Recent Updates in Management of TTP

Immunoadsorption for ABO incompatible Solid Organ Transplants

Regulatory Updates on Bio Medical Waste Management in Blood Banks

Transfusion Support in Neonates

“Donate blood, save life”

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Editorial Office:

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Editorial

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Dear All,

Greetings form the Dept. of Transfusion Medicine, PGIMER, Chandigarh! Hope you and your families are doing well and we pray for healthy and happier times ahead. It is really a matter of great pride for all of us to know that the alumni of the DTM PGIMER are performing exceptionally well both in the national and international arenas. The current initiative of PGIMER, Transfusion Medicine alumni periodical will act as platform to share your work, latest development in field and to take you down to the memory lanes of Dept. This will help all of us to remain in touch with each other and express our professional & personal viewpoints on a particular topic.

In the Current issue, Dr Ravi Sarode, from USA, has given an insightful overview of Thrombotic Thrombocytopenic Purpura (TTP), a rare clinical entity which poses a great challenge in its management. Dr Sarode has touched upon various aspects of TTP including the recent trends in its management, which would certainly be helpful to all of us involved in management of this challenging clinical disorder. Dr Sarode is one of our very senior alumni and has a very bright and illustrious academic carrier and has been guiding us from time to time in various aspects of Transfusion Medicine for the growth of the department and we express our deep gratitude to him for the same.

Dr. Prasun Bhattacharya and Dr Dipti Rajan Rout has given a very concise and updated version of the Biomedical waste management practices and rules. This assumes a great importance in the current covid-19 Pandemic times. This is followed by a novel concept on retention of Voluntary blood donors by Dr Suchet Sachdev and Dr Priyadarsini, wherein, they have tried to narrate few steps to be taken to motivate the temporarily deferred blood donors to return for blood donation after completion of their deferral period.

Dr Rekha Hans and Dr Yashsawi Dhiman has very nicely described the utility of Immunoadsorption columns in ABO incompatible solid organ Transplants including various technical considerations for the renal transplant. Dr Daljit Kaur and Dr Rakesh kumar has given a current update on newer technologies to address the challenge of transfusion transmissible infectious agents including pathogen inactivation.

Dr Lakhvinder Singh and Dr Sheetal Malhotra has described pros and cons of molecular testing in immunohematology in our setting and this still seems far from reality in routine blood banking except for research and academic institutes. The current update on neonatal transfusion by Dr Kshitija Mittal and Dr Anoopa Pokhrel nicely covers current guidelines and technical aspects in catering the requirements of this special group of patients. A brief write up on role of new stem cell mobilizing agents in increasing the stem cell yield in the peripheral stem cell harvest by Dr Satya Prakash and Dr Ram Subramanian is quite interesting and useful in planning PBSC harvest procedures. Last but not the least, the lighter moments, by Dr Aparna Joshi, would certainly fill you with the nostalgia of your Alma mater.

I am sure the interesting and informative contributions by all our alumni would certainly generate enthusiasm in young professionals in our specialty to explore these areas of research.I also would like to request all the alumni members to join the PGI Chandigarh Alumni Association though the website https://pgialumni.org/.

I Congratulate and thank you all, for sparing your valuable time and contributing to this newsletter, especially Dr Satyam Arora and Dr Gopal Patidar, Associate editors, who have worked extremely hard for last few months to give this newsletter the current shape.

Stay safe and healthy, Best wishes

Recent Advances in the Management of Thrombotic Thrombocytopenic Purpura (TTP)

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TTP is a rare, fascinating disease, first described by Eli Moschowitz in 1924 in a young girl's autopsy where he found widespread hyaline microthrombi in many organs with resultant ischemic damage. It was not until the 1966 when Amorosi and Ultmann named it TTP following a review of cases from the literature and described the classic diagnostic pentad of microangiopathic hemolytic anemia (MAHA), thrombocytopenia, neurological symptoms, renal failure, and fever. The majority of these patients had the pentad indicating a severe disease with over 90% mortality. In the 1977, Bukowasky et al. described plasma exchange (PLEX) as a therapy for TTP with good results. In 1982, Joel Moake described two siblings during the neonatal period with congenital TTP who had ultra-large von Willebrand factor multimers (UL-VWF) in their plasma, and postulated an enzyme deficiency that regulated VWF multimers size. These patients were treated with plasma infusions at three-week intervals. Since these children were managed with plasma infusion, in 1992, Gail Rock published the first randomized clinical trial (RCT) of PLEX versus plasma infusions in suspected TTP patients who were qualified for the study based on unexplained biad of MAHA and thrombocytopenia. This RCT showed a significantly better response to PLEX than plasma infusion, establishing PLEX as the standard of care first-line emergent therapy.

In 1994, Furlan (Switzerland) and Tsai (USA) simultaneously described a VWF cleaving protease (VWF-CP) that regulated VWF multimer size in normal plasma under a high shear rate in the microcirculation. In 1998, Tsai and Furlan simultaneously described a severe deficiency (<10% activity) of this VWF-CP in TTP patients due to an IgG autoantibody (aTTP). This explained the benefit of PLEX by removing the autoantibody while replacing the deficient VWF-CP enzyme with plasma. In 2001, the genetic defect in congenital TTP (cTTP) was confirmed in VWF-CP, and the enzyme was renamed as ADAMTS 13 (a disintegrin and metalloproteinase with thrombospondin motif – 13th member of the family). During this decade, hemolytic uremic syndrome (HUS) was clearly separated from TTP as an individual entity because HUS patients had normal ADAMTS13 levels.

Because of its autoimmune nature, glucocorticoids were often used since the late 1990s. The PLEX and steroid had reduced the mortality from >90% to <20%. However, it was recognized that up to 30-50% of patients had exacerbation of the disease (either decrease in platelet count and/or increase in LDH during or within 30 days from the last PLEX), and similarly, about 30-40% patients also had relapses (recurrence of TTP >30 days after the last PLEX). This led to the use of rituximab (anti-CD-20) in patients with exacerbation and relapses. Despite that, the recurrences were common. Scully's group from the UK showed a significant benefit of upfront use (within days of TTP diagnosis based on a severe ADAMSTS13 deficiency) of rituximab in TTP patients to reduce recurrences, number of PLEX needed to achieve clinical remission, and hospital stay. A few patients are still refractory and have shown a good response to bortezomib, cyclosporin, cyclophosphamide, and vincristine.

