more of the globin chain subunits of the hemoglobin (Hb) tetramer. **Clinical manifestations** are diverse, ranging from asymptomatic hypochromia and microcytosis to profound anemia, which can be fatal in utero or in early childhood if untreated.

- **BURDEN OF THALASSEMIA:**
- **INDIA:** The average prevalence of B thalassemia carriers is 3-4% which translates to 35 to 45 million carriers in our multi-ethnic and culturally and linguistically diverse population of 1.21 billion people. Several ethnic groups have a much higher prevalence (4-17%).

(Reference :-(1) Madan N, Sharma S, Sood SK, Colah R, Bhatia HM. Frequency of b thalassemia trait and other hemoglobinopathies in northern and western India. Indian J Hum Genet 2010;16:16 e25. (2) Colah RB, Gorakshakar AC. Thal Reports. Control of thalassemia in India, 4; 2014. p. 1955.)

- **GUJARAT:** Prevalence of Thalassemia trait average to 1.76% in tribal districts and 2.18% in non-tribal districts of Gujarat.

(Reference: National Journal of Community Medicine Vol 3 Issue 1 Jan-March 2012)

Need for comprehensive programme for prevention and control of Thalassemia:
(Reference: Prevention and Control of Hemoglobinopathies in India, National Health Mission, Ministry of Health & Family Welfare, Govt. of India, 2016)

It is estimated that around 10,000-15,000 babies with thalassemia major are born every year.
Most of the thalassemia major children resort to palliative treatment by blood transfusions which is eventually compromised by the concomitant problem of iron overload, alloimmunization and blood borne infections.
The only cure available for these children with thalassemia major is bone marrow transplantation (BMT) more appropriately called hematopoietic stem cell transplant (HSCT).
However, this can help only a few patients because of cost, paucity of BMT centers, or non-availability of a suitable HLA matched donor.
Therefore, the mainstay of treatment is a regimen of regular blood transfusions followed by adequately monitored iron chelation therapy to remove the excessive iron overload- as a consequence of the multiple blood transfusions.
Thus, it is a transfusion dependent disorder and places a great burden on healthcare services.
In India, the cost of transfusing and chelating a 30 kg body weight child for one year was estimated at Rs. 200,000 for one year in 2008.
With an estimated birth of 10,000 children with Thalassemia Major every year, and survival for 50 years, the cost of managing 500,000 children (10,000 x 50) works out to Rs.10000 crores, and Rs.100 crores even if only 1% were to survive to 50 years of age.

Apt way to address this problem is to have a comprehensive Thalassemia prevention and control programme with its components consisting of public awareness and education, carrier screening and counselling, information in prenatal diagnosis and preimplantation diagnosis.

Screening for carriers of Beta-Thalassemia Trait (BTT)

Ideal is to screen every individual for BTT, but cost of screening is the prohibitive to this approach.
Target group screening by CBC (MCV<80 fl & MCH<27 pg), NESTROFT (First line test) followed by High Performance Liquid Chromatography (second line tests) in adolescence, premarital couple, pre conceptional and antenatal mothers and cascade screening in near relatives of Thalassemia major children.
Blood centers should also be instrumental in creating liaison between probable carriers, Obstetricians & Gynecologists, Geneticists & Molecular Pathologists for supervision of sample collection, transportation & report dispatch with counselling.

Quality Assurance and Quality control for the first line screening tests is must to ensure to reliable results as the success of the prevention & control programme depends on first line screening tests. Internal Quality control & Participation in External Quality Assurance Scheme/proficiency testing is must for blood centers undertaking the Thalassemia Prevention Programme.

Blood centers are better placed to manage such programs because they have experience in counselling through their blood donation counselling programs, contacts with other Non-Government Organizations and can reach periphery of society, availability of expertise as most blood centers are now headed by Transfusion Medicine Specialist.

CONCLUSION:

Hemoglobinopathies are one of the major public health problems in India. To achieve success in their prevention and control, an on-going holistic approach is required. It is feasible to establish centers for awareness, screening and counselling in blood centers. Blood centers should establish linkage with higher centers for prenatal genetic testing and help in timely detection and thus prevention of birth of Thalassemia major babies. It is expected that with optimal collaboration and support from community, effective prevention and control of thalassemia can be achieved. This will level to a healthier new generation which enjoys a batter overall quality of life.

14. HEPATITIS CONTROL PROGRAM

Dr. Rajesh Gopal
APD, GSACS

Screening for HBsAg and Anti HCV should be offered to all who are perceived to be at risk using serum/ plasma/whole blood specimen. Hepatitis B & C are asymptomatic viral infections which can lead to cirrhosis and hepatocellular carcinoma. All positive specimens have to be confirmed by molecular testing (viral load) for further management. Hepatitis B is usually asymptomatic and can progress to complications like cirrhosis and hepatocellular carcinoma (HCC). The disease is manageable with lifelong treatment and preventable with vaccination. Hepatitis C is usually asymptomatic and can progress to complications like cirrhosis and hepatocellular carcinoma (HCC). The disease is curable with early diagnosis and treatment.

Transmission of Hepatitis B & Hepatitis C

- Hepatitis B is transmitted through blood and body fluids, while hepatitis C is usually only transmitted through blood.
- Using contaminated needles
- Accidental needle stick

- tattoos and body piercing
- sexual contact
- Mother-to-baby during child birth

Chances of Hepatitis B & C through Blood Transfusion is around 99.9 (i.e. about 100%). So it is mandatory to test every unit of donated blood for Hepatitis B & C.

National Viral Hepatitis Control Programme (NVHCP)

The National Viral Hepatitis Control Programme has been launched by Ministry of Health and Family Welfare, Government of India on the occasion of the World Hepatitis Day, 28th July 2018. It is an integrated initiative for the prevention and control of viral hepatitis in India to achieve Sustainable Development Goal (SDG) 3.3 which aims to ending viral hepatitis by 2030.

This is a comprehensive plan covering the entire gamut from Hepatitis A, B, C, D & E, and the whole range from **prevention, detection and treatment** to mapping treatment outcomes. Operational Guidelines for National Viral Hepatitis Control Program, National Laboratory Guidelines for Viral Hepatitis Testing and National Guidelines for Diagnosis and Management of Viral Hepatitis were also released.

Aim

- ❖ Eliminate Hepatitis C by 2030
- ❖ Achieve significant reduction in the infected population, morbidity and mortality associated with Hepatitis B and C viz.
- ❖ Reduce the risk, morbidity and mortality due to Hepatitis A and E

Key Objectives

- ❖ Strengthen the existing infrastructure facilities
  - ➢ Build capacities of existing human resource
  - ➢ Raise additional human resources, only where required
- ❖ Develop linkages with the existing Programmes.
  - ➢ Medical Education, Medical Services, Immunisation, Maternal Health, IDSP, NACP, **Blood Bank** and Dialysis Centres.
- ❖ Monitoring of Programme through MIS Portal

15. THE NITTY GRITTY OF NEONATAL TRANSFUSIONS

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1. Introduction

As the fetus matures to the neonate, to the infant and the child there are many rapid physiologic changes. Hematological values, blood volume and hemodynamic and metabolic responses to blood loss are highly varied and different from those in adults. Pediatric transfusions can be considered as neonatal transfusion practices (birth to 4 months of age) and those in older infants (>4 months) and children depending on their development.

2. Neonatal red cell transfusions

Neonatal transfusions are required primarily as small volume (top-up transfusions) or large volume (exchange transfusions). Generally red cell transfusions are given to neonates to maintain the level of hemoglobin/hematocrit believed to be most desirable for each clinical condition. Top-up transfusions are required in the following situations:

- Transfusion in preterm neonates due to anemia of prematurity.
- Hypovolemia
- Septic shock
- Iatrogenic blood loss

Large volume transfusions are required in the following situations.

- Exchange transfusion for hyperbilirubinemia
- Extracorporeal membrane oxygenation
- Cardiac bypass operations

Traditionally neonatologists insist on fresh RBCs (less than 5-7 days old) due to the concerns (such as increased extracellular potassium, decreased pH, and decrease in RBC 2,3-DPG) of stored RBCs but recent studies have shown that transfusion of fresher units does not provide additional benefit.

Exchange transfusion for HDFN

The rationale for exchange transfusion is that it removes antibody coated fetal red cells and the plasma containing maternal antibody. It removes unconjugated

bilirubin and improves neonatal hematocrit. The selection of blood should be such that it is compatible with the maternal serum. Since neonates do not synthesize IgM or IgG antibodies (antibodies are present maternal in origin). Hence neonates sample must be obtained for forward grouping and direct antiglobulin test. For similar reasons maternal sample is essential for mother's grouping and cross-matching donor cells with maternal serum.

3. Transfusion Threshold

Transfusion threshold is a very debatable topics in recent past. There have been many RCTs during last decades like Iowa trial, PINT trial, TOP trial and ETTNO trial. All these trial have shown that restrictive strategies for transfusion in neonates is more safe and does not pose any additional risks to the recipients. Even long term neurological evaluation have shown that it is safe to use lesser thresholds for transfusion neonates.

4. Age of units and use of additive solutions

Many RCTs have shown that there is no additional advantage of using fresher units (RBCs) for transfusion in neonates. Fresher units may be preferred in specific conditions like exchange transfusions or top up transfusion in preterm neonates. Even use of additive solutions in not contraindicated in neonatal age groups of patients. It is recommended that additive solution suspended RBCs should not be used for massive transfusion in neonates.

5. Transfusion practices in older infants and children

Indications for transfusion are similar to those of adults, but the following factors have to be taken into account: the age-appropriate hematocrit/hemoglobin levels and ability to tolerate degree of anaemia or blood loss.

a. Transfusion support for children with thalassemia major

The management of thalassemia major is based on regular blood transfusions and effective iron chelation therapy. The aims of transfusion therapy are two folds:

(1) to correct the anemia and,
(2) to maintain a circulating level of hemoglobin sufficient to suppress endogenous erythropoiesis.

The usual transfusion policy is to perform ABO and Rh(D) typing of donors and patients and subsequent compatibility testing. However, there are many minor but clinically significant blood groups where alloimmunization may occur in these multi-transfused patients. Once the alloantibodies develop, finding compatible units may become difficult. In thalassemic requiring regular transfusions, the following transfusion policies recommended are:

(i) Detailed antigen typing of the patient before starting transfusion, the patient should be typed for common antigens of the Rh, Kell, Kidd and Duffy systems.

(ii) Better match than usual crossmatch: In addition to ABO and Rh(D) compatibility, blood matched for other antigens of the Rh and Kell system should be preferred. Antigens of the Rh and Kell system are strong immunogens and may act as co-inducers to otherwise antigenic stimuli of minor blood group antigens.

(iii) Antibody screening in the patient prior to each transfusion.

(iv) Screening of patients for transfusion transmitted infections markers. HBsAg, anti HIV I & II and anti HCV.

(v) Transfusion products: Patients with thalassemia suffer from chronic anemia and hence require many packed red blood cells transfusions. The usual dose in a moderate transfusion regime is 10-15 ml packed RBCs per kg body weight. The packed cells are usually transfused ever a period of 3 to 4 hours.

6. Modified Packed RBCs:

a. Leukoreduced

The two most frequent reactions observed in multi-transfused patients and attributed to contaminating leucocytes are febrile non-hemolytic transfusion reaction (FNHTRs) and alloimmunization. Both reactions can be prevented by leukoreduction at the time of component preparation. The risk of alloimmunization can be reduced by a three log leukoreduction using leukofilters preferably at pre-storage stage.

b. Washed Packed RBCs:

Presence of plasma proteins in the residual plasma of PRBCs can give rise to allergic reactions especially in patients with IgA deficiency. Red cells suspended in additive, solutions or washed with normal saline are transfused. Hence transfusion centers need to be equipped with sterile connecting devices and biological safety cabinets.

7. Platelet and plasma transfusions

The indications for platelet transfusion therapy are same as in adults, except those thresholds for both prophylactic and therapeutic platelet transfusions are higher in neonates and also depend on the cardiopulmonary status of the newborn.

16. INHIBITOR WORK UP IN HEMOPHILIA

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Hemophilia is an X-linked congenital bleeding disorder caused by a deficiency of coagulation factor VIII (FVIII) in hemophilia A (HA) or factor IX (FIX) in hemophilia B (HB). The deficiency is the result of mutations of the respective clotting factor genes. Hemophilia has an estimated frequency of approximately 1 in 10,000 births. The estimated incidence of HA is 1 in every 5000–7000 live male births.[1] HA is more common than HB, representing 80%–85% of the total hemophilia population. Hemophilia generally affects males on the maternal side. However, both F8 and F9 genes are prone to new mutations, and as many as 1/3 of all cases are the result of spontaneous mutation where there is no prior family history. Accurate diagnosis of hemophilia by factor assay to demonstrate deficiency of FVIII or FIX is essential for appropriate management. Hemophilia should be suspected in patients presenting with a history of easy bruising in early childhood, “spontaneous” bleeding (bleeding for no apparent/known reason), particularly into the joints, muscles, and soft tissues, excessive bleeding following trauma or surgery. The classification of hemophilia was first described in 1958 by Biggs and Macfarlane on the basis of the relation between bleeding and residual FVIII/FIX activity, which in 2001 was accepted by the Scientific and Standardization Committee of the International Society on Thrombosis and Hemostasis and is still valid today. Patients are categorized as having severe (FVIII:C/FIX:C <1 IU/mL), moderate (FVIII: C/FIX: C 1–5 IU/mL), and mild hemophilia (FVIII: C/FIX: C >5 IU/mL).

The clinical phenotype of hemophilia is primarily dependent on the severity of deficiency. Approximately 60% are affected by the severe form, defined as factor levels of <1%. Another 15% are affected by the moderate form (factor levels of 1%–5%), and the remaining 25% are affected by the mild form (factor levels of 6%–30%). Currently, the mainstay of treatment is the replacement of FVIII with the use of either plasma or recombinant FVIII concentrates to achieve hemostasis. FVIII replacement is effective unless a patient develops an alloantibody (inhibitor) against the exogenous FVIII.

“Inhibitors’’ in hemophilia refer to IgG antibodies that neutralize clotting factors. Inhibitors to FVIII and FIX are considered to be the most serious treatment related complication. It is more common in severe hemophilia. Inhibitor development results in partial or complete lack of the efficacy of replacement therapy and it makes the management of patients more difficult with an increased risk of morbidity, serious bleeding, and disability, resulting in a substantial impact on patient’s quality of life and health-care costs, compared to patients without inhibitors.

The incidence of inhibitors in severe hemophilia A is approximately 30 % of which 79% occur within first 20 exposures and remainder 21% within first 75 exposures of FVIII/FIX containing products. The incidence of inhibitors in mild and moderate hemophilia A is 5 to 10%. Genetic and environment risk factor for the development of inhibitor are type of haemophilia, family history and race, type of mutation, polymorphic immune regulatory

gene-HLA, high intensity clotting factor concentrate (CFC) exposure, CFC type and patient's age at first exposure of CFC.

Indications for inhibitor testing are after initial exposure, after intensive factor exposure, recurrent bleeds or target joint bleeds, despite adequate CFC replacement therapy, failure to respond to adequate CFC replacement therapy, lower than expected factor recovery or half life after CFC replacement therapy, before surgery and suboptimal post-operative response to CFC-replacement therapy.

Screening for a FVIII inhibitor is based upon the APTT and involves measuring the APTT on a patient's plasma sample mixing with pooled normal plasma (PNP) before (Incubated mix) and after (Fresh mix) it has been incubated at 37º C for two hours. Incubation step is not necessary if screening for a FIX inhibitor. If the difference between the fresh mix and incubated mix APTT is more than 8 seconds, inhibitor screening should be consider as positive. Quantification of the inhibitor titer is performed by Bethesda assay using different dilution of test plasma with imidazole buffer at pH 7.4. Bethesda unit (BU) is defined as the amount of an inhibitor that will neutralise 50 % of 1 unit of FVIII:C in normal plasma after 120 minutes incubation at 37ºC. Nijmegen-modified Bethesda assay offers improved specificity and sensitivity over the original Bethesda assay. Different types of FVIII assays can be used to determine the FVIII during Nijmegen-Bethesda inhibitor assay. The protocol for the US national inhibitor program requires a chromogenic assay to be used when positive FVIII inhibitor results below 2 BU are observed. An inhibitor titer of ≥ 0.6 BU/ml for FVIII and ≥ 0.3 BU/ml for FIX should be considered clinically significant. Some non-neutralizing anti-FVIII antibodies which are not detected by the Nijmegen-Bethesda assay may be clinically relevant because they may increase clearance of FVIII and can be measured by ELISA.

Inhibitors are classified as low responding (low titer) if the inhibitor level is always <5 BU/mL and high responding (high titer) if the historical peak titer is >5 BU/mL at least once due to the occurrence of anamnestic response after FVIII re exposure. On the basis of inhibitor classification, the best approach to patients' treatment may vary substantially. Patients with a low Bethesda titer (<5 U/ml), usually respond to high purity or recombinant human FVIII. Therapy with human FVIII is seldom successful in patients with high titer antibodies (>5 BU/ml), high-affinity antibodies, and infinite coagulation times. As an alternative, the use of inhibitor – bypassing products may be useful. These include the prothrombin complex concentrate (PCCs), activated PCCs, and recombinant FVIIa. The factor substitution therapy, Emicizumab, is increasingly used to prevent haemorrhage in FVIII inhibitor patients. This agent is effective for preventing bleeds (prophylaxis) in haemophilia A inhibitor patients but is not indicated for treating bleeds. Inhibitor eradication by immune tolerance induction therapy is successful in 70-80% of patients with severe haemophilia A.

Inhibitor development affects the severity and treatment of the disease significantly and there by increases the suffering and cost to the patient.

17. THERAPEUTIC PLASMA EXCHANGE IN VARIOUS SCENARIOS

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Therapeutic plasma exchange (TPE) is a type of apheresis procedure where the blood of the patient is made to pass through an apheresis machine, the plasma is filtered and removed and replaced by replacement fluids such as albumin or plasma along with the reinfusion of the red cells.

TPE in different clinical settings:

1. **Therapeutic plasma exchange in solid organ transplants: Desensitization in prospective transplant recipients:** The prospective transplant recipients planned for **ABO incompatible** transplants or those with **donor-specific antibodies (DSA)** against the specific HLA class I and II antigens present in the potential donors are desensitized with TPE with other modalities. It is also used as supportive therapy for the management of cases of graft dysfunction or graft rejection post-transplant.
   In cases of acute or fulminant hepatic failure, TPE plays acts as a **bridging therapy** before the transplant.
2. **Therapeutic plasma exchange in neurological cases:**
   The role of TPE is seen as a first-line therapy in the management of neurological conditions such as **thrombotic thrombocytopenic purpura (TTP), myasthenia gravis (MG), and gulleian barre syndrome (GBS).** The TPE helps in the removal of the offending agent, the antibodies in these diseases.
3. **Other miscellaneous indications:** There are various other common and uncommon indications across the different systems including paediatric cases for TPE. The latest ASFA guidelines provide a ready reckoner for systemic review and evidence based approaches in the grading and categorisation of these TPE indications.

18. QUALITY CONTROL TTI TESTING: INTERPRETATION & TROUBLESHOOTING OF LJ CHARTS

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Quality systems are crucial for the overall effectiveness of all aspects of the screening programme and in assuring the quality, safety and efficacy of all blood and blood products. Key elements of a quality system for blood screening include organizational

management, quality standards, documentation, traceability, training, assessment and maintenance and calibration. All screening tests should be performed in accordance with defined quality requirements, and all blood donations and blood components prepared from them should be handled appropriately before, during and after laboratory testing. It is the responsibility of the blood transfusion service as well as individual laboratories to implement these standards consistently. A quality system in a laboratory defines all processes and procedures that should be put in place to ensure effective blood screening. Serological screening for infectious diseases in blood banks currently includes qualitative serological testing for HIV, HTLV, HCV, HBV and syphilis. It is recommended that NAT (nucleic acid testing) for HIV, HBV and HCV be used in parallel with serological screening to reduce the risk of transmission during the immunological window period.

Serological screening involves the use of sensitive and specific tests, employing the ELISA (enzyme-linked immunosorbent assay) and CLIA (chemiluminescence immunoassay) methodologies in most cases. The platforms used are automated so that a large volume of samples can be covered in a short timeframe, thereby ensuring easier processing of results. All serological tests used in screening are qualitative and should be accompanied by quality control procedures that are appropriate for this kind of test and guarantee the quality of the end results.
Quality control procedures are necessary to ensure the quality of the results originating from laboratories responsible for serological screening. International and national recommendations indicate that quality management systems must necessarily adopt at least two types of controls: (a) internal quality controls and (b) external quality control.

External quality controls entail participation in at least one external quality assessment (EQA) programme using well-characterized panels that contain specimens for all screening parameters and enable assessments to be conducted at least once a month. Internal Quality Control (IQC) is the backbone of any quality assurance program. Internal quality control is the set of procedures undertaken by the staff of a laboratory for continuously and concurrently assessing laboratory work and the emergent results, to decide whether they are reliable enough to be released. It is meant to allow laboratory technicians to check their own performance and help them to monitor the reliability of their technique. It maintains day to day working objectively and detects any deviation very early like

Inclusion of quality control measures in a testing laboratory facilitates validation of test results in terms of accuracy and precision. Monitoring day-to-day performance of assays increases the probability of detecting the deviations at the earliest. Quality control of assay may be performed using control sera supplied with the kit, known standard sera available through national and international agencies or pools of sera prepared "*in-house.*" Till date, most transfusion-transmitted infections (TTI) testing laboratories rely solely on commercial kit controls provided with the kit for test validation. These controls have a high positive value and provide only single-point calibration. They are incapable of monitoring batch to batch variation in test kits or gradual faltering of equipment or deterioration of test reagents.

Internal quality control (IQC) using "*in-house*" samples of borderline positivity offers a low cost and flexible option for the objective evaluation of test procedure on a day-to-day basis. The purpose is to (a) detect immediate errors occurring due to change in

environmental conditions, test system or operator performance; (b) monitor the test performance over time, influenced by variance in environmental conditions, test system, or operator performance.

IQC samples detect errors which may be systematic or random. Systematic errors indicate a change in accuracy or stability of assay whereas random errors point to decreased precision. The identification and analysis of the errors which occur in different phases and components of testing process help in establishing and implementing the trouble shooting and corrective action protocol.
Calculations:

E-Ratio = Optical density (OD) of test or control sample/cut off OD

Mean (M) is the arithmetic average of all E-ratios. It is a measure of central tendency.

M = Sum of individual E-ratios (E1 + E2 + E3…. +En)/no. of aliquots (n)

Deviation (D) for each aliquot is the difference between individual E-ratio and the mean E-ratio.

D1 = E1 − M, D2 = E2 − M,…… Dn = En − M

Standard deviation (SD) is a measure of dispersion of observations about mean. It was calculated by summing up all the deviations, then squaring the sum. This was divided by n. The square root of this value yielded SD.

$SD = \sqrt{(D1 + D2 + D3.... +Dn)^2/n}$

Control values were calculated mean ± 1SD, mean ± 2SD, and mean ± 3SD.

The coefficient of variation (CV) was expressed percentage and calculated as:

CV = SD × 100/M
LJ charts are plotted to graphically monitor if the control values were falling within the range. Mean is marked on Y axis as a horizontal line. Control limits are marked at appropriate intervals as ± 1SD, ±2SD and ± 3SD. Runs are plotted on X axis. Each day the values of control E-ratio of assay are marked against the run. Each chart is plotted for 30 runs. Charts are labeled with kit details (name, lot number, and expiry date), equipment used (ELISA washer and reader), and operator name.
Drift or trend - Seen when the control value moves progressively in one direction from the mean for a minimum of three (3) days. Suggests that a problem is gradually developing, such as deterioration of a reagent or control.

Dispersion – Increase in Random Errors and Lack of Precision. Suggests inconsistency of technique or fluctuations in instrumentation function.

Shift – Abrupt changes observed when a problem develops suddenly. May be due to instrument malfunction or an error in technique.

Westgard rules should be used to interpret daily QC values. The level of QC applied in the laboratory varies according to the number of specimens analyzed per day. A data set of at least 20 points should be obtained over a 30 day period. These data points are used to calculate mean, standard deviation, coefficient of variation; determine target ranges. It is made sure that all the procedural variation is represented including different operators, different times of the day. Variability in the data is determined to establish the acceptable range.

19. TRANSFUSION TRANSMISSIBLE INFECTION (TTI) TECHNIQUES: ELISA VERSUS CHEMILUMINESCENCE

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Blood transfusion is a lifesaving process but an important associated risk is the transmission of blood borne pathogens. These can be viruses, bacteria , parasites or prions dependent on the local epidemiology. Screening blood donors for TTIs to ensure safe transfusion is critical in the “transfusion chain” . Sensitive and specific screening methods help reduce the risk of TTI transmission to very low levels. This has been demonstrated by many countries who have implemented effective blood screening programs and reduced TTI transmission dramatically over the last 20 years.

While the number of pathogens screened for TTI may vary from region to region, World Health Organization (WHO) recommends mandatory screening for Human Immunodeficiency virus (HIV1 & 2), Hepatitis B virus (HBV) , Hepatitis C virus (HCV) and Treponema pallidum (TP) . For HIV 1 & 2 , a combination of antigen and antibody assays are recommended. The recommendations for HBV is to perform the HBV surface antigen (HBsAg), for HCV either antibodies or antigen antibody combinations and for TP specific treponemal antibody testing. The Indian recommendations also include malaria screening as we are endemic to this parasitic disease. Malaria may be tested using a validated and sensitive antigen test. WHO recommends that all assays used for TTI testing should have sensitivity and specificity of not less than 99.5% so as to avoid missing false negatives.

The different types of assays available for testing range between immunoassays to molecular methods like nucleic acid amplification techniques (NAT). Immunoassays remain the mainstay of TTI testing in India and these assays are available in a variety of formats. This session will focus on Enzyme Linked Florescent assay (EIA/ELISA) versus Chemiluminescent immunoassays (CLIAs). While the design of EIAs and CLIAs is similar, their mode of detection of immune complexes formed is different. With EIA it is colour generation and with CLIA it is measuring the light produced by a chemical reaction. Most EIAs available in India are open systems and can be performed manually or automated depending on the volume of samples. On the other hand, CLIAs are usually automated with dedicated assay systems often referred to as closed system testing.

A literature review of studies conducted in India suggests that CLIA has similar sensitivity to EIA but improved specificity and greater positive predictive value than conventional EIA. Chang et al from China studied detection of HIV in blood donors using EIA and CLIA methods and observed CLIA to be more specific thereby improving their serological blood screening strategy and avoiding unnecessary loss of blood donors.

CLIA also has advantages of being technically simple with short turn-around time, high-speed throughput, multi-analyte analysis on a single platform, random access and full automation which is advantageous in high volume hospital laboratories. CLIA is also useful during emergency settings such as screening of rare blood group donors and predonation screening of apheresis donors as single tests can be easily performed and the TAT of CLIA is usually around 1 hour versus 3 to 4 hours for EIA.

To conclude, both EIA and CLIA are among the recommended technologies for TTI testing in India. The type of testing to be adopted by a blood center would depend on several local factors like volume of samples for testing, the need for emergency testing, availability of equipments and their optimization. A quality systems approach and close monitoring of all quality parameters is essential to ensure TTI testing minimizes chances of infection in recipients.

20. TACKLING WINDOW PERIOD TO REDUCE TRANSFUSION TRANSMITTED INFECTIONS

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With blood-transfusion now being an essential factor in medical management of diverse clinical conditions, the prevention of transfusion-transmitted infectious (TTIs) has become a major area of interest in the transfusion medicine fraternity. The most important TTIs being human immunodeficiency virus (HIV), Hepatitis B and C viruses (HBV and HCV respectively).

Many approaches have been take to reduce the potential of TTIs such as thorough donor education and history taking, donor deferral, infectious agent testing, and pathogen-reduction technologies (PRT), yet medics continue to find the best intervention to achieve the right balance between blood availability, cost, and safety.

Risk-based decision making used to identify low-risk donors and defer high risk donors is typically accomplished using a donor history questionnaire. While, the approach to protect the blood supply though appropriate donor selection and risk-based deferral are well established, some such as the PRT are at an initial stage, though hold a lot of promise.

PRT offers a departure from the traditional paradigm of targeted testing as these allow for global treatment of blood products, rendering them safe from spreading the infection by making the pathogens (Bacteria or Virus) incapable of replication. While the individual PRTs vary, a key limitations is the absence of the technology for red cells and whole blood and high cost.

At this stage, undoubtedly, the most effective and most discussed intervention to reduce TTIs is a diagnostic testing mechanism that can detect infection in blood donors in very early stages of infection thereby reducing the window period of detection i.e., using highly sensitive and specific molecular assays also known as Nucleic acid testing (NAT).

Serological assays to detect TTI cost lower than NAT, are readily available and have a variety of formats, spanning rapid/point of care, semi-automated and fully automated but even the most sensitive of serological assays would miss infections in blood donors in the very early stages when the level of pathogen is below the detection limit of serological assay.

It is in the use of these sensitive and specific NAT assays, where blood transfusion offers the glaring example of health disparity between high income (HIC) and low- and middle-income countries (LMICs).