Recent Advances in the Management of Thrombotic Thrombocytopenic Purpura (TTP)

Management of aTTP:

The current management has evolved significantly in the last decade. In patients presenting with unexplained MAHA and thrombocytopenia (usually <30 x 10^9/L), an emergent plasma exchange (1-1.5 plasma volume on day 1 and 1.0 volume after that) should be started after collecting plasma samples for ADAMTS13 activity and antibody testing. Other relevant laboratory tests include troponin (cardiac involvement is common), along with a comprehensive metabolic panel (serum creatinine is usually <2.5 mg/ml, non-oliguric renal failure). Glucocorticoid should be given on day 1. Once the diagnosis is confirmed by severe ADAMTS13 deficiency, rituximab should be given upfront (100 mg fixed-low dose/week x 4 or 375 mg/sq m weekly x 4). In cases with severe neurological symptoms, caplacizumab should be given until platelet count is >150 x 10^9/L and ADAMTS13 is >20-30%. PLEX can be tailored according to ADAMTS13 levels (>50%) measured at least twice a week to reduce unnecessary plasma exposure. Refractory TTP (no increase in platelet count or after increasing it falls) may also need caplacizumab and other immunosuppression therapy such as bortezomib (1 mg weekly x 4) or other immunosuppression. ADAMTS13 can be measured at regular intervals during the follow-up to detect early biological relapse (<30-50%) to prophylactically use rituximab therapy to avoid clinical relapse and hospital admission for PLEX.

Platelet transfusion is generally contraindicated to avoid “adding fuel to the fire”, and ultrasound guided central line can be placed safely without platelet transfusion. In case, PLEX cannot be started immediately, plasma or cryopoorplasma infusions should be given in the interim.

Management of cTTP:

The cTTP (Upshaw-Schulman Syndrome) is diagnosed based on persistent ADAMTS13 levels <10% and no detectable antibody. Congenital-TTP can be divided into three subtypes. Neonatal – when newborn presents with severe unexplained jaundice, thrombocytopenia, and MAHA. These patients are likely to need frequent infusions of plasma, or intermediate purity FVIII concentrates containing sufficient ADAMTS13 (carried by VWF) because they generally have ADAMTS13 activity <1-2%. Childhood – when young children develop TTP symptoms following some infections and they only require plasma infusions for these episodes. Their ADAMTS13 is usually between 2-5%. Adult-onset – usually identified during pregnancy (in the past known as pregnancy-associated TTP/HUS) and requires a high degree of suspicion to separate from aTTP. They may have ADAMTS13 levels between 5-9%.

Differential diagnoses:

MAHA and thrombocytopenia can be encountered in many clinical conditions such as malignant hypertension, atypical HUS, widespread malignant metastasis, hematopoietic stem cell transplantation, vasculitis, disseminated intravascular coagulation, etc. None of these conditions benefit with PLEX, and therefore, if the baseline ADAMTS13 value is >20%, PLEX can be discontinued. ADAMTS13 values between 10-20% require careful evaluation including if there were any plasma containing blood products were transfused especially platelets.

Thus, recently tremendous progress has been made in the management of aTTP. The future management may include a cocktail of caplacizumab and rADAMTS13 at the time of clinical diagnosis followed by aggressive immunosuppression therapy with steroids and rituximab and avoiding PLEX!

Bio Medical Waste Management in Transfusion Medicine and Blood Banking

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Biomedical waste is a term applied to waste generated in the diagnosis, treatment or immunisation of humans and animals, in research or in the production and testing of biological products. It also includes the waste coming out of medical treatment given at home or in health camps or in blood donation drives.

Blood Centres use a wide variety of substances including chemicals, testing kits and reagents, syringes, test tubes, vials, blood samples, blood bags, micro tips, and needles/sharps which ultimately become part of biomedical waste. Several hazards and risks are associated with improper waste management at blood centres including injuries from sharps, risks of infection to donors and patients, risks of infection outside the BTS centre for waste handlers, scavengers, and eventually the public.

In addition, the risks associated with hazardous chemicals and reagents resulting in air, water, and soil pollution, especially due to inadequate treatment and improper disposal methods. The disposal of various categories of waste generated by blood centres should be proper to provide for the safety of staff, patients, public and the environment.

The Ministry of Environment, Forest and Climate Change published the Biomedical Waste Management Rules on 28 March 2016 (Schedule I, Rule 5). These rules superseded the Biomedical Waste (Management and Handling) Rules, 1998. The 2016 Rules have been amended in 2018 and 2019. Newer guidelines are released in the wake of the current COVID-19 pandemic in the year 2020, as well.

These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood centres, Ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs.

Special guidelines have been released for handling, treatment and disposal of COVID-19 waste at Laboratories which are as follows: [1]

1. To depute dedicated sanitation workers separately for BMW and general solid waste with suitable segregation facility. To provide training to Waste handlers about infection prevention measures such as Hand hygiene, Respiratory etiquettes, social distancing, use of appropriate PPE, etc. via videos and demonstration in local language.

2. To have separate colour coded bins (with foot operated lids)/ bags/ containers in blood centres and maintain proper segregation of waste as per BMWM Rules, 2016 as amended and Central Pollution Control Board guidelines for implementation of BMW Management Rules.

3. To use precautionary double layered strong & leak proof bags (using 2 bags) for collection of waste generated from COVID-19 samples; and to be labelled as “COVID-19 Waste”.