The HICs have adopted NAT as a routine method to tackle the issue of window period of TTIs for more than 2 decades but use of donor NAT remains rare to non-existent in upper middle-income and in low-income countries.

The need of the hour is a cost effective NAT which is specifically developed and designed for the LMICs and takes into consideration certain LMIC specific factors such as

a) Fragmented blood banking leading to most blood banks having a workload of just 500-1500 blood donors a month

b) Price sensitive healthcare system

c) High background incidence of the targeted pathogens

d) Lack of specialized/trained manpower

A lot of research, discussions, debate and investment in blood transfusion safety has resulted in very low risk of TTIs in the developed world. Many strategies spanning from refined donor selection and testing system along with innovations such as PRT, could prove transformative by addressing infectious risk proactively.

On the other hand, countries such as India are still at a stage where transfusion-associated infectious risk remains pervasive. While serological testing is mandatory in India, the universal implementation of NAT in addition to serological testing is the best way to tackle the issue of detecting TTIs in the window period.

21. AUTOMATION IN IMMUNOHEMATOLOGY

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In recent times, there have been rapid technological advances in the field of Transfusion Medicine with an increasing emphasis on quality and safety of blood. Automation has changed the way we work in medical laboratories across specialties revolutionizing the way laboratory tests are done, interpreted, validated, data managed and reported.

In immunohematology, the conventional pre-transfusion testing technique using test tubes is quite cumbersome and not amenable to automation. Over the last few decades the introduction of newer techniques such as Column Agglutination Technique (CAT), Solid Phase Red Cell Adherence Assay (SPRCA) and Erythrocyte Magnetic Technique (EMT) has tried to overcome these short comings of conventional techniques and bring about an improvement in the quality of testing and the reproducibility of results.

There are many advantages of automation such as reducing human errors while performing tests and subjective variations during interpretation of results, preventing transcription errors during documentation of results, improving objectivity, reproducibility, and storage and retrieval of results, improving traceability of all variables during testing including, samples, reagents and operating staff, reducing manual input and therefore manpower economy . In addition high throughput devices with lesser turnaround time improve the quality of services in large tertiary care settings

There are many technologies in use which have been automated to various degrees. These are described below

Gel Column Agglutination

In this controlled centrifugation of RBCs through a gel column is done. The serum and cell reaction takes place in a microtube. In the usual format there are 5-6 microtubes in a plastic card. The microtube consists of a reaction chamber that narrows to become a column with a conical bottom. The reaction chamber is designed to allow prior incubation of test serum and RBCs. Each column contains Sephadex gel suspended in a buffer solution. Depending on the configuration of card, the gel is premixed with antisera/AHG/other reagents

Bead Column Agglutination

The test is performed in a microcolumn prefilled with glass microbeads in suspension of antihuman globulin serum, any diagnostic reagent or neutral isotonic solution. Detection of sensitized red cells is based on the sieving effect of glass microbeads. Red cells & serum are incubated at the upper part of a column over the glass microbeads suspension. These microbeads are calibrated & during centrifugation, they retain the agglutinates & the unsensitized cells sediment at the bottom

Solid Phase Red cell Adherence (SPRCA)

One of the components of an antigen–antibody reaction is immobilized onto a solid medium and after reaction with a free antigen/antibody the end point of the reaction is indicated by use of red cells, which may be a part of the antigen–antibody reaction or may be added as indicator cells. In forward grouping U shaped micro plate wells are coated with Anti-A antiserum, Anti-B antiserum, and Anti-D antiserum, A drop of 0.5% bromelin-treated red cells are added to the well. On centrifugation antigen positive cells spread out while antigen negative cells form a button at the bottom of the well. In case of reverse grouping a monolayer of RBC membrane is attached to the bottom of the well and plasma to be tested is added after incubation for 5 min, the excess plasma is blotted and anti-IgG bound indicator red cells are added to give a visible reaction. SPRCA may be adapted to other red cell serology tests such as antibody screening, identification, and cross matching. It may also be adapted to platelet serology

Erythro-magnetic Technology (EMT)

This is based on magnetization of RBCs in a magnetizing solution. In this technique hemagglutination method is used in combination with a magnetic field. Bromelin, a proteolytic enzyme, induces a marked decrease in the electronegative charge on the surface of RBCs enabling their agglutination by normally non-agglutinating antibodies in saline medium. When subjected to a magnetic field, the magnetized RBCs migrate & form a pellet at the bottom of the well, after shaking, free RBCs are resuspended. Presence of agglutination in the centre shows a positive reaction while spread out RBCs are seen in a negative reaction

Comparison of technologies used for immunohematology tests

Technology	Column Agglutination Technology	Solid Phase Red Cell Adherence Assay	Erythro-Magnetic Technology	Conventional Tube Testing (CTT)
Number of steps required	8-12	13-15	8 to 14	14-19
Washing step	Omitted	One washing step	Omitted	Multiple washing steps
Advantages	Small sample volume Uniformity of testing in repeat testing Clear and easily readable results Results may be stored for 24hrs Sensitivity for clinically significant antibodies (CSAs) better than CTT	Small sample volume Easy handling of large batches Improved sensitivity in testing IgG antibodies. Good at detecting weaker expressions of blood group antigens Suitable for lipaemic / haemolysed samples	Small sample volume Highly suitable for automation as there are no washing / centrifugation steps Suitable for ABO/D grouping and K typing Sensitivity for CSAs comparable to CAT	Amenable to all modifications of RBC and serum during testing ABO –Rh typing may be done in the shortest possible time

Disadvantages	More suited to batch testing in terms of time efficiency Preparation of 0.8% suspension is cumbersome It takes a minimum of 20 min to do an ABO/D grouping. Roulex and fibrin clots may be reported as positive	Technique takes time to learn RBC modification such as enzyme treatment not possible. Low specificity may cause unnecessary delay due to further work up of the sample. Does not detect IgM antibodies	Does not detect IgM antibodies Manual method is labour intensive and requires comprehensive training Error in reading lipaemic and fibrinic samples Does not detect IgM antibodies	Large sample volume required Procedure in cumbersome and time consuming The results are variable and may depend on the expertise of the staff doing the test. Sensitivity for CSAs less than other techniques
Antibody Screening				
Sensitivity for clinically significant antibodies	90 – 94%	Approx. 97%	83.3-90.4%	Approx. 43% (LISS-IAT
Specificity	94.4%	94.3%	98.2% (R2)	98.6%

The benefits of automation in blood group serology are increased productivity, vein to vein traceability, barcode reading, enhanced quality assurance, controlled and standardized processes; Hospital information system interface reduces potential for transcription errors. This leads to reduced stress leads to fewer errors, staff satisfaction and more flexibility with staff scheduling.

In spite of these benefits there are still a number of challenges in shifting to full automation. These are alteration of the workflow, changes in current procedures, habits. Newer skills need to be acquired by the staff which requires staff training, basic knowledge of computers and data entry. There is a need for back-up for the Automated Equipment and validation of equipment and continuous quality assurance. There might be an increase in costs.

Automation is a boon to laboratory services but we have to understand that every new technology has its limitations and when we are stuck with complex immunohematology cases, we may need to revert to tube testing as it is most amenable to all kinds of manipulation using chemicals and enzymes.

"It's about finding that balance where you have one foot in the familiar, one foot in the unfamiliar.
If you have two feet in the unfamiliar it's overwhelming.
If you have two feet in the familiar then there's just boredom.
It's about having both."
*— **Humble the Poet***

22. TRANSFUSION SUPPORT IN TRANSPLANT PATIENTS

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INTRODUCTION

An organ transplant is the moving of a whole or partial organ from one body to another (or from a donor site on the patient's own body), for the purpose of replacing the recipient's damaged or failing organ with a working one from the donor site. Organ donation can be categorized as living, or deceased (previously referred to as cadaveric) as per the source. Organ transplants can be categorized as "life-saving", while tissue transplants are "life-enhancing". Organs that can be transplanted are the heart, kidneys, liver, lungs, pancreas, and intestine. Tissues include bones, tendons, cornea, heart valves, veins, and skin.

Organ donation and transplants in India are regulated under Transplantation of human organs act, 1994 with main purpose to regulate the removal, storage and transplantation of human organs for therapeutic purposes and to prevent commercial dealings in human organs. The Act contains detailed provisions relating to the authority for removal of human organs, preservation of human organs, regulation of hospitals conducting the removal, storage or transplantation of human organs, functions of appropriate authority, registration of hospitals and punishment/penalties for offences relating to aforesaid matters.

Successful transplant program requires an interdisciplinary team that has well define policies, procedures and communication pathways. The blood transfusion service provides appropriate compatibility testing and transfusion support before during and after transplantation. Transplantation places a huge demand on the blood product pool and conversely, transfusion therapy is a major issue in any transplantation program. Services that may be required by a transplant programme include provision of leucoreduced blood components, blood irradiation, massive transmission support, ABO subgroup typing, Antibody screening and identification and advance immunohematology testing. Transfusion services should understand and address such expectations of the transplant team.

BLOOD COMPONENTS –TYPES AND AVEREGE REQUIREMENT

- Blood component requirement in non-hepatic transplants is lesser and limited to 2-3 PRBC and 4-6 FFP and Platelets as per the published data. In liver transplants the requirements goes upto 15-20 PRBC and multiple other blood components including FFP, Platelets in form of RDP or SDP and cryoprecipitates. However there is lack of availability of the data mentioning blood components usage which covers the perioperative scenario of the organ transplant programme.
- Selection of blood components is very important in managing the blood requirement of the transplant patients. All types of the blood components shall be available in the blood centre before planning an organ transplantation surgery. The selected blood components shall be compatible by crossmatch on AHG phase. If possible, selecting the phenotype matched PRBCs help to reduce the further risk of alloimunization and prevent DHTR in already alloimunized recipients.

- As the recipients are at more risk of alloimmunization to red cells and HLA system, the choice of cellular blood components (PRBC and platelets) shall be leuco-reduced. Leucoreduction of blood components can give advantage against CMV transmission, as the recipients are at risk of getting infected by CMV post transplant due to immunosuppresants and other reasons. The cellular blood components shall also be irradiated to prevent TA- GVHD (Transfusion associated Graft versus Host Disease).

ROLE OF BLOOD INVESTIGATIONS

- ABO and Rh blood grouping is the primary but important test required in the work up of organ transplant. Subgroups of ABO blood group system also play a key important role in the transplant outcome and management. Blood centre shall specifically adopt the systems which help to identification of ABO blood groups including presence of isoagglutinins, especially in case of subgroups.
- Blood group antibodies Anti-A and Anti-B can bind to the endothelial cells if corresponding antigens are present, which may lead to initiation of cycle of comp[lemet fixation, vascular damage, and thrombosis leading to ischemia and graft rejection.
- Risk of alloimmunization due to exposure of blood components is very high in patients who are given multiple blood transfusions, pregnancy and transplant. Hence such candidates are at more risk of being alloimmunized to Red cell antigens and HLA system. Assessment for antibodies to HLA system is required for non-hepatic transplant candidates.
- Transplantation of the heart, lungs, and liver, in particular, place a significant burden on the patient's coagulation system.
- Standard quantitative coagulation tests include platelet count, PT, APTT, fibrinogen assay. Usefulness of these quantitative parameters in the qualitative assessment of the clot formation and lysis is not much clear.
- Whole blood based Visco-elastic testing representing the global hemostasis environment is available in form of Thromboelastography (TEG) or Rotational Thromboelastometry(ROTEM). These tests help to assess various parameters of clot formation including rate of clot formation, strength of clot, clot lysis etc.

ALTERNATIVES OF BLOOD TRANSFUSION

- Preoperative autologous donation (PAD) is a technique wherein the patient's own blood is collected and stored preoperatively. The prerequisites for this technique are Hb levels equal to or more than 11 g% and Hct of 33%.
- Acute Normovolemic Hemodilution (ANH) involves the collection of blood and its replacement with a colloid and/or crystalloid infusion followed by reinfusion of the collected blood at the end of the surgery.
- Intraoperative Cell Salvage (ICS) is an effective tool in blood conservation. It allows the retrieval and reuse of blood lost in the operative field. Perioperative management goal should be always focused toward safe transfusion-free transplantation with zero tolerance for blood loss of any kind. However, these measures have limited usefulness where multiple transfusions are required.

INFECTIONS

- Most of the organ transplant patients are maintained on a long term immunosuppressive therapy postoperatively, in order to prevent transplant rejection. Thus this group of patients is highly vulnerable to viral infections like herpes viruses, CMV (cytomegalovirus) and EBV (Epsteine Barr virus)

PASSENGER LYMPHOCYTE SYNDROME

- Passenger lymphocyte syndrome is a complication of both solid-organ and stem cell transplant. It is caused by antibodies produced by donor B lymphocytes, causing a primary or secondary immune response to recipient erythrocytes. Most commonly, it is in minor ABO mismatches, such as with a group B liver transplanted into a group AB recipient. Although less common, there have also been reported cases with other blood group system mismatches, such as Rh, Kidd, and Lewis antigens. Antibodies derived from donor lymphocytes typically do not appear until 7 to 14 days postoperatively and can be found for 14 to 21 days after transplant.
- Typically, PLS presents as a mild, self-limiting hemolytic anemia. Laboratory findings are suggestive of hemolytic anemia including decreased hemoglobin and haptoglobin, elevated reticulocyte count, and indirect hyperbilirubinemia.
- Antibody adsorption and elution studies help to establish the diagnosis. Passenger lymphocyte syndrome has been successfully treated with supportive care and blood transfusions. Therapeutic plasma exchange and use of monoclonal antibodies like rituximab may help to remove antibodies from the circulation.

ANTIBODY REDUCTION

- Antibodies formed in the recipients against the transplanted organ, play a major role in the graft rejection. Thus these antibodies should be removed from the recipients' circulation.
- Options for antibody depletion in sensitized patients include plasma exchange with or without antibody adsorption columns; intravenous immunoglobulin (IVIG); monoclonal antibodies, e.g. rituximab; and other immunosuppressive drugs.
- Preoperative use of immunoadsorption columns like Glycosorb may help to reduce Anti-A and Anti-B blood group antibody titers in ABO incompatible transplants.

SUMMARY

- Transfusion medicine plays a key important role behind the successful transplant program
- Availability of leucoreduced, irradiated cellular blood components can assure the minimum post transfusion complications
- Use of plasma exchanges can help to reduce the circulating antibodies like HLA antibodies or Anti-A, Anti-B blood group antibodies in ABO-incompatible organ transplant
- Visco-elastic testing like TEG can help to understand the coagulation status and rationalization of blood component usage

23. PATIENT BLOOD MANAGEMENT IMPLEMENTATION: AN URGENT NEED OF INDIA

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Blood transfusion, a lifesaving intervention, comes at a cost of inherent risks. Therefore, appropriate transfusions, that is, transfusion only when absolutely required is necessary to ensure blood safety. Over the past 30 years, various studies on transfusion appropriateness have led to the development of guidelines for transfusion and various alternatives have also been studied. While the guidelines have been established in countries like Australia, Canada, UK etc., there is unfortunately no such guideline in India leading to a wide variation in transfusion practices.

Patient Blood Management. (PBM) is the next paradigm and envisions patient centric decision making, regarding transfusions. It is a multimodal, multidisciplinary patient-centered strategy aimed at minimising the use of blood products and improving patients' outcomes. The essential elements of patient blood management include: the prevention of conditions that might otherwise result in the need for transfusion (through health promotion and screening for early detection), appropriate diagnosis and optimal treatment, including the use of alternatives to transfusion, good surgical and anaesthetic techniques, the use of alternatives to blood transfusion and blood conservation.

Strategies for optimal management of patient and transfusion of blood products also include, evidence based transfusion thresholds/triggers based on high quality clinical trials both on the benefits of blood transfusion as well as harms of transfusion like increased length of hospital stay/ICU stay.

It is with great pleasure that I inform you that AIIMS Jodhpur has been at the forefront of implementation of PBM in India. The multi department, multi-pronged approach for correction of preoperative anemia, use of blood loss minimization strategies, treating nutritional anemias, early diagnosis and management of bleeding disorders and use of intra operative autologous normovolemic hemodilution (ANVH) and cell salvage has reduced the blood requirement in AIIMS Jodhpur.

Increasing awareness of the risks of transfusion especially those that are not immediately perceptible resulted in global initiatives to emphasise the judicious use of blood components. The concept of Patient Blood Management where the patient-centred approach which addresses iron deficiency, anaemia, coagulopathy and blood loss as treatable factors which may not always require transfusion has gained momentum globally.

Anaemia and iron deficiency are recognized as serious global health issues in their own right, affecting billions of people worldwide and in India. The report also suggests that use of transfusion for correction of anaemia is a major contributor for blood usage in Rajasthan. National Family Health Survey IV suggests that more than 50% of the population is anaemic. Correction of this potentially treatable indication for transfusion is the need of the hour.

Even after 12 years of the endorsement of PBM by World Health Assembly Resolution WHA63.12 in May 2010, it is yet to be implemented in spirit in India. While previous attempts at sensitization of doctors for rational transfusions has resulted in mixed results, a focussed action plan for the same has been lacking. National Health Mission has recognised the importance of PBM for better patient care and through the 'Project for implementation of PBM in Rajasthan' aims to make PBM standard of care.

In the Pandemics all stakeholders and transfusion service providers across the globe urges to implement the practical and common-sense principles of PBM and its multiprofessional and multimodality approaches. A systematic approach to patient blood management enables the health system for efficient use of all resources and reduce the health care cost.

PBM needs leadership and support at every level, including national and regional leaders, hospital management, and clinicians. However communication skill is the keystone for implementation.

ORAL PAPER ABSTRACTS

OP-1

HOSPITAL TRANSFUSION COMMITTEE- A STEP TOWARDS GOOD BLOOD TRANSFUSION PRACTICE: A STUDY FROM A HOSPITAL-BASED BLOOD CENTER OF WESTERN INDIA.

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AIM: To monitor Blood Centre practices and audit blood utilization through HTC meetings.
OBJECTIVES: Primary objective:To monitor blood collection, usage,discard, performance in external proficiency testing of Blood Center, blood utilization review, and out of core hour transfusions.Secondary objective: Change blood transfusion policies ensuring delivery of quality care in transfusion medicine within the hospital and keep update with current trends.
MATERIALS AND METHODS: This record based descriptive retrospective study was conducted at Blood Centre, Department of Pathology, GMERS Medical College and Hospital, Gotri, Vadodara, Gujarat, India. The minutes/power point presentations of HTC meetings held during the study period of 7 years from January 2012 to December 2018 were analysed. Blood Centre and hospital records were reviewed in case of inadequacy or discrepancy, and records were considered as accurate.
RESULTS: Total blood collection increased from 385 units in 2012 to 3198 units in 2018. Similarly, blood usage increased from 335 units in 2012 to 3192 units in 2018. Blood unit wastage declined from 21.9% in 2012 to 2.5% in 2018. External Quality Assurance System (EQAS) results were graded from excellent to acceptable during the entire study period. 43.92% traceability forms were received back by the Blood Center. Blood utilization review was done for completeness of documentation and appropriateness of transfusion. Amongst cases of non-conformances in documentation, 'Blood transfusion requisition form' was not found in case files of 16.57%cases, 'Blood transfusion consent' was not taken in 42.63%cases, 'Blood transfusion monitoring form' was incompletely filled in 70.71%cases, 'Blood transfusion traceability form' was incompletely filled or not returned to the Blood Centre in 79.80% cases. Inappropriate transfusion was given in 2.9%cases. 58.84% transfusions were single unit transfusion. 16.10% units were transfused out of core hours.
CONCLUSION: Each hospital-based Blood Center should establish Hospital Transfusion Committee to implement National Blood Policy, improve transfusion services, monitor blood usage and wastage, audit blood utilization, discuss adverse transfusion reactions, incidents and disseminate transfusion information for efficient transfusion practice

OP-2

EXPERIENCE OF STANDALONE BLOOD CENTRE ON RECIPIENT HEMOVIGILANCE OF LAST FIVE AND A HALF YEARS

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INTRODUCTION: We are Standalone Regional Blood Transfusion Centre. We analyzed the data from December 2016 to June 2022 of recipient hemovigilance of our centre

AIMS AND OBJECTIVES: To analyze the data reported and find ways to improve reporting from our blood centre and try to reduce transfusion reactions

METHODS: We analyzed the data retrospectively for observational study

RESULT: Untoward reaction occurred in 92 cases (0.05%) during the period. Types of reactions reported were as under: FNHTR 39.13%, allergic 33.70%, TAD 6.52%, TACO 5.43%, immune hemolysis due to other allo-antibodies 3.26%, Hypotensive BTR 2.17%, Anaphylaxis 2.17%, non-immune hemolysis 1.09%, immune hemolysis due to ABO incompatibility 1.09%, pain at infusion site, other 1.09%. All reactions were immediate. 90 cases recovered while outcome was unknown in 2 cases. Components involved were WB 0.33%, SDP 0.18%, PRBC 0.09%, Cryo 0.04%, SW-PRBC 0.03%, LR-PRBC and FFP 0.02% each. No reactions occurred in RDP and CCP. FNHTR and allergic reactions were common where expiry date was <7 days at the time of transfusion. Recovery time was highest (2 days) in case of hemolytic reactions followed by TACO and TAD. 9 transfusions were given within 24 hours in case of polytrauma. Out of sterility of 22 blood bags done, two were found positive for bacteria but they were kept at room temperature (open system) in ward and sent to our centre after more than 9 hours. No signs or symptoms of infection were found in recipients. In six cases, more than one reactions were found, FNHTR, TAD and TACO in 1 cases, FNHTR and TACO in 2 cases, FNHTR and TAD in 1 cases, FNHTR and allergy in 1 case, Hypotension, Bradycardia and respiratory arrest in 1 case.

CONCLUSION: FNHTR are commonest of all reactions followed by allergic, TAD, TACO, immune hemolysis due to other allo-antibodies, hypotensive BTR and anaphylaxis, immune hemolysis due to ABO incompatibility and non-immune hemolysis. All reactions were immediate. WB and apheresis platelets were involved in maximum cases. We must encourage use of leucodepleted products. No major difference was found in reactions if expiry date of component involved was within 7 days of transfusion. As expected, recovery time is more in case of hemolytic reactions.

OP-3

LARGE VOLUME LEUKAPHERESIS IS EFFICIENT AND SAFE EVEN IN SMALL CHILDREN UP TO 25 KG BODY WEIGHT.

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AIM & OBJECTIVE: To report safety and efficacy of large volume leukapheresis in patients/donors with weight less than 25 kg body weight& to obtain an adequate number of CD34+ cells with the minimum number of procedures: this can be done using large volume leukapheresis (LVL).

MATERIALS & METHODS: We have analysed the efficacy and safety of 1 autologous&8 allogenic large volume leukapheresis (LVL)procedures performed in 8 children(3males and 5 females), median age 5.3 years(range, 2years-10years)& median body weight of donors16.56 kg(range, 11kg–22kg). The procedures were performed with a Spectra Optia. ACD-A solution used as anticoagulants.

RESULTS: The target CD34+ cell doses(≥4×10^6/kg body weight of patient)were collected by single LVL from 7 patients/donors (87.5%), while 1donor (12.5%) needed another procedure to achieve adequate CD34 dose. All our LVL were well tolerated. Side effects were observed in zero patients and 1 procedure was kept on hold for 15-20 minutes to adjust femoral line as flow was not adequate.No bleeding or no need for transfusion support except blood priming to maintain blood volume & hematocrit during procedure as Extra Corporeal Volume (ECV) of Spectra Optia is 297 ml.

CONCLUSION: Our experience shows that LVL is efficient and safe even in small children with low body weight and reduces the overall number of procedures required, particularly those who mobilize low numbers of CD34+ cells & conditions where weight of patient is significantly high compare to donor's weight. The most important factors are good venous access, adequate preparation of the child's electrolyte status, and surroundings in which the small child as well as parents feel comfortable, and can tolerate the procedure better.

OP-4

EVALUATION OF ADVERSE TRANSFUSION REACTIONS IN A TERTIARY CARE HOSPITAL

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INTRODUCTION: An adverse event is an unintended and deleterious occurrence associated with blood component transfusion. It may occur during or after a transfusion. It can be acute or delayed and can be due to immunologic or non immunologic causes. Continuous monitoring of adverse transfusion reactions and their analysis can promote better comprehension of various contributing risk factors. Hemovigilance data system being quality indicator assists in ensuring quality and safe blood transfusion.

OBJECTIVES: To evaluate the incidence of different types of transfusion reactions reported during or after transfusion of blood components like packed red blood cells, fresh frozen plasma & platelets in patients.

METHODS: It was an observational retrospective study in which all the reported adverse transfusion reactions were evaluated during the period from 1st January, 2021 to 1st July, 2022. Patient demographic details, components transfused and clinical presentation were analyzed to identify various factors affecting adverse transfusion reactions.

RESULTS: Incidence of transfusion reactions in our study period was 17 (0.014%) reactions out of 1,22,337 blood components transfused. Out of 17 blood transfusion reactions, 4 were allergic transfusion reactions, 4 were febrile non hemolytic transfusion reaction (FNHTR), 4 were non immune haemolysis and 3 were unrelated to transfusion. On component wise categorization, 14 reactions (0.021%) were from packed red blood cells, 1(0.0038%) from platelets and 2 (0.0065%) from Fresh frozen plasma.

CONCLUSION: An equal incidence of allergic reactions, febrile non hemolytic transfusion reactions and non immune hemolytic reactions was observed. All resolved after proper management without any complications. No fatal reactions were reported. Non infectious complications of transfusion were both unrecognized and underreported. Users should be encouraged to report even minor adverse events to ensure better understanding of the same and prevent such events in future.

KEYWORDS : Adverse transfusion reaction, febrile non hemolytic transfusion reaction , allergic reaction.

OP-5

TRANSFUSION EFFECT OF SINGLE DONOR PLATELET AND RANDOM DONOR PLATELET IN PATIENTS OF THROMBOCYTOPENIA DUE TO DENGUE AT TERTIARY CARE HOSPITAL IN KARAMSAD,GUJARAT

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AIMS AND OBJECTIVES:
1. To study need of mainstay of the treatment - platelet transfusion in thrombocytopenia due to dengue.
2. To find whether Random donor platelets(RDP) or Single donor platelet(SDP) are better for post transfusion recovery.

METHOD: The study includes 80 transfusion episodes consisting of 40 RDP (108 units of RDP) and 40 SDP. Platelet Rich Plasma-Platelet concentrate (PRP-PC) and Apheresis-Platelet concentrate were prepared. Pre and post transfusion assessment of platelet count was done in automated cell counter Sysmex XN 550. The post transfusion efficacy of transfused platelets was assessed by corrected count increment (CCI) and percentage recovery (PR). Paired 't'-test was used for statistical analysis and a probability of $p<0.05$ was used to reject null hypothesis.

RESULTS: The mean platelet dose of RDP (n=40) and SDP (n=40) was 4.5±1.51 x 10^{11} and 4.64± 0.54 x 10^{11} respectively. The mean platelet increment of RDP was 20.45 ± 4.66 x 10^3 /µl. The mean platelet increment of SDP was 31.55 ± 12.57 x 10^3 /µl. The mean CCI of RDP was 12.77 ± 2.55 x 10^3 /µl.The mean CCI of SDP was18.14 ± 6.71 x 10^3 /µl. The mean PR of RDP was 15.01 ± 1.89 x 10^3 /µl. The mean PR of SDP was 20.15 ± 10.45 x 10^3 /µl.

CONCLUSION: Post-transfusion increments of platelets were higher in patients who received SDP as compared to RDP, but the CCI and PR were comparable in both groups of patients.

OP-6

IDENTIFICATION OF ALLO ANTIBODIES IN THALASSEMIA PATIENTS

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BACKGROUND – Patients with transfusion dependent thalassemia are at increased risk of forming red cell allo-antibodies due to their lifelong need for transfusion therapy. This can result in hemolytic transfusion reaction particularly when patients' red cell typing is not known. It can also create challenges in sourcing compatible blood and cause delays when patient requires transfusion in emergency.

OBJECTIVE - To identify the different allo antibodies in multitransfused thalassemia patients.

METHOD – A retrospective study conducted between January 2019 to July 2022,in a blood center at tertiary care hospital. Total of 440 thalassemia patients were evaluated. Antibody screening and identification were done by using column agglutination method using ID- DIA CELL AND ID- DIA PANEL .

RESULT-440 thalassemia patients were transfused with leucodepleted packed red blood cells during the period and 22(5%) were found positive for antibody screening. The allo antibodies identified were anti- E(27.2%), anti-c(22.7%), anti-D(13.6%), anti-C^w(4.5%), anti-K(4.5%), anti-e(4.5%), anti-C(4.5%) and anti-Kp^b (4.5%). And 5 antibodies could not be identified, out of which 4 had auto antibody.

CONCLUSION – Alloimmunisation remains a challenge in patients of thalassemia. Routine antibody screening and identification can offer a rapid provision of antigen negative units .Red cell genotyping can help provide insight into unexpected antibodies and detect variant alleles.