Bio Medical Waste Management in Transfusion Medicine and Blood Banking

Category No.	Type of Waste	Type of Bags/ containers to be used for disposal	Treatment and Disposal options
Yellow	1. Human Anatomical Waste 2. Animal Anatomical Waste 3. Soiled Waste 4. Expired or Discarded Medicines & Cytotoxic drugs along with glass or plastic ampoules, vials etc. 5. Chemical Waste 6. Microbiology, Biotechnology and other clinical laboratory waste 7. Chemical Liquid Waste* 8. Discarded linen, mattresses, beddings contaminated with blood or body fluids. 9. Used masks & gowns.	Non-chlorinated plastic bags or containers * Separate collection system leading to effluent treatment system	Chemical treatment and Discharge into drains for Liquids and secured landfill for solids
Red	1. Contaminated Waste (Recyclable) viz. Vacutainers, tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves	Non-chlorinated plastic bags or containers	Autoclaving/ microwaving/ hydroclaving and then sent for recycling Plastic waste should not be sent to landfill sites.
White (Transluscent)	1. Waste sharps including Metal sharps-Needles, Syringes with fixed needles, Needles from needle tip cutter/burner, Scalpels, Blades	Translucent, Puncture, Leak, tamper proof containers	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
Blue	1. Broken/ discarded glass, Medicine vials & ampoules except those contaminated with cytotoxic wastes. 2. Metallic Body Implants	Cardboard boxes with blue colored Marking. Puncture proof and leak proof boxes or containers with blue colored marking, as per BMW rules, 2018	Disinfection or autoclaving, microwaving, hydroclaving and then sent for recycling

Categories of Bio-Medical Waste

4. To collect and store BMW separately, labelled as "COVID-19" prior to handing over the same to waste treatment facility. Use dedicated trolleys and collection bins in COVID-19 isolation wards which should be disinfected with 1% sodium hypochlorite solution daily.

5. General solid waste: The wet and dry solid waste bags to be tied securely in leak-proof bags, sprayed with sodium hypo-chlorite solution and hand over to authorized waste management facility on daily basis.

6. Yellow coloured bags should not be used for collecting general solid waste. Compostable bags should be used for collecting wet-waste.

7. Maintain separate records of waste generated from COVID-19 isolation wards.

8. To collect used PPEs such as goggles, face-shield, splash proof apron, Plastic Coverall, Hazmet suit, nitrile gloves into Red bag and to collect used mask (including Triple layer mask, N95 mask etc.), head cover/cap, shoe-cover, disposable linen Gown, non-plastic or semi-plastic coverall in Yellow bags.

9. Designated nodal officer for biomedical waste management in hospital shall provide training. Nodal officers, in turn, need to be trained by Health Departments / professional agencies in association with SPCB/ PCC of the States/ UTs.

References:

- Guidelines for handling, treatment and disposal of waste generated during treatment/diagnosis/quarantine of Covid-19 patients. 25th March 2020 (www.mohfw.gov.in accessed on 14/06/2021

Probability of Donor Return in Case of Temporary Deferral and Factors Affecting it

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Temporarily deferred donors represent a easily pursuable pool as the major job of donor recruitment and motivation has already been done. But the psychological effect of deferral on the donor needs to be understood as donors are more likely to feel dejected and miss the warm glow of donation. Temporary deferral rates in our country varies from 2.9 - 22% (1-3), suggesting that a significant numbers of donors are being deferred. Most common reasons for deferral being a low hemoglobin, alcohol consumption, abnormal blood pressure and medication intake. Studies abroad have shown that temporarily deferred donors are unlikely to donate again, take a longer time for their next donation and the overall number of donation in their lifetime is significantly less in comparison to non-deferred donors. In addition, factors like first time donation, younger age, multiple deferrals, unpleasant donation experience and deferral for recipient safety has a more negative impact on donor return (4).

Preliminary steps in re-recruitment of temporarily deferred donors starts during the process of deferral itself. Proper documentation of the nature (permanent or temporary), duration and reason for deferral along with donor contact details is a must without which the donors are lost from the records. There are times when the donor confuses the deferral to be permanent or assumes that he / she will be deferred during the next donation as well. Hence, communication regarding the nature, duration of deferral and its importance on donor or recipient safety must be explicitly clear and polite. Self-deferral and preliminary telephonic screening can help save donor's time and in reducing the dejected feel following deferral.

During the deferral period, steps to keep in touch with the donor like enrolling them in research studies or offering investigation and management related to reason of deferral shall help in easing the process of re-recruitment. The best time to contact the donor for next donation is immediately after the completion1. of deferral period (5). Various modes like written communication through letter, e-mail, SMS or oral communication via telephone can be adopted. Telephonic conversation is more effective as the donor can be motivated again as well as an appointment for the next donation can be fixed. But SMS services are more cost-effective and have a better contact rate. In a survey conducted to find the factors resulting in blood donor relapse, time constraint was the most common reason stated by regular as well as lapsed blood donors (6).

Further studies on effect of temporary deferral on Indian donors, their return rate and practicality of the proposed strategies on our population must be studied as there is dearth in literature from our country on this topic. Measures such as organizing mobile blood donation drives, widening in-house collection hours as per donor convenience, smoothening the process of donation, reducing waiting time and encouraging donation in other blood centres will help improve the donor return rate.

References:

1.John F, Varkey MR. Evaluation of blood donor deferral causes in a tertiary hospital, South India. Int J BioMed Adv Res. 2015;6:253-8.

2.Shah R, Tulsiani S, Harimoorthy V, et al. Analysis of efforts to maintain safe donor in main donor pool after completion of temporary deferral period. Asian J Transfus Sci. 2013;7:63-7.

3.Kandasamy D, Shastry S, Chenna D, et al. Blood donor deferral analysis in relation to the screening process: A single-center study from Southern India with emphasis on High Hemoglobin Prevalence. J Blood Med. 2020;11:327-34.

4.Davison TE, Masser BM, Gemelli CN. Deferred and deterred: a review of literature on the impact of deferrals on blood donors. ISBT Sci Ser. 2020;15:3-10.

5.Hillgrove TL, Doherty KV, Moore VM. Understanding non-return after a temporary deferral from giving blood: a qualitative study. BMC Public Health. 2012;12:1063.