POSTER ABSTRACTS

P-1
SUCCESSFUL DONOR RECRUITMENT PROGRAMME AT SURAT RAKTADAN KENDRA AND RESEARCH CENTRE

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AIM AND OBJECTIVES: Our strategies to maintain 100% Voluntary Blood Donation by Creating awareness.
METHODS: Propagation, Canvassing, Broadcasting and Advertising on **:-**

A. Electronic Media,
F.M. Radio
Television
Social Media – Face Book, Whats App, Instagram, Twitter, Youtube

B. By Print Media
Press notes and Advertisement in Newspaper

C. Distribution
IEC Material

D. Public awareness Through
Exhibition, Rallies

E. Motivational Committee and Calendar of whole year of Voluntary Blood Donations Camps.

F. Recognition of Camp organizer by Awards and Trophies.

RESULTS: By Creating awareness we got success in different strata of society like Residential society, Co-operative Institutes, Corporate Sector Industries and other social organization, in getting Voluntary Blood Donation Camps.
CONCLUSION: By adopting above strategy the goal of 100% Voluntary Blood Donation was achieved since 2005 which is continuous till today.

P-2
RETROSPECTIVE ANALYSIS OF PATTERNS OF DEFERRAL AMONG BLOOD DONORS IN A TERTIARY BLOOD CENTRE

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INTRODUCTION: Blood transfusion saves millions of lives. Proper donor selection is an important step to ensure safety of both donor and the recipient. Donors undergo strict selection criteria laid down by the Director General of Health Services and Drug Controller of India to ensure safety and quality of blood and blood products derived from their donation. Due to this, it is likely that donors may get deferred either temporarily or permanently. Rates and Reasons for deferral vary from region to region. All donors who are deferred must receive proper counselling and education regarding deferral reasons and adequate advice to rectify it.
AIM: The aim of the study is to analyse the rates and reasons of donor deferral in our blood centre.

OBJECTIVES:

- To observe the rates of deferral among different sexes
- To observe the rates of temporary and permanent deferrals.
- To study the various reasons of temporary and permanent deferrals.

MATERIALS AND METHODS: It is a retrospective observational study done over a period of 2 years from January 2020 to December 2021. Details of the donors who were deferred either temporarily or permanently during the study period was collected from the donor registry in the Blood Bank Data Management System in our Blood centre.

RESULTS: Out of the 73215 donors who registered for blood donation during the study period, 3192 donors were deferred either temporarily or permanently due to various reasons. Total deferral rate was 4.35% in our Blood centre. The major reasons observed were Haemoglobin less than 12.5g% (30.6%), Hypertension (6.3%), Ongoing Medication (6%), Surgical Procedures (4.3%) and Prior Vaccination (2.7%).

CONCLUSION: Knowledge about rates and reasons of donor deferral guides the medical personnel to focus on proper screening of donors. Proper follow up measures and donor motivation programmes can be carried out in case of temporarily deferred donors to bring them back to donor pool.

KEYWORDS: Blood Donation, Donor Selection Criteria, Donor Deferral.

P-3
DISTRIBUTION OF ABO and Rh(D) TYPES OF BLOOD GROUP IN WHOLE BLOOD DONORS AT TERTIARY CARE HOSPITAL, JAMNAGAR

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BACKGROUND: The study was conducted to know the distribution and frequency of blood blood group among attending whole blood donation at M.P.Shah medical collage, Jamnagar. So that demand and supply will maintain without any type of lack.

AIMS AND OBJECTIVE: The aim is to compare the demand and supply ratio of a particular blood group of their distribution in the society so that supply of blood products at right time without any type of lack.

METHODS AND MATERIALS: Study Area and Setting: Institution based cross-sectional study was conducted at Shree M. P. Shah Govt. Medical Collage Jamnagar from 01/01/2015 up to 30/12/2020 including all routine and camp whole blood donors.Study Population: Total 1,39,216 blood donors data were collected.Study: Retrospective

RESULT: Out of 1,39,216 whole blood donors, ABO blood group was 'B'(33.81%) followed by 'A'(23.69%), 'O'(21.77%) and 'AB'(20.73%).While Rh blood group system (93.27%) donors were RH Positive and (6.73%) donors were Rh-Negative. Female Blood donors was very low comparatively with male donors.

CONCLUSION: The present study concludes that most common blood group is 'B' and lest common is 'AB' at S.P.Shah Blood center,Jamnagar. Where Rh Positive donors was 93.27% and Rh Negative blood donors 6.73%. Blood donation by female was very low compare to male blood donors. It indicates the awareness for female to donate a blood.

P-4

ANALYSIS OF DEFERRED BLOOD DONORS AT TERTIARY LEVEL HOSPITAL BASED BLOOD CENTER OF SOUTH GUJARAT.

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AIMS AND OBJECTIVE: To detect and document the rate and reason for donor deferral in our tertiary care hospital based blood bank.
MATERIAL AND METHOD: Total 24370 whole blood donors were counseled for donation between 1st January 2020 to 31st December,2021.Donor selection and deferral was done as per the Drugs and Cosmetic Act,1940& its amendments. Data wereanalyzed with respect to different categories like age groups, gender, type of donor and cause of deferral.
RESULTS: Out of total 24370 blood donors, 21675 (88.94%)donors were eligible and 2695(11.06%) blood donors were deferred. The most common cause among male was medical or surgical reason and among female was low hemoglobin concentration.
CONCLUSION: The blood bank should modify recruitment strategy according to locally and regionally prevalent donor demographics. Anaemia especially in female can be easily alleviated by proper nutrition supplement.

P-5

PHENOTYPE MATCHED RBC: A BOON TO PATIENTS-A CASE REPORT

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BACKGROUND:-Red blood cells (RBCs) carry numerous protein and carbohydrates antigen on their surface. There are over 600 antigens, which are separated into 33 blood group system.
If a person is exposed to blood with different antigens than his or her own, he or she may form antibodies that can result in extravascular and/or intravascular hemolysis when the recipient is reintroduced to the same antigens in a future transfusion. If patient is positive for antibodies and not find the compatible units, we can go for phenotype matched blood transfusion.
AIM:-To Transfuse the safest blood possible to the patient with positive antibody screening in orderto avoid any kind of transfusion reaction.
MATERIAL AND METHODS:-A 65 year old male having thrombocytopenia with anemia got admitted to hospital. His Hb:5.9g/dl, platelet count : 82000/cumm on admission. We received the request of 1 red cells and 3 units of FFP. His blood group was “B” POSITIVE and the result of DAT, AUTO control were negative whereas IAT (antibody screening by 3 cell panel) was positive, and after which antibody identification was carried out by 11 cell panel. Anti-C was the probable antibody deciphered and phenotype matched donor was searched for- in the inventory.

RESULT:-Patient's blood group was "B" POSITIVE and the result of antibody screening was positive giving probable phenotype of patient as R_2R_2.Random donor blood was not compatible and that also suggested for phenotype matched transfusion. From the phenotype registry of blood centre, 3 units of phenotype matched RBCs were transfused which Hb from 5.9 to 9.2g/dl. All transfusions were uneventful.
CONCLUSION:-Performing RBC antigen phenotyping, after identifying alloantibodies is critical to provide best matched transfusion and prevent additional alloimmunization in patient.

P-6
A STUDY OF IRREGULAR ANTIBODIES IN MULTI- TRANSFUSED PATIENTS AT A TERTIARY LEVEL GOVERNMENT HOSPITAL IN SOUTH GUJARAT

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BACKGROUND: Alloimmunization is the one of the major concern in the management of patients who required repeated blood transfusion as a lifesaving treatment. The knowledge of rate of such alloantibodies is essential for selecting appropriate red blood cells for transfusion. AIMS: This study was carried out to get the frequency and type of unexpected red cell antibodies in the multi-transfused patient at a tertiary level government hospital in South Gujarat.
MATERIALS AND METHODS: This study was carried out in multitransfused patients who required blood transfusion during the time period of thee years(2020-2022) . The antibody screening was done with 3 & 11 commercial cell screening & identification panel by column agglutination technique (Matrix Gel System & Matrix Erygen AS-ID, Tulip Diagnostics, India) at saline & anti-human globulin phase.
RESULTS: The overall prevalence of alloimmunization was 7.0%. The majority of these had a single alloantibody (12 cases,75%) whereas the remaining 4 cases (25%)had multiple antibodies. The anti-c and anti-D antibodies comprised the most common alloantibody (43.75% each both) followed by, anti-lea &leb (18.75%), anti-e & anti-E (6.25%) antibodies. Gender & number of blood units were found to be risk factors of alloimmunization in transfused patients. In our study we found females (93.75%) are more prone to alloimmunization. Those who were transfused more than 2 units have higher frequency of alloimmunization. The highest incidence of alloimmunization was observed in obstetrics and sickle cell patients.
CONCLUSIONS: The majority of alloantibodies detected in the current study were clinically significant and of mainly belonging to Rh blood group system. Thus pre-transfusion antibody screening on patients' samples prior to cross-match needs to be initiated in India and we can at-least provide corresponding Rh antigen negative blood to ensure safe transfusion practice
KEYWORDS: Red Cell, Red cell antigen, Alloimmunization, alloantibodies, Indirect Antiglobulin Test.
MeSH TERMS: Erythrocyte, Isoantibodies, Coombs test

P-7
PATTERN OF ANTIBODY DISTRIBUTION IN PATIENTS WITH INDIRECT ANTIGLOBULIN TEST POSITIVITY

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INTRODUCTION: The detection of antibodies directed against red blood cell antigen is critical in pre transfusion compatibility testing. Besides ABO antibodies other various type of antibodies are encountered in transfusion practice which is critical in pre-transfusion compatibility testing**.** Indirect antiglobulin positive patient having more change of various antibodies.
AIM AND OBJECTIVES: To assess the frequency of red cell antibodies presented in Indirect antiglobulin positive patients & identification of antibodies to achieve safe blood transfusion.
MATERIAL AND METHODS: This was a Retrospective study with samples of Indirect antiglobulin positive patients being processed for blood grouping and antibody screening (done by QWALYS-3) and identification (done on 11 cell panel-BIORAD). Data were analysed and frequency was calculated.
RESULTS: A total of 94662 patients were taken for the study. Antibody screening was performed Out of which, 383 Patients were identified with alloantibody. Most common alloantibody found in the study was anti-D (24%) followed by anti-E (8.8%) in Rh blood group system and anti-M (7.7%) in MNS blood group system.
CONCLUSION: Antibody screening and identification of specific alloantibody helps in identifying most appropriate blood unit that lacks the corresponding antigen and prevent alloimmunization.
KEYWORDS: Alloimmunization, Antibody identification, Antibody screening, Indirect antiglobulin test.

P-8
CLINICALLY SIGNIFICANT AUTOANTIBODY DIRECTED TO RED CELL ANTIGEN SENSITIVE TO A-AMINOETHYLEISOTHIOURONIUM BROMIDE (AET).

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ABSTRACT:

A 62 year old female patientadmitted to hospital with anemia and required blood transfusion. She was grouped A_1B RhD positive with a strong agglutination with anti-A and anti-A,B by forward grouping but showed weaker clumps with anti-B. However, her reverse grouping showed no agglutination with group A cells and strong agglutination with group B. Antibody screening test showed no agglutination but a strong reaction by IAT. DAT on her RBCs was found strongly positive with broad spectrum antiglobulin reagent as well as monospecific anti-IgG. This would probably explain a weak reaction observed with anti-B reagent in forward grouping. However, a weak IAT result was only appreciated under the microscopic view, thereby suggesting that the bulk of antibody was present on her RBCs. Ether elution

method was ensued to augment autoantibody for further testing. The eluate was tested the panel of cells with modified approach as at first, the cell-eluate mixture was incubated tube at 37°C, following which the sensitized cells were washed x4 using normal saline. The washed sensitized cells suspension was super-imposed on to IgG- gel column and centrifuged. The modified strategy was adopted mainly to get rid of hemoglobin pigment that otherwise would interfere in reading the results. The reaction pattern indicated its specificity as a pan-reacting autoantibody with no clear pattern. It reacted strongly with RBCs pre-treated with papain enzyme but its reactivity was greatly reduced if the red cells treated with α-aminoethyleisothiouronium bromide (AET). These results suggested that the autoantibody directed to the high frequency antigen (HFA) that is sensitive to AET but resistant to proteolytic enzyme. The observation as "enzyme resistant, AET sensitive" pattern ruled out the autoantibody specificity to HFA of the INDIAN blood group system, e.g. anti-In^b, anti-In5 etc., but keeping open its specificity to any of the HFA of the KELL blood group system, e. g. anti-k, anti-Kp^b, anti-Js^b etc.

P-9

CRYOPRECIPITATE- PREPARATION,STORAGE&UTILIZATION IN TERTIARY CARE TEACHING HOSPITAL.

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INTRODUCTION: Cryoprecipate is concentrate of high molecular weight plasma protein that precipitates when frozen plasma is thawed at 4°C and then centrifuged, collected & refrozen at-20°C.

The main constituents of 20ml Cryoprecipitate bag(1) Factor 8: 80-100 IU
factor 13:20-30%of original
Von willebrand Factor:40-70%
Fibrinogen: 150–250mg
Fibronectin:55mg
Plasma :10- 15ml

Various Indications for utilization of cryoprecipitate in Hemophilia A,Vonwillebrand Disease,Post partum hemorrhage,Disseminated intravascular coagulation,during massive blood loss,congenital/ acquired fibrinogen deficiency,acquired factor 8 and factor 13 deficiency etc.

AIMS& OBJECTIVES:

1. To evaluate&quality control in preparation of Cryoprecipitate.
2. To evaluate &quality control in storage of Cryoprecipitate.
3. To evaluate the practice appropriateness in accordance to cryoprecipitate transfusion guideline and usage in patients.

METHODS: Total 500 units of Cryoprecipitates issued to the patients from 1st April-31st July 2022 at Civil hospital ahemedabad.The techniques used for preparation and storage in this hospital were analyzed and indication as well as dosage for Cryoprecipitate tarnsfusion were further studied.

For preparation of Cryoprecipitate plasma should be frozen at-70 °C immediately after collection of blood within 6 hour. Then overnight Thaw frozen plasma at4°C in thermoscientificcryofuse machine, then centrifuge plasma at speed of 3500 rpm for 6 minutes at 4°C. Store cryoprecipitate bag at-20°C. It's shelf life is 12 month from date of collection.Reconstitute cryoprecipitate at 37°C in cryobath before issuing and administered within 4 hours.

RESULTS: The implication of proper preparation & storage techniques followed help to preserve the effectiveness of Cryoprecipitate. cryoprecipitate was more effective in first 24 Hours when given in Patients of DIC , trauma and surgical stress(CABG).Average 6- 8 units of Cryoprecipitate were issued per patients of trauma ,DIC and who undergoing surgery .Average 8-10 units of Cryoprecipitate were issued to patients of hemophilia A(factor dose 20 IU/kg),congenital/acquired fibrinogen deficiency.