6.Charbonneau J, Clourtier MS, Carrier E. Why do blood donors lapse or reduce their donation's frequency? Transfus med Rev. 2016;30:1-5.

Role of Immunoadsorption in ABO Incompatible Solid Organ Transplantation

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ABO incompatible solid organ transplantation is of concern as A and B antigens are expressed in vascular endothelium of solid organs/allografts and if transplanted into a recipient with anti-A and/or anti-B (major incompatibility) may lead to hyper acute rejection of the allograft. Such transplants have been made feasible by pre-transplant desensitization achieved by both drug-based immunosuppression and B-cell depleting therapies. In addition, extracorporeal removal of pre-existing isoagglutinin pre-transplant and rebound isoagglutinin post-transplant by therapeutic apheresis (TA) has proven efficacious. TA technique has evolved from non-selective conventional therapeutic plasma exchange (cTPE) to semi-selective cascade plasmapheresis (CP)/double-filtration plasmapheresis to selective immunoadsorption (IA) columns.

In 2001, Tydén et al.(1) published a protocol utilising immunoadsorption (IA) and Rituximab as an adjunct to standard triple therapy immunosuppression to significantly reduce antibody titres in major incompatible transplants. IA columns can be non-selective, semi selective or selective that share the same principle, with a matrix containing binding molecule (synthetic/organic) that binds the immunoglobulin (Ig) when plasma flows through this matrix. Selective anti-ABO antibody removal is usually performed by Glycosorb®-ABO, which is a low molecular weight carbohydrate column containing A or B blood group antigens linked to a Sepharose matrix (Glycorex Transplantation, Lund, Sweden).

The inlet of IA column is attached to the plasma line (coming out of the centrifuge compartment) of a plasma exchange kit and the outlet is attached to treated plasma bag which is attached to replacement port of the kit, thus returning patient's own plasma through return line. Real time IgG and IgM titres are performed using Gel columns or conventional tube technique to check titres. British Transplantation Society(2) recommends antibody titre of 8 or <16 to initiate transplant. Post operatively titres are performed daily for 2 weeks, and a rescue plasma exchange is usually planned if rebound titres rise above 16. Thereafter, weekly monitoring of anti ABO titres is done for 6 weeks until tolerance or accommodation occurs.

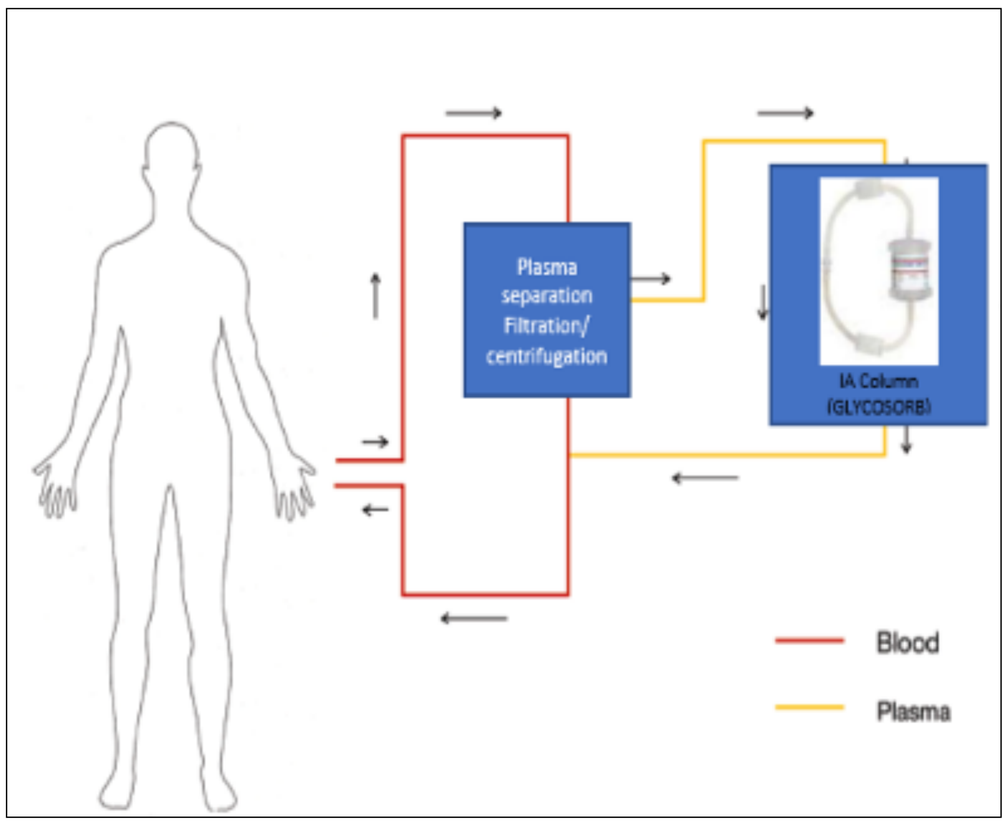

Figure 1: Immunoadsorption using selective ABO column.

Role of Immunoadsorption in ABO Incompatible Solid Organ Transplantation

If recommended titres (8) are not achieved in a single session of IA i.e processing of approximately 6 to 7 PV, reusing the column for same patient after a gap of one day is done at some centres of our country for cost cutting and maximum efficacy, against the single use recommendations of the manufacturer. Reuse have been reported from a few European countries like Switzerland as well. After each use the column is flushed with 1 L of normal saline and sterilised with Ethylene oxide at 55C over 10 hours. Column is labelled and kept in dark at 2–8°C for at least 12 h. Before reuse, column is visually inspected for break, discoloration or clot and again flushed with 1 L normal saline before reconnecting. It is observed that subsequent titre reduction efficacy of column decreases by almost 50% but remains superior to the single session of conventional plasma exchange.

Contraindication

In a patient on angiotensin-converting enzyme inhibitors (ACEi), IA with native peptide column such as tryptophan may lead to impaired bradykinin metabolism following side effects like hypotension. For columns using synthetic peptides this is not much of a concern.

Advantages of IA

Processing of large volume of plasma (5 to 6 PV) in one session provides shorter period for desensitization, early surgery, and shorter hospital stay with no need of "replenishment fluid" as patients' own plasma is reinfused back. In selective IA, there is no loss of desired proteins like albumin, clotting factors and other antibodies and more than 90% of target hemagglutinin is removed, reducing titres quickly. Whereas with conventional TPE or cascade filtration more sessions are required to bring the titre to acceptable range.

Disadvantages of IA

The selective ABO columns (Glycosorb®-ABO) are expensive (2.75 lakhs) and are meant for single use as per manufacturers. Reusing the column after sterilization is a cumbersome task. Prolonged procedure predisposes the patient to risk of citrate related adverse reactions and hypotension that requires continuous infusion of calcium that needs to be monitored and adjusted in fluid balance to prevent fluid overload. IA procedure does not permit "negative balance" during the procedure, which is sometimes desirable considering fluid retention and edema which eventually requires manual removal.

References

1. Tydén G, Kumlien G, Genberg H, Sandberg J, Lundgren T, Fehrman I. ABO incompatible kidney transplantations without splenectomy, using antigen-specific immunoadsorption and rituximab. Am J Transplant. 2005;5(1):145-8.

2. Sahay M. Transplantation of human organs and tissues Act-"Simplified". Indian journal of transplantation. 2018;12(2):84.

Newer Challenges in TTI Screening for Blood Transfusion Services and Pathogen Reduction

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The transmission of pathogens via blood transfusion is still a major concern. Blood transfusion may be a life-saving procedure but at the same time it carries the risk of transmission of several infectious agents like viruses, bacteria, parasites or prions including an ever-increasing threat of emerging and remerging infections. Blood donor screening and testing for transfusion transmitted infections (TTIs) have become stringent all around the world. WHO has recommended testing of all donated blood for (TTIs) like human immunodeficiency virus (HIV I and II), hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis together as a strategy to ensure safe blood.[1]

In India, as per Drugs and Cosmetics Act, 1945 amended from time to time, all blood donations are mandatorily screened for HIV I and II, HBsAg, HCV, Syphilis and Malaria.[2]

In developing countries, a major source of HCV, HBV and HIV infections is transfusion of blood and blood products from inadequately screened blood donors. The Blood centres must use highly sensitive and validated testing methods to screen for TTIs in donated blood components before making them available for transfusion. Serological testing technology is still the mainstay of TTI screening tests since the implementation of the first testing for syphilis.

Although the technological advancements have led to the evolution of more sensitive methods like enzyme-linked immune-sorbent assay(ELISA) and chemiluminescence immunoassay (CLIA) to detect markers of TTIs, the prevalence of false-positive cases has increased concurrently. Subsequently, progressive implementation of nucleic acid–amplification technology (NAT) screening for HIV, HCV, and HBV has reduced the residual risk of infectious-window-period donations and false-positive cases.[3,4]

However, the ongoing paradigm does not prevent all TTIs because it applies only to known pathogens and not to newer and emerging agents, thus accepting the threat of transmitting unknown pathogens through transfusion. Newer methods like Pathogen inactivation (PI)or Pathogen Reduction Technology(PRT) are now available that cause irreversible damage to the nucleic acids, thus impairing the target pathogen's ability to replicate. PI effectively eliminates classical pathogens like viruses, bacteria, fungi, and protozoa while not damaging the cells or plasma proteins of the blood component.[5]

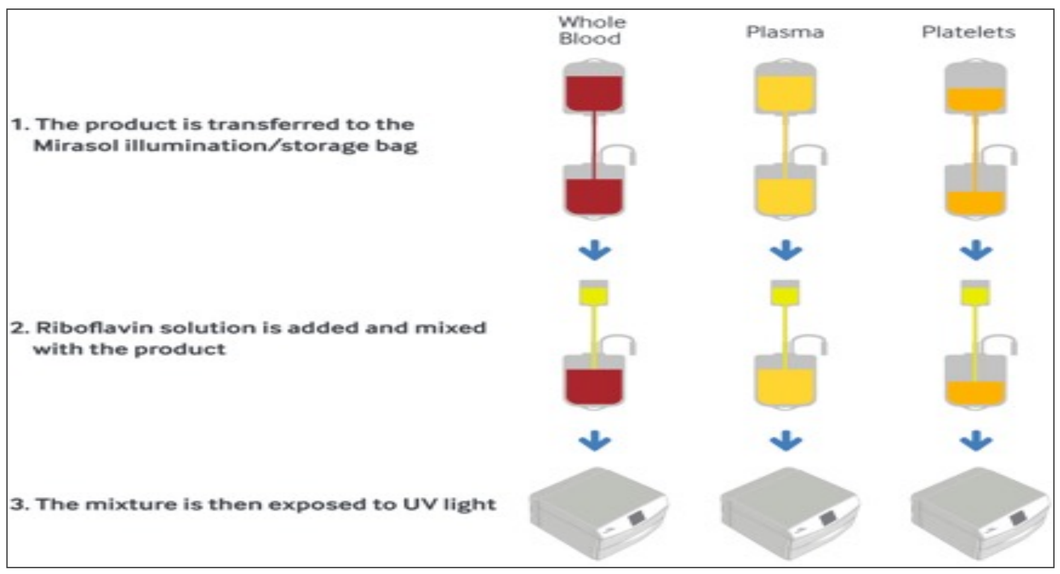

Figure1: The Mirasol PRT system Process: Platelets, Plasma and Whole Blood in Three Simple Steps.

Newer Challenges in TTI Screening for Blood Transfusion Services and Pathogen Reduction

PI with solvent detergent has been used for plasma derivatives for years, and a pathogen-inactivated frozen plasma product is in use in Europe presently.Contrary to screening tests for transfusion-borne pathogens, PI proactively protects against emerging infectious agents entering the blood supply in a given community.Whether pathogen inactivation will manifest as safe and effective, is being determined, but experience with thousands of transfusions in Europe is encouraging.[6,7] The US Food and Drug Administration (FDA) has also recommended the use of approved PI technologies and adequately controls the risk of bacterial contamination of platelets.