CONCLUSION: When appropriate preparation& storage chain maintained, it preserves effectiveness of Cryoprecipitate, when transfused on appropriate time to the patients leads to improvement of the condition and desired therapeutic effect.

P-10
PREPARATION & REGISTRATION OF SECURITY PLAN TO GET LICENSE FOR OPERATION OF GAMMA IRRADIATION CHAMBER

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AIMS & OBJECTIVES: To prepare security plan of Gamma Irradiation Chamber and get registered by District Law and Enforcement Authority for safety of “Radiation Source”.

METHODS: As per the requirements specified in section 4.5.1 of the Atomic Energy Regulatory Board (AERB) safety Guide on “Security of Radioactive Sources in Radiation Facilities” (AERB/RF-RS/SG-1), published by the AERB, which is the Competent Authority for radiation protection in the country, the security plan needs to be registered with the District Law and Enforcement Authority.

Some documents are required for preparation & registration of Security plan are as given below:

- Description regarding GIC facility
- Map Layout Plan
- Police Verification of Employer
- Certificate of RSO
- Trustworthiness certificate of staff
- Emergency Response plan
- SOP , Log book & log sheet of Irradiation Machine
- Log book of Key Control Register
- Undertaking of Sensitive Information Protection
- Training records of Radiation worker, sweeper & Security Guard
- Security Agency Registration Letter etc.

Aboveall documents are filed and sent to District Law and Enforcement Authority for registration. After registration, soft copy of “Registered Security Plan” is sent to AERB by using eLORA system. AERB then issue license.

RESULTS: Security Plan registration requires five months in District Law and Enforcement Authority. Finally preparation and registration of Security Plan is completed.
CONCLUSION: Stepwise submission of documents properly results in issue of license for GIC operation from Atomic Energy Regulatory Board.

P-11

PREVELENCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG HEALTHY BLOOD DONORS AT TERTIARY CARE CENTRE.

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ABSTRACT:

Blood transfusion saves lives but carries the risk of transfusion transmitted infection. A retrospective study done on blood donors. A serological screening by ELISA and rapid method was carried out for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Syphilis, Malaria. Out of 3462 donors serology reactivity was 1.61%. For HIV 0.12%, HBV 0.40%, HCV 0.24%, Syphilis 0.84%, Malaria ≈ 0%. Study shows that we can still reduce reactivity rate by efficient screening and counselling.

KEYWORDS: Human Immunodeficiency Virus, Hepatitis B Virus, Hepatitis C Virus, Syphilis, Malaria

P-12

A COMPARATIVE STUDY OF MALARIA ANTIGEN TEST WITH PERIPHERAL BLOOD SMEAR IN DIAGNOSIS OF MALARIA AT TERTIARY CARE HOSPITAL CHANDKHEDA, GUJARAT (INDIA)

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OBJECTIVE: The study was aimed to compare microscopic examination of blood films with newly develop Immunochromatography card test which can be the alternative for the microscopy and diagnosis can be made at the earliest.
RESULTS: Total of 229 sample 1 0 were malaria positive. All 1 0 positive samples were P. vivax positive by malaria antigen card test and slide positive.
CONCLUSIONS: We can conclude that the card test has got a number of advantages though one needs to keep in mind the cost of the test which may not be affordable by many. The high cost of the test may prevent its regular and routine use in many of the laboratories.

P-13
PREVALANCE AND TRENDS OF TRANSFUSION TRANSMITTED INFECTION AMONG BLOOD CENTER IN SOUTH GUJARAT.

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AIMS AND OBJECTIVES:

- To detect the prevalence of transfusion transmitted infections among blood donors in blood center attached to tertiary level hospital of south Gujarat.
- To analyses transfusion transmitted infection among different blood groups and different age group blood donors.
- Compare prevalence of transfusion transmitted infection in year 2021 and 2022.

MATERIALS AND METHODS:

- In this Retrospective study, donors were selected as per the Drugs and Cosmetic Act, 1940& its amendments between 1st January 2020 to 31st December 2021.
- Age group : 18 to 65 years
- Testing methods:

  Fully automated ELISA based testing in Euphoria 4.1 (Tulip diagniostic) and CLIA (Chemiluminescence immune Assay) based testingin vitros 3600 (ortho clinical diagnostic, USA) was done for HIV (4th generation kit),HBV and HCV.The tests for syphilis was done by either TPHA rapid strip test or ELISA and the tests for malaria was done by either ELISA or rapid test.

RESULT:

- Out of total 21675 blood donors, 271 (1.25%) were reactive for transfusion transmitted infections between 1st January 2020 to 31st December 2021.
- In year 2020, most frequent blood group was B POSITIVE among TTI reactive blood donors and maximum reactive donors were found among 40-50 year age group.
- In year 2021, most frequent blood group was B POSITIVE among TTI reactive blood donors and maximum reactive donors were found among 20-30 year age group.

CONCLUSION:

Stringent measure need to be taken for blood donor screening,by using more sensitive screening methods to detection of infection early,like nucleic acid testing assay, to reduce incidence and prevalence of TTIs.

P-14
A CASE OF SUCCESSFUL AUTOLOGOUS PERIPHERAL BLOOD STEM CELL HARVESTING AT TERTIARY CARE HOSPITAL.

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BACKGROUND: - Mobilized peripheral blood stem cells are increasingly used in both autologous & allogenic hematopoietic stem cell transplantation.
AIM: - To analyse data of 2 patients who have undergone auto PBSCT in our centre.

MATERIALS & METHODS:- PBSC harvesting was done after G-CSF mobilization of stem cells. G-CSF was administered at a dose of 10micro / Kg /day for 5 days. PBSC harvest was done using cobe-Spectra Apheresis system on the sixth day.
RESULTS: - In the current study, PBSC harvested from two patients. One from 16 yr old male patient, suffering from Hodgkin's lymphoma & other from 71 yr old female patients, suffering from multiple myeloma. The median blood processed volume was 10,097 ml. with a processing time 224 mins to yield final PBSC product of 212 ml. The median MNC & CD34 cell dose for both autologous harvests was 2 X 10^8 / kg / apheresis & 2.4 X 10^6/kg /Apheresis respectively. The procedure was well tolerated. No any long term or short term complication was reported.
CONCLUSION: - Adult stem cells harvested, stored and transfused to both patients. Cell dose of both products were satisfactory. But it is small study of short duration, it needs further work-up and review for definitive conclusion.

P-15
THERAPEUTIC PLASMA EXCHANGE PRACTICES IN TERTIARY CARE CENTRE

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BACKGROUND-Therapeutic plasma exchange is a process where ,through an apheresis machine, plasma is removed and blood cells are reinfused along with fluids like plasma or albumin to the patient. It removes pathogenic substances such as auto- antibodies,lipoproteins,cryoglobulins,and toxins present in the plasma and plays a key role in management of various diseases .Early starting of TPE after diagnosis of disease may enhance fast recovery .A typical goal is to exchange 1- 1.5 times the estimated plasma volume as per American Society of Apheresis (ASFA) guidelines.
OBJECTIVES: The aim of the study is to assess the clinical outcome in patients of different neurological and non- neurological disease.
METHODS: This is Retrospective Obsevational analysis of all the TPE procedures done from January 2021 to January 2022 in tertiary care centre. TPE Procedures were performed using Cell Separator Spectra Optia (TERUMO PENPOL) and COM-TEC Cell Separator (FRESENIUS KABI). Pre and Post procedure clinical status and investigations were evaluated.Patients demographic details , plasma volume processed ,replacement fluid given,adverse reactions related to procedures and equipment failure were collected and evaluated.
RESULTS:A total of 1177 were procedures performed for 235 patients over the period (an average of 5 sessions/patient).The most common indication for TPE was Guillare Barre Syndrome (67%) followed by Myasthenia crisis(21%).Others include Peripheral neuropathy(16%),Acute Transverse myelitis(15%), Systemic lupus erythematous(12%),Neuromyelitis optica (10%) Multiple Sclerosis(9%),Thrombotic Thrombocytopenic Purpura,(12%),Auto immune Hepatitis(10%),Autoimmune Encephalitis(6%), Dengue encephalitis(5%),Suspected Prions(5%), Dermatomyositis(5%), Demyelination(5%)andDegenerating disorders(4%).
Most of the patients showed improvement after first two cycles(70%).Most common adverse reaction was Hyocalcemia (35%)followed by Allergic reaction(23%) and Hypotension(1-2%).10% procedures were aborted due to technical fault in machine.

CONCLUSION: Plasma exchange is considered as an effective and cheaper immunomodulatory treatment when as compared to Intravenous immunoglobulin(IVIG).It holds strong evidence in improvement of neurological disorders.The exchange plasma volume should be calculated for all the patients to see the effect of variables like weight and hematocrit.The use of this nodality of treatment should be encouraged.

KEYWORDS: Apheresis, Spectra Optia, Fresenius Kabi, Guillare Barre Syndrome

P-16
FIRST EXPERIENCE OF AUTOMATED RED CELL EXCHANGE IN SICKLE CELL CRISIS: A CASE REPORT FROM TERTIARY CARE HOSPITAL

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BACKGROUND: Sickle cell disease is an inherited autosomal recessive blood disorder**.** Sickle cell anaemia (SCA), is a chronic disorder having qualitative defect in globin chain. It is caused by a single mutation & substitution of valine with glutamic acid at sixth position in beta globin gene resulting in abnormal haemoglobin Hb –S. Red Cell Exchange(RCE) is removal of a patient's red blood cells while replacing with donor red blood cells either manually or using automated systems· In SCD Automated Red Cell Exchange is an evolving technique which prevents new vaso - occlusive events by removing HBSS& HBSβ Cells and provides added oxygen carrying capacity without increasing viscosity of blood.

CASE REPORT : We report our first experience of automated red cell exchange in 20 year old female diagnosed case of sickle cell disease presented to us with complaints of chest pain, breathlessness at rest, pain in both upper limbs, vomiting, diarrhoea. Red Cell Exchange was planned to tide over the acute sickle cell crisis and provide symptomatic improvement.

KEY WORDS: Sickle cell crisis, Apheresis, Automated Red Cell Exchange.

P-17
A ROLE OF APHERESIS IN GUILLAIN BARRE SYNDROME IN TERTIARY CARE HOSPITAL

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INTRODUCTION: Guillain Barre Syndrome(GBS) is a Severe polyneuropathy with variable degree of muscle weakness. The severe GBS with respiratory failure may affect 25 - 30% of the .Plasmapheresis is an extracorporeal technique involving removal of plasma containing pathogenic substance and substituting with suitable replacement fluid by apheresis device. Plasmapheresis exerts beneficial effect by removing both auto antibodies and alloantibodies . In addition ,it also removes monoclonal proteins, toxins and immune complexes. The definite beneficial effect has been observed on the course of illness is due to removal of cytokines and antibodies which also leads to decrease in severity of symptoms.

AIMS AND OBJECTIVES:

1) To study effectiveness of plasmapheresis in GBS.
2) To study plasmapheresis protocols in clinical practice.

METHODS: A Retrospective study was conducted in a series of 50 patients who underwent Plasmapheresis as a treatment modality for GBS from 1st May 2022 to 31st July 2022 in civil hospital Ahmedabad. The S.Optia and F.Cabi; continuous flow cell separator System were used for Plasmapheresis. Prognostic indicators like Age, Sex, presenting severity, time between onset of illness and arrival at Hospital, time taken to start plasmapheresis and Outcome of treatment were analysed .plasmapheresis protocol i.e. no.of cycles are determined depending on severity of GBS.

RESULT: Out of 50 patients who underwent Plasmapheresis; All patients had power 1 or 2 on admission but on discharge the power was grade 3 to 5 in 72% patients. The number of patients who received 5 cycles,4 cycles,3 cycles were respectively 50%,32% and 18%. Patients treated with Plasmapheresis early, showed significantly better recovery with secondary parameters like: time to recover, walking without aid,% of patients requiring artificial ventilations, duration of artificial ventilation, full muscle strength recovery and severe sequelae. There was reduced risk of infections and cardiac arrythemia in patients treated with plasmapheresis.

CONCLUSION: Early treatment with plasmapheresis has better outcome when started within 7 days after disease onset in patients of GBS.In severe GBS; 4 or 5 cycles are required for better outcomes.In mild GBS;3 cycles are effective. plasmapheresis is effective in reducing disability grade amongst all time points:atpresentation,immediate post therapy and after 4 weeks.plasmapheresis has been proven to superior over other supportive treatment alone in GBS.

P-18
PLASMA EXCHANGE IN THE TREATMENT OF PAUCI-IMMUNE TYPE RAPIDLY PROGRESSIVE CRESCENIC GLOMERULONEPHRITIS

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INTRODUCTION: Pauci-immune crescentic glomerulonephritis (CrGN) is one of the most common cause of rapidly progressive glomerulonephritis (RPGN). The characteristic features of pauci-immune CrGN is focal necrotizing and crescentic glomerulonephritis with little or no glomerular staining for immunoglobulin or complement by immunofluorescence microscopic examination.In patients with ANCA-negative pauci-immune CrGN, the pathogenesis is not clear. Anti-endothelial cell antibodies (AECA) have been implicated in the pathogenesis of vasculitis. Plasma exchange has been used for the treatment of rapidly progressive glomerulonephritis (RPGN) since many years. The aim of plasma exchange is to remove disease-associated molecules and therefore interrupt disease progression. The American Society for Apheresis (ASFA) assigned Category III, grade 2C to the therapeutic plasma exchange (TPE) to treat the ANCA-associated vasculitis (AAV).

CASE REPORT: A 48 years old male was admitted to hospital because of bilateral pitting pedal edema, dark colored urine and proteinuria. His renal function deteriorated rapidly. Serum immunoglobulin and complement levels were within normal ranges. An autoantibody examination showed negative for antinuclear antibody and antineutrophil cytoplasmic antibody. Histologic examination of a renal biopsy specimen revealed that the glomeruli had sever crescent formation. While Immunofluorescence microscopy Suggestive of Complement C3 depositions, with +2, patchy, mesangial staining in glomeruli. The patient was treated with steroid pulse therapy with cyclophosphamide followed by oral prednisolone. As patient's creatinine was increasing and urine output was decreasing, 5 cycles of hemodialysis and plasma exchange were done, after that patient was improved clinically.
KEY WORDS: Plasma exchange, Glomerulonephritis

P-19
PLATELETPHERESIS DONOR DEFERRAL : CHARACTERISTIC AT A TERTIARY CARE HOSPITAL OF JAMNAGAR

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AIMS AND OBJECTIVES :-

1. To have a background profile of Single Donor Platelet Donorsand identify some common reasons of deferral.
2. To encourage and retain a pool of voluntary Single Donor Platelet Donors.