The following PI technologies are currently available or are underway:

1.INTERCEPT Blood System (Platelet and Plasma)

2.MIRASOL PRT System (Platelets and Plasma)

3.THERAFLEX system (Platelets)

4.S-303 system (RBCs)

The outbreaks of West Nile Virus, Zika Virus or Chikungunya virus in the past have challenged the health authorities to consider PI as a testing technology. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has been identified as a newer causative agent of Covid 19 disease and is considered as a potentially low risk threat to blood safety while viral RNA has been isolated from the infected patients.The recent studies by Ragan et al and Keil et al have demonstrated that Riboflavin and UV light effectively reduce the titer of SARS-CoV-2 to the limit of detection in human plasma and platelet and by 3.30 ± 0.26 log on average in whole blood. The data suggests that the process would be effective in reducing the theoretical risk of transfusion transmitted SARS-CoV-2.[8,9]

Major concerns surrounding the implementation of PI need to do with its impact on the integrity of blood components and therefore the toxicity of the chemicals utilized in these systems. However, in exploring superior standards and methods to further reduce TTIs in improving the security of donated blood components and, in turn, patient care, these highly sensitive and advanced techniques demand high costs, dedicated infrastructure facility, technical expertise on equipments and consumables in addition to approval from licensing authorities.

References

1.World Health Organization. Blood transfusion safety <http:// www.who.int/bloodsafety/voluntary_donation/en/>; 2012 [accessed 10.05.2021].

2.Government of India. Drugs and Cosmetics rules. <http://www.cdsco.nic.in/html/Drugs and Cosmetic Act.pdf>; 1945 [accessed 10.05.2021].

3.Hans R, Marwaha N. Nucleic acid testing-benefits and constraints. Asian J Transfus Sci 2014; 8:2-3

4.Agarwal N, Chatterjee K, Coshic P, Borgohain M. Nucleic acid testing for blood banks: an experience from a tertiary care centre in New Delhi, India. Transfus Apher Sci. 2013 Dec;49(3): 482-4

5.Dean CL, Wade J, Roback JD. Transfusion-Transmitted Infections: an Update on Product Screening, Diagnostic Techniques, and the Path Ahead. J Clin Microbiol. 2018 Jun 25; 56(7):e00352-18.

6.Seltsam A. Pathogen Inactivation of Cellular Blood Products an Additional Safety Layer in Transfusion Medicine. Front. Med. 4:219.

7.Busch MP, Bloch EM, Kleinman S: Prevention of transfusion-transmitted infections. Blood 2019; 133:1854–64.

8.Ragan I, Hartson L, Pidcoke H, Bowen R, Goodrich R. Pathogen reduction of SARS-CoV-2 virus in plasma and whole blood using riboflavin and UV light. PLoS One. 2020 May 29; 15(5).

9.Keil SD, Ragan I, Yonemura S, Hartson L, Dart NK, Bowen R. Inactivation of severe acute respiratory syndrome coronavirus 2 in plasma and platelet products using a riboflavin and ultraviolet light-based photochemical treatment. Vox Sang. 2020 Aug; 115 (6):495-501.

Scope of Molecular Testing for Immunohematology in India

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Access to cost-effective, high-resolution molecular blood group genotyping has the potential to increase the quality of transfusion services by providing extended phenotyped matched blood to prevent alloimmunization and delayed hemolytic transfusion reactions in multi-transfused patients. The conventional and reference method for blood grouping has been serology/ hemagglutination techniques but it has some limitations. The results are difficult to interpret in certain situations, involves cumbersome and time consuming procedures, and results may be subjective.

In India, we have large number of endogamous ethnic groups leading to large genetic variations. In a study from Mumbai India, allelic differences in ABO blood group genes were found in different tribes from Mumbai[1]. Further molecular studies in the country will help to form the database of various alleles in the country. It can help in family and anthropological studies. It will also help in understanding the molecular basis of rare ABO discrepancies like weak subgroups, B(A) or cis AB. In Rh Blood group system, molecular methods can identify the genetic mechanisms for Rh(D) negative phenotypes and further reclassifying it into D variants as partial D or weak D. Rh(D) genotyping can also supplement technical advances in prenatal care. It can determine Rh(D) status of fetus of a Rh(D) negative antenatal women (by non invasive fetal DNA testing). This non invasive fetal RhD typing is potentially cost effective as it will avoid unnecessary exposure to RhIg in RhD negative women carrying a fetus negative for RhD antigen.

Molecular technology platforms establish accurate genotype and a predicted phenotype in situations when serological techniques may not be effective as in case of AIHA with autoantibodies and DAT positive cases. Molecular methods can be used to obtain extended phenotype in recently transfused individuals or in individuals dependent on long term transfusion support as thalassemia and sickle cell disease patients. In a study on 200 thalassemic patients, there was discordance in genotype and phenotype in 77 % of the patients[2]. Also it is useful for certain rare blood group antigens for which no antisera is available and in situations where serological typing is unable to detect variants or hybrids or silencing mutations.

Scope of Molecular Testing for Immunohematology in India

Blood group genotyping is useful for typing large number of blood donors to form a designated donor base and to identify donors with rare blood group phenotype. The data after blood group genotyping can be used to prepare rare donor registries and to provide appropriate blood product to patients with multiple antibodies or with antibodies against a high frequency antigen. Red cells from rare red cell antigen donors can also be used as in-house reagent red cells for the identification of corresponding antibodies.

Various high-throughput molecular blood grouping platforms have been developed to predict blood group phenotypes. These molecular systems will improve transfusion safety by enabling us to provide a better match for a typed recipient. These include conventional polymerase chain reaction (PCR); Microarray technology, BioArray Solutions, Immucor, Luminex technology, TaqMan OpenArray, GenomeLab SNP stream, RBC-ReadyGene, Sanger sequencing and new generation sequence technology (NGS)[3]. Next-generation sequencing (NGS) is a newer technology to sequence an entire genome for superior variant detection.