METHODS :-This prospective observational study was carried out at the department of Immunohaematology and Blood Transfusion, Shri M.P Shah Government Medical College Jamnagar over a period of one year (August '21 to July '22).
A detailed history was taken and the donors were selected as per the departmental Standard Operating Procedure for Plateletpheresis donors selection:

- ✓ Weight > 50kgs
- ✓ Age : 18 – 60 years
- ✓ At least 3 months from the last Whole Blood Donation or 48 hours from the last Single Donor Platelet Donation for males.
- ✓ At least 4 months from the last Whole Blood Donation or 48 hours from the last Single Donor Platelet Donation for the nulliparous females.
- ✓ ABO identical Donor
- ✓ Adequate venous access
- ✓ Hemoglobin > 12.5 g/dl
- ✓ Platelet Count > 150 * 10^3 / µl
- ✓ No consumption of Non-Steroidal Anti-Inflammatory Drug for the last 3 days.
- ✓ Non-Reactive for TTI Markers.

RESULTS: -A total of 246 donors were screened for 111 procedures.

- Total Donor deferred: 135/246 (54.8%)
- Most Common Cause: poor venous access (55%) > low platelet count (22%)
- Temporary causes include weight (7%),anemia (3%), infections (2%), drug intake (1%), temporary ailments (10%).

CONCLUSION:-The highest cause of donor deferral for plateletpheresis is poor venous access followed by low platelet count. Amongst the procedures taken, maximum number of donors were repeat donors due to easy venous access.Donors deferred due to temporary causes like low hemoglobin, infections, drug intake, etc must be adequately counseled to encourage them for future donations.

P-20
ROLE OF THERAPEUTIC PLASMA EXCHANGE IN CRITICAL CARE

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AIMS AND OBJECTIVES: To discuss the role of therapeutic plasma exchange (**TPE**) in critical care

METHODS: This was a retrospective study conducted by the Department of Transfusion Medicine, Sri Ramachandra Medical College & Research Institute from July 2021 to June 2022. Patients who underwent TPE for various conditions were included in the study. Fresenius ComTec cell separator was used for TPE. Replacement fluids used were Fresh Frozen Plasma, 5% Human Albumin, Normal Saline. Acid Citrate Dextrose A (ACD-A) was the anticoagulant used for all the sessions. Vascular access was achieved through a Hemodialysis double lumen catheter in internal jugular vein or femoral vein. All the TPE sessions were carried out in the ICU with monitoring of patient vitals.

RESULTS: For 21 patients included in the study, a total of 48 TPE procedures were done. Among them there were 6 females and 15 males. Various indications for TPE were Alcoholic Liver Disease (n=7), Non-Alcoholic hepatitis (n=5), yellow phosphorus poisoning (n=4), Drug Induced Liver injury (n=3) and Guillain Barre Syndrome (n=2). Duration of TPE session varied between 2 to 3 hours depending upon the volume of plasma exchanged. Volume of plasma exchanged was about 1-1.5 volumes approximately in each session. The outcome of TPE observed among the 21 patients was - 6 patients recovered, 8 patients got discharged against medical advice and 7 patients succumbed to the illness. The cause of death was septicemia and multi organ dysfunction syndrome. In cases of Acute Liver Failure, patients showed improvement in clinical condition and lab parameters after 3 sessions of plasma exchange.

CONCLUSION: Therapeutic Plasma Exchange acts by removing the offending pathogenic substance (cytokines, toxic metabolites and antibodies) from the plasma and thereby significantly improving the clinical condition and laboratory parameters. TPE is also a first line treatment (ASFA category I) for hematological conditions like Thrombotic Thrombocytopenic Purpura (TTP). Plasma exchange can be performed as a bridge therapy in patients with acute liver failure awaiting liver transplantation.

P-21
CLINICAL SIGNIFICANCE OF RARE MATERNAL ANTIBODY

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INTRODUCTION: Anti D is the most common cause of HDFN butcan occur with other antibodies.Although Jk^a antigens are well developed on RBCs of neonates and have been detected on fetal RBCs as early as 11 weeks but rarely responsible for severe HDFN possibly because of poor immunogenicity.The frequency of Kidd antigens is high in Caucasian population (77% for Jka and 72% for Jkb). Approximately 20–29% of Caucasian and Asian population have the Jk(a+b−)

phenotype. Moreover, people with phenotype Jk(a−b−) are usually Asiatic. Kidd antibodies are usually IgG, capable of passing through the placenta and bind complement, producing hemolysis both intra and extravascular causing HDFN.

AIM AND OBJECTIVE: To detect antibodies against minor blood group antigens other than the Rh-antibodies to prevent Hemolytic Disease of the Foetus and Newborn(HDFN) due to the rare antibodies.

METHOD: Blood samples of a newborn baby,having signs and symptoms of hemolysis, were received along with mother's sample for blood requisition for 50 ml RBC.

RESULT: On blood grouping, both baby's and mother's blood group were found to be group B,Rh Positive. The Indirect Antiglobulin Test (IAT) of mother's and Direct Antiglobulin Test (DAT) of baby was positive (2+) with anti-IgG and anti-C3d gel card. Crossmatch by IAT was incompatible.Screening and identification of mother's serum for irregular antibodies showed anti-Jka antibody. Baby's cells were positive for the Jka antigen. Antigen Jka negative blood units were cross matched with mother and neonate's sample using column agglutination technique and found to be compatible. After transfusion, baby was relieved from symptoms and discharged later.
The most common route of sensitization against Kidd antigens is via blood transfusion. Antibodies usually IgG are able to cross the placenta, bind complement and produce rapid either intravascular and/or extravascular hemolysis. In those fetal RBC-maternal blood contactcases, the sensitization is rare but possible.

CONCLUSION: The present case emphasizes the significance of antibodies against minor blood group antigens other than Rh blood group system as a cause of HDFN. This case illustrates the importance of performing an IAT in all antenatal women irrespective of D status.

KEYWORD: Hemolytic, Newborn, Anti-Jka, Kidd, Anemia

P-22
CLINICAL AUDIT OF PHYSICIAN COMPLIANCE TO DEFINED TRANSFUSION TRIGGERS FOR REDBLOOD CELL CONCENTRATE TRANSFUSION IN MEDICINE WARDS AT SHREE KRISHNA HOSPITAL,KARAMSAD,GUJARAT.

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INTRODUCTION: Blood and blood components are an important part of patient management treatment protocol. Evidence to indicate the minimal use of blood and blood products is available. Transfusion protocols have been established through the Hospital Blood Transfusion Committee of Shree Krishna Hospital based on standard guidelines. However, inappropriate use of blood with no concrete evidence still continues.Hence,regular audit of blood component usage is essential to identify the treating physician's compliance to transfusion guidelines.

OBJECTIVE: To ensure the rational use of red cell concentrates at the medical ward of Shree Krishna Hospital.
METHODS: Clinical audit of the RCC transfusions in male and female medicine ward patients of Shri Krishna Hospital was carried out from 1st January 2022 to 31st March,2022.Hospital transfusion protocol was used as reference gold standard for audit.For clinical audit,patient's medical records andHospital Informative System (HIS) were referred. Data was analyzed forgender-wise distribution, indications for RCC transfusion, associated comorbid conditions, pre-transfusion hemoglobin (Hb) level of the patient.
RESULTS: The male: female ratio was 1.5: 1. Majority of the subjects had the Hb levels in the range of 5-7 gm %. Majority of the RCC was stored for 2- 5 weeks and the mean duration of storage was 4.3 weeks. A statistically significant improvement was observed in the mean Hb levels in the post-transfusion period compared to the pre-transfusion Hb. 82.8% patients had appropriate blood transfusion while 17.2% had inappropriate blood transfusion in the context of Hospital Blood Transfusion Protocols. It is proposed to intervene by sensitizing consultants and residents regarding the rational use of blood and carry out another cycle of audit to ensure 100 percent compliance with the objectives
CONCLUSION: Regular audit of blood components is crucial so that appropriate measures can be taken for proper usage. Continuous medical education regarding the transfusion services for the clinicians and residents havea major role in improvement for the clinical transfusion practices in the hospitals.
KEY WORDS: Transfusion audit, Appropriate utilization, Blood components

P-23
GLANZMANN'S THROMBASTHENIA: A RARE CONGENITAL PLATELET BLEEDING DISORDER

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INTRODUCTION: Glanzmann's Thrombasthenia is a rare congenital genetic platelet disorder. It is associated with either deficiency or dysfunctionality of Platelet Glycoprotein (GP) IIb / IIIa complex.
OBJECTIVE: To study a clinical course of a child with Glanzmann'sThrombasthenia.
CASE HISTORY: A 4 ½ years old male presented with multiple episodes of hematemesis and low grade fever, having past history of bleeding following trauma and severe degree of pallor without any icterus at Dr.M.K.Shah Medical College & Research Institute,Ahmedabad
RESULT: Patient has normal platelet count with abnormal platelet functions studies in the form of prolonged bleeding time, poor clot retraction and absence of platelet aggregation. In our case, Bleeding is managed by platelet transfusions.
CONCLUSION: Patient with Glanzmann'sThrombastheniacan lead a normal life, if it is diagnosed successfully. Treatment is based on proper supportive care and platelet transfusions only.
KEYWORDS: Glanzmann'sThrombasthenia, Rare Bleeding disorder, Platelet aggregation (GP IIb/IIIa complex), Platelet Transfusions

P-24
CLINICAL USE OF BLOOD AND BLOOD COMPONENTS IN OBSTETRIC PATIENTS AT A TERTIARY CARE CENTRE.

Dr Maitri Katrodiya, Dr Nisarg Parikh, Dr Falguni Patel, Dr Maulik Vora, Dr. Urvi Prajapati
Dr.M.K.Shah Medical College and Research Centre

AIM AND OBJECTIVE: The use of blood and its components has become a lifesaving stratergy in management of obstetric hemmorrhages.this study was undertaken to acertain and analyse the prevalence and indication of various blood components in obstetric patients at tertiary care center.
METHOD: Retrospective study of 200 patients of obstetrics for blood and it's component transfusion from march,2021 to july,2022.
RESULT: Prevalence of blood and it's components transfusion in obstetric patients was 19.7%. Out of 200 patients; 74.5% (n= 149) had cesarean delivery,20.5% (n=41) had vaginal delivery; 5% (n=10) had assisted vaginal delivery. Mode of delivery was highly associated in blood transfusion. Mostly women received blood transfusion were multiparous (62%). Blood and blood components therapy was significantly more in women who underwent cesarean section as compared to vaginal delivery. Out of total blood components transfusion packed cell volume(pcv) 84%, fresh frozen plasma(ffp) 6.38%, packed red cell(prc) 9.58%.
CONCLUSIONS: Evalute frequent indication of blood transfusion in obstetrics, number and component of transfused that would be helpful to estimate the need of blood products in future to cope up the need to secure an adequate blood donor pool

P-25
BLOOD TRANSFUSION PRACTICE IN MANAGEMENT OF THALASSEMIA PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL.

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INTRODUCTION: Thalassemias are group of hereditary disorders characterized by anomalies in globin chain synthesis. About 10% of total world thalassemia patients belong to Indian Subcontinent and among them 3-4% are carrier. Clinically the most severe form of this disorder is classified as Thalassemia Major which is transfusion dependent. The current management of thalassemia is based on regular red cell transfusions and effective chelation therapy.
The main goals of transfusion therapy:
-correction of anaemia
-suppression of erythropoesis
-inhibition of GI iron absorption which occur due to increased but ineffective erythropoesis.
Repeated blood transfusions are associated with iron overload, transfusion transmissible infections, alloimmunization etc. On other hand, inadequate transfusions lead to severe anaemia and debility.

AIMS & OBJECTIVES

1. To evaluate various modalities of blood transfusion in thalassemia patients.
2. To evaluate effectiveness of blood transfusion in Thalassemia Major patients
3. To Study the outcome due to repeated blood transfusion and under transfusion.

METHODS: Data were obtained from 250 thalassemia major patients aged 3 years or more receiving regular blood transfusions at Civil Hospital, Ahmedabad during period of 1st January 2019 to 31st July 2022.The clinical data and laboratory results were analyzed.

All patients were subjected to history taking with special emphasis on frequency of transfusion, type of blood component used, type of chelation. Serum ferritin level and pre transfusion haemoglobin level were assessed.

RESULT: 250 Patients were transfused with Leucodepleted PCV, 48% were under transfused with mean Hb of <10gm%. 27.2% were taking chelation therapy in form of Desferrioxamine for iron overload, out of which 0.05% were adequately treated with maintaining serum ferritin < 1000ng/ml . 0.08% patients were found to be alloimmunized.

CONCLUSION: The study suggests adequacy of transfusions to achieve goal of haemoglobin level 10gm%, also to institute effective chelation measures with the aim of keeping serum ferritin levels <1000ng/ml to avoid iron overload. Regular monitoring should be done to prevent under & over transfusion by measuring pre& post transfusion Hb levels. Failure to evaluate packed cells for Rh Alloantigens before starting transfusion therapy can lead to alloantibody synthesis.

P-26
STUDY OF ADVERSE DONOR REACTIONS IN NORMAL HEALTHY BLOOD DONORS:EXPERIENCE OF TERTIARTY HEALTH CARE CENTRE

Dr Swastik Kumar Patel , Dr Bhoomika Shingala, Dr Jitendra H Vachhani
Shri M.P. Shah Gov.Medical College Jamnagar, Gujarat

INTRODUCTION: Whole blood donation is generally a safe procedure,but sometimes adversereactions of varying severity may occur during or after completion of blood donation process.

AIMS AND OBJECTIVES: To determine the incidence of various adverse donor reactions.Special attention could be given to those donors of potential adverse reactions.

MATERIALS AND METHODOLOGY: This is a retrospective study of 9 months (from August 2020 to April 2021) in whole blood donors at our hospital. Donor selection is done according to our standardized operative procedure.

RESULTS: A Total 16778 blood donation were occurred in this period,16333 (97.35%) males and 445 (2.65%) females.Out of 16778,5041 First time donors and 11737 repeated donors.Incidence rate of adverse donor reactions were in first time donors 1.14%,repeated donors 0.58% and overall, 0.75% in our centre.

CONCLUSION: This study helpto identify the donors at risk of donor reaction and to reduce the incidence by adopting appropriate donor screening,counselling,post donation care basically for first time blood donors. Most common adverse donor reaction was Vaso-vagal reaction followed by hematoma.

P-27

PROFICIENCY TESTING FOR IMMUNOHAEMATOLOGY, TRANSFUSION TRANSMITTED INFECTION AND HEMATOLOGY - EXTERNAL SAMPLES FOR INTERNAL ASSESSMENT.