In India, we have various levels of Blood banks and testing is limited to simple serological tests in most of the centres. The cost of the molecular test in India outweighs its benefits. There is a lack of vision as far as advances in molecular techniques are concerned. In our opinion, these techniques can be made cost effective by centralizing the testing laboratory and each blood bank should have access to these laboratories for better patient care.

Reference

1. Ray S, Gorakshakar AC, Vasantha K, Nadkarni A, Italia Y, Ghosh K. Molecular genotyping of ABO blood groups in some population groups from India.Indian J Med Res. 2014;139(1):105-111

2. Kulkarni S, Choudhary B, Gogri H, Patil S, Manglani M, Sharma R, Madkaikar M. Molecular genotyping of clinically important blood group antigens in patients with thalassaemia. Indian J Med Res. 2018;146:713-720.

3. Liu Z, Liu M, Mercado T, Illoh O, Davey R. Extended blood group molecular typing and next-generation sequencing. Transfus Med Rev. 2014 Oct;28(4):177-86.

4.

Latest in Neonatal Transfusion Practices

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Blood component transfusions are critical supportive therapies for neonates especially preterm who constitute the most frequently transfused population. Almost all and approximately 10% of extremely preterm neonates require at least one RBC and platelet transfusion respectively during their hospital stay. There is lack of international consensus on transfusion indications and optimal thresholds are largely based on expert opinion and has been extrapolated from pediatric and adult practice.

Neonatal Exchange Transfusion

The most common indication is hyperbilirubinemia caused by hemolytic disease of the fetus and newborn. A double-volume exchange transfusion (two 85-mL/kg for full-term and two 100-mL/kg transfusions for very low birth weight (VLBW) neonates) removes approximately 70% to 90% of circulating red cells and 50% of total bilirubin.

Red blood cells (RBCs) are resuspended in ABO compatible and thawed Fresh Frozen Plasma (FFP) for an exchange transfusion. RBCs should be <5 to 7 days old to avoid high levels of potassium and maximize red cell survival. Most transfusion services provide RBC units that are hemoglobin S negative, cytomegalovirus (CMV) reduced-risk (leukocyte reduced or CMV seronegative) and irradiated. Irradiation should be performed just before the exchange to prevent potentiation of the potassium storage lesion.

Large volume neonatal red cell transfusion

Single circulating blood volume (approximately 80 mL/kg) transfusion is referred to as large-volume transfusion. It is mainly used in neonatal cardiac surgery. RBCs should be <5 days old and have the same specification as that for neonatal 'top-up' transfusions. RBCs should be irradiated for babies with known or suspected T-cell immunodeficiency. In-line blood warmers are recommended to combat the effects of hypothermia. Additive solution (AS) preserved RBC units should be used with caution in pre-term neonates due to fear of renal toxicity from adenine and mannitol effects on cerebral blood flow.

Neonatal 'top-up' transfusion

Small-volume red cell transfusions up to 20 mL/kg referred to as 'top-up' transfusions are commonly carried out to replace iatrogenic losses from repeated laboratory testing exacerbated by reduced red cell production in preterm neonates. Indications for transfusion largely depend upon the hemoglobin concentration along with the cardiorespiratory status and factors such as weight gain (Table 1). A venous hemoglobin < 13 g/dL in the first 24 hours of life requires consideration for RBC transfusion.

Latest in Neonatal Transfusion Practices

Table 1: BCSH recommendations for neonatal top-up transfusions

Post-natal age	Suggested Transfusion Threshold Hb (g/dL)		
	Ventilated	On oxygen/CPAP	Off oxygen
First 24 hours	<12	<12	<10
Week 1 (days 1–7)	<12	<10	<10
Week 2 (days 8–14)	<10	<9.5	<7.5-8.5 depending on clinical situation
Week 3 (days 15 onwards)		<8.5	

Table 2: Transfusion guidelines for platelet transfusions

AABB guidelines	BCSH guidelines
With thrombocytopenia	Platelets <20 or 30,000/µL - in the absence of bleeding
Platelet count <30,000/µL with failure of platelet production Platelet count <50,000/µL in stable premature infant with active bleeding or before an invasive procedure Platelet count <1,00,000/µL in sick premature infant with active bleeding or before an invasive procedure	Platelets <50,000/µL - bleeding, current coagulopathy, planned surgery or exchange transfusion
Without Thrombocytopenia Active bleeding in association with qualitative platelet defect Unexplained excessive bleeding in a patient undergoing cardiopulmonary bypass Patient undergoing extracorporeal membrane oxygenation with platelet count <1,00,000/µL or higher platelet counts and bleeding	Platelets <1,00,000/µL - major bleeding, major surgery (e.g. neurosurgery)
Dose: 5-10 mL/kg	**Dose:** 10-20 mL/kg

Randomized controlled trials have been conducted to compare the outcomes of restrictive (hemoglobin = 7 g/dL) vs liberal (hemoglobin = 10 g/dl.) transfusion thresholds in VLBW neonates. One of the trials found lower rate of transfusion events with higher rates of periventricular leukomalacia and death in the restrictive strategy. Another trial found no significant difference between the two arms, however, on 18 to 24 months follow-up after birth revealed infants in the restrictive arm had more cognitive delay than those in the liberal arm. However, these follow-up studies were post-hoc analyses and not powered to detect differences.

Small-volume transfusions administered slowly have been found to have minimal effect on serum potassium concentrations in neonates. RBCs should be ABO and RhD compatible with baby and mother. AS preserved red cells if used should have a hematocrit of 50-70% and can be used up to 35 days from donation.

Neonatal Platelet transfusions

Severe thrombocytopenia (<50,000/µL) is a common finding, however, no clear cut correlation has been found between the severity of thrombocytopenia and major bleeding, such as intraventricular haemorrhage. The platelet concentrates should be ABO RhD identical or compatible with the recipient.