Keyuri F. Jariwala ,Dr. Sumit Bharadva
Surat Raktadan Kendra and Research centre

AIMS & OBJECTIVES: The aim of the study is to evaluate the performance of our Blood Centre in EQAS tests for Immunohaematology, TTI and Hematology over the past five years from 2017-2021.The primary objective of proficiency testing is to provide laboratories with an information and support to demonstrate and improve the quality of their analytical measurement. SRKRC is participating in EQAS program from the year 2010.EQAS samples are received from Christian Medical College (CMC) Vellore ,Indian Red Cross Society, Bombay, National AIDS Research Institute (NARI), ICMR through SRL, Surat, SDMH, BEQAS, Indian Society of Hematology and Transfusion Medicine-AIIMS Hematology department, New Delhi.
METHODS: All tests were run as routine test samples by laboratory technicians. ABO grouping, Cross-matching, Antibody screening was done by manual technique as well as Automated Immunohaematology system – DIAGAST & NEO. .For TTI the first assay in which the sample were tested on ELISA. Any other assay used to clarify screened reactive results is a supplemental assay Rapid. The samples were evaluated and the results sent to them in the format provided. For Hematology we receive specimens of stabilized whole blood for performing CBC, Red cell indices, a peripheral blood smear and a stained slide for Retic count.
RESULTS: All test results along with the marks calculation sheets were received, analyzed and documented. For incorrect results root cause analysis was done to prevent the errors and corrective actions were planned.
CONCLUSION: Regular participation in proficiency testing programs has helped our blood bank to be more effective in maintaining quality of service. The efficiency of the standard operating procedure and compliances of the personnel to the SOPs are accurately assessed by EQAS program. Thus it also helps in continuous assessment of laboratory practices and personnel.

P-28

QUALITY CONTROL OF BLOOD COMPONENTS- AN EFFECTIVE WAY TO PROVIDE QUALITY PRODUCTS BY A STAND ALONE BLOOD BANK

Harshal brambhatt, Dimple Rohit, Dr. Jitesh Godhani, Dr.Vishva Parikh
Ayush Blood Center, Vadodara

AIMS & OBJECTIVE:

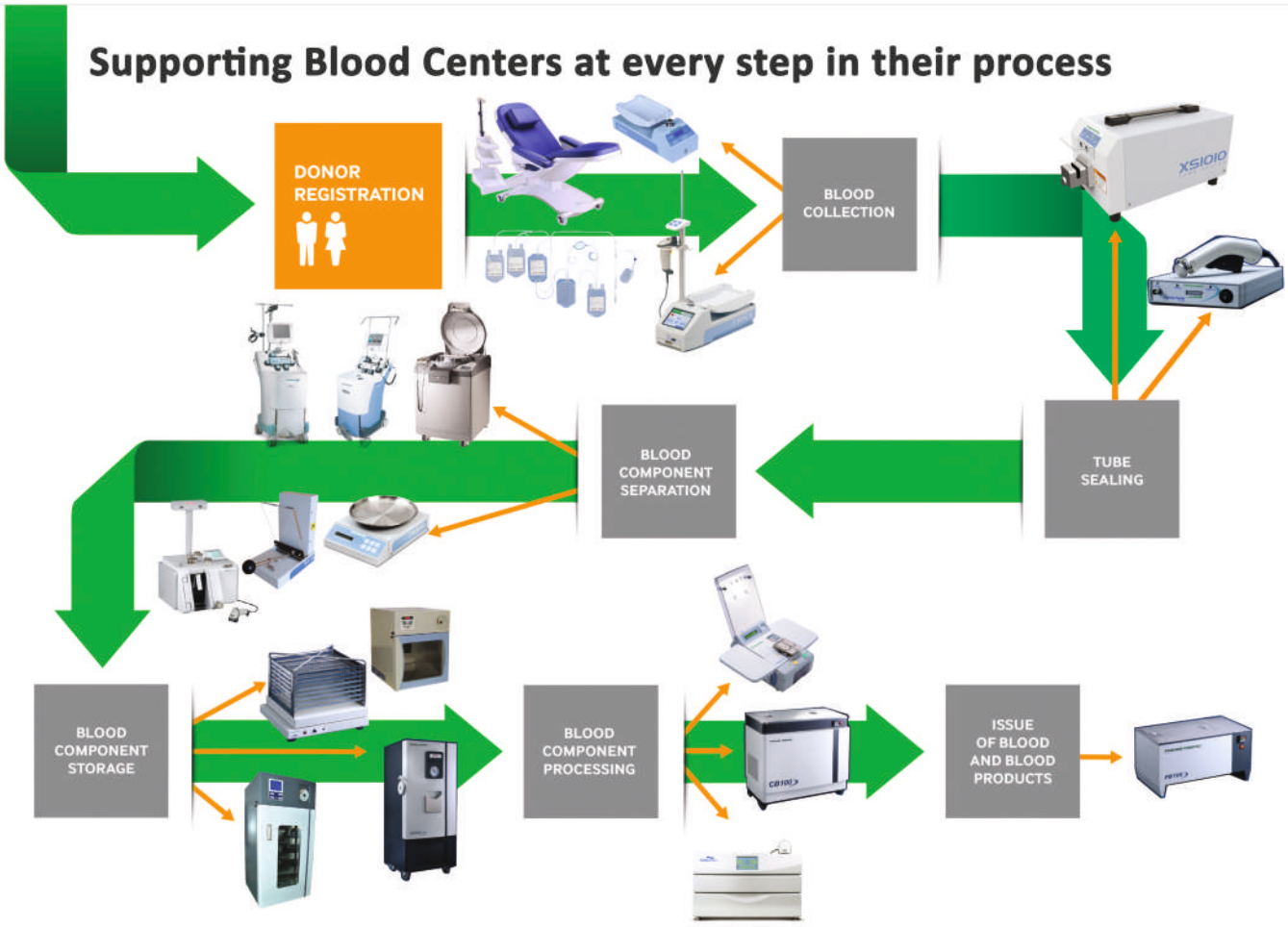
1. To ensure high quality with maximum efficacy in supplying blood and blood products.
2. To minimize the risk to patients and donor.

METHODS: Retrospective analysis of data of quality control of all blood bags from July 2020 to June 2022. Therapeutic phlebotomy bags are excluded.1% of each or minimum 4 bags/month of Red cell concentrate, Fresh frozen plasma, Platelet concentrate, Cryoprecipitate and Platelet apheresis done.
RESULTS: There is improving trend in Red cell concentrate QC out of range with consistent in SDP , FFP, PC and Cryoprecipitate QC
CONCLUSION: Quality control in a blood bank is an important tool for effective and safe transfusion to patients which minimize the cost of therapy and risk of transfusion transmitted diseases.

P-29
ROLE OF HORIZONTAL & VERTICAL AUDITS IN QUALITY MANAGEMENT SYSTEM: AN EXPERIENCE OF TERTIARY LEVEL BLOOD CENTRE.

Dr. Tejas Kansara, Dr. Kruti Nathani, Dr. Jitendra Patel, Dr.Amrish Pandya
Department of IHBT, Government Medical College, surat

AIMS& OBJECTIVE: To study the utility of vertical and horizontal quality audits as a quality improvement tool in a transfusion centre and to compare, contrast Vertical and Horizontal audit.
METHODS: It was an observational study and data were collected prospectively, of vertical quality audits &Horizontal audit that were conducted in the blood centre of the New Civil Hospital, Surat, Gujarat from May 2019 to June 2020. Data derived from both the audits formed the basis for study. Non-conformities observed during these audits and their root cause analysis with corrective actions/preventive actions were done. Descriptive analysis of the data was done using Microsoft Excel.
RESULTS: During the study period, 245 blood units from total 11,093 were reviewed in vertical audits out of which 149 nonconformities observed. 67(44.97%)nonconformities encountered were documentation related nonconformities which was most common followed by 43 [28.86%]other non-conformities,22 [14.7%]operator related non-conformities, 10 [6.71%]software systemnon-conformities and7 [4.70%] procedural or technical non-conformities in decreasing order. In Vertical audit, maximum non-conformities observed were in donor area were 56 [37.58%], followed by 44 [29.53%] in red cell serology area, 27 [18.12%] in Component separation area, 12 [8.05%] in Component storage area, TTI area and 5 [3.36%]in other areas were in decreasing order.
Total two annual Horizontal audits were conducted which included6 [31.57%]Major Non-conformities and 13 [68.42%]Minor non-conformities. In Horizontal audit the maximum non-conformities encountered were other nonconformities (7, 77.78%), followed by 5 [26.32%] eachprocedural or technical & documentation non-conformitiesand operator related & software system non-conformities both were 1 [5.26%] in decreasing order. Maximum non-conformities observed were in red cell serology area were 5 [26.32%] followed by Donor area and other areas were 4 [21.05%], Component storage area 3 [15.79%], TTI area 2 [10.53%] and Component separation area 1 [5.26%] in decreasing order.
CONCLUSIONS: There are distinct advantages of Horizontal and Vertical audits respectively and both the systems should be used in a manner which is complimentary in order to bring about continuous quality improvement.



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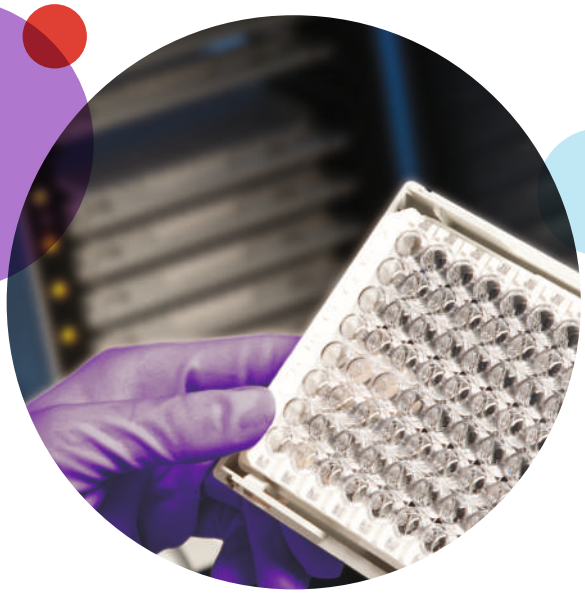

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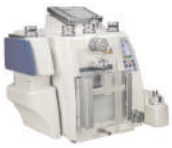

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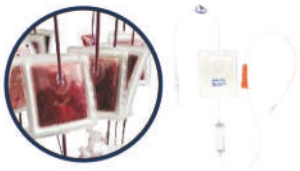

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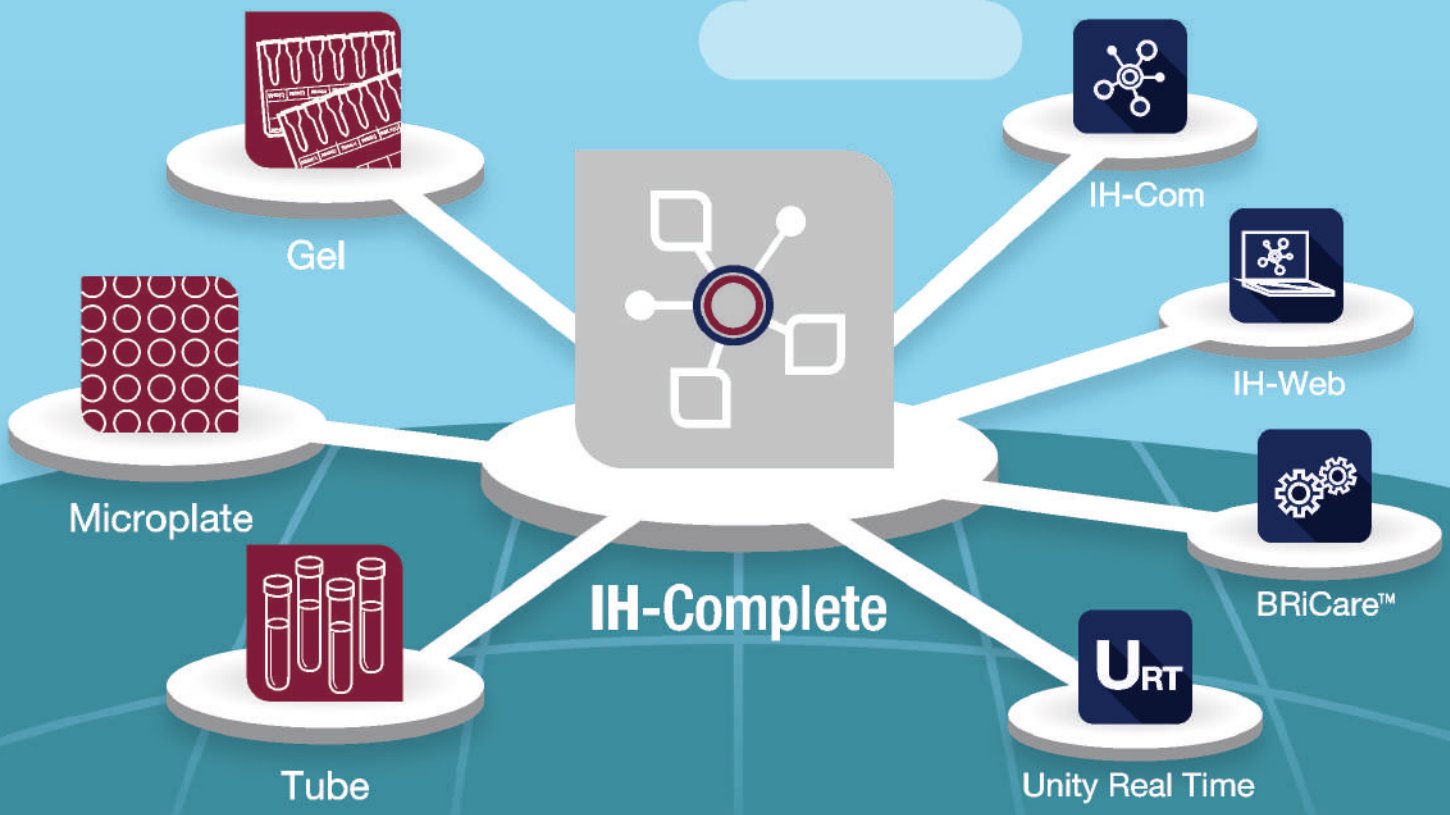

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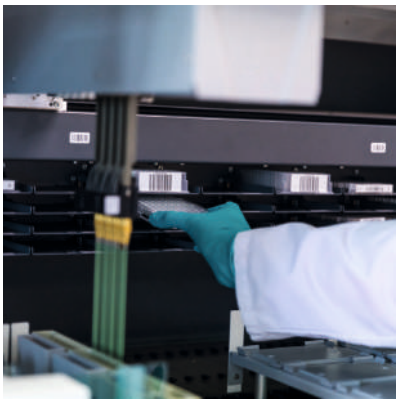

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