Neonatal FFP transfusion

In neonates, low levels of vitamin K dependent factors (Factor II, VII, IX, X) and contact factors (Factor XI, Factor XII, prekallikrein and high molecular weight kininogen) contribute to altered coagulation test results. The naturally occurring anticoagulants are also decreased. Though the procoagulant and anti-coagulant are in balance and spontaneous bleeding or thrombosis is rare, however, reserve capacity is limited for both systems. BCSH guidelines recommend that FFP should be used for neonates with vitamin K deficiency and bleeding, DIC with bleeding and with congenital coagulation factor deficiencies where no factor concentrate is available (Factor V deficiency). The dose should be 12–15 mL/kg and clotting tests should be repeated after administration.

References

1. AABB Technical Manual 20th Edition

2. JPAC (Joint United Kingdom (UK) Blood Transfusion and tissue transplantation Services Professional Advisory Committee Transfusion Handbook

Peripheral Blood Stem Cell Mobilizers: Indication, Types and Safety Profile

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Hematopoietic stem cells (HSCs) are CD34 positive and lineage negative precursor cells having self-renewal and multilineage differentiation capability. They reside in a microenvironment in the bone marrow known as the stem cell niche. The osteoblastic niche produces angiopoietin-1 for tight adhesion and TPO for stem cell maintenance in a long-term quiescent state. In contrast, the vascular niche helps in short-term proliferation and differentiation. [1,2] The dynamic neurohormonal balance between these two is responsible for hematopoietic homeostasis. The CXCL-12 abundant reticular cells (CAR Cells/Stromal cells), produce the stromal-derived factor-1, a ligand also known as CXCL-12. Its receptor, CXCR4, is expressed on stem cells. The interaction between the two is critical for retaining stem cells in the bone marrow. [3,4]

Mobilization is a process of forced entry of HSCs from the bone marrow into peripheral blood using a mobilizer agent breaking the interplay between chemokines like CXCL-12, SCF, TPO, and their receptors/ adhesion molecules. [5] This review aims to provide inputs regarding various indications and types of stem cell mobilizers and their safety profile.

Indication:

The Stem cell rescue from peripheral blood is a standard treatment modality post-chemotherapy in malignancies such as Multiple Myeloma, Hodgkin's, and other lymphomas. The cell dose is an essential factor for the success of stem cell transplantation. Studies have shown faster platelets and neutrophil engraftment, lessen transfusion support, and improved survival after high dose transplantation. [2] However, HSCs normally circulate in the peripheral blood at extremely low levels. A minimum of $2x10^6$ number of CD34+ cells/Kg of body weight is established criteria for autologous transplantation, and a stem cell yields of 3-10 x 10^6/Kg are required for allogenic and haploidentical transplantation to accelerate the engraftment process. [4,6] Therefore, stem cell mobilizers are used to escalate the circulating pool of HSCs before harvesting by apheresis procedure.

Types:

These mobilizer agents can be either growth factors (G-CSF, GM-CSF) alone or in combination with chemotherapy such as cyclophosphamide for lymphoma patients. [6] Granulocyte colony-stimulating factor (G-CSF, dose of 10-24 µg/kg/day subcutaneously) induced release of protease from mature neutrophils was proposed as a mechanism for HSCs egress from the bone marrow. However, cytokines alone fail to mobilize in approximately 23-40% of cases. These poor mobilizers (defined as <2 x 10^6/Kg after 3-5 days of apheresis) are mostly elderly, lymphoma patients on extensive chemo-radiotherapy and diabetics. [2,4] Plerixafor (dose 160-240 µg/kg) is a CXCR4 antagonist, discovered as an anti-HIV drug, was found to be a promising agent in these patients with inadequate response to G-CSF. [7]

Peripheral Blood Stem Cell Mobilizers: Indication, Types and Safety Profile

Standard approaches are to use G-CSF alone for allogeneic donors and to use G-CSF alone or G-CSF plus either plerixafor or cyclophosphamide for autologous mobilization. Some centres reserve the use of plerixafor for patients who fail to mobilize adequate numbers of CD34+ cells, but other centres include plerixafor more routinely. Stem cell factor (SCF, Steel factor, c-kit ligand) in combination with G-CSF has been extensively evaluated for the purpose of HSC mobilization. [8] Investigational agents include FLT3 ligand, recombinant human growth hormone, integrins (α4β1 and α9β1) antagonist benzene sulfonyl O-pyrrolidinyl carbonyl tyrosine (BOP), IL-8, plerixafor biosimilar (YF-H-2015005), synthetic heparin sulfate mimetic (EP80031), and NSAID Meloxicam. [9,10]

Safety profile:

G-CSF use is infrequently associated with mild to moderate side effects such as bone pain, myalgia, and headache, and splenomegaly (1-1.5 cm), which are generally resolved spontaneously after apheresis. The long-term follow-up study also abolishes any increased risk of hematological malignancy. G-CSF recipients very rarely develop splenic rupture generally managed by emergency splenectomy. [11,12] Plerixafor appears to be generally well-tolerated. Most adverse effects in clinical trials were mild and transient. Thus, presently available stem cell mobilizer seems to be safe and effective with cautious use.

References

1.Guerrouahen BS, Al-Hijji I, Tabrizi AR. Osteoblastic and vascular endothelial niches, their control on normal hematopoietic stem cells, and their consequences on the development of leukemia. Stem Cells Int. 2011;2011:375857. doi: 10.4061/2011/375857. Epub 2011 Dec 7. PMID: 22190963; PMCID: PMC3236318.

2.Hopman RK, DiPersio JF. Advances in stem cell mobilization. Blood Rev. 2014 Jan;28(1):31-40. doi: 10.1016/j.blre.2014.01.001. Epub 2014 Jan 14. PMID: 24476957; PMCID: PMC4068706.

3.Sugiyama T, Omatsu Y, Nagasawa T. Niches for hematopoietic stem cells and immune cell progenitors. Int Immunol. 2019 Feb 6;31(1):5-11. doi: 10.1093/intimm/dxy058. PMID: 30169696.

4.de Kruijf EFM, Fibbe WE, van Pel M. Cytokine-induced hematopoietic stem and progenitor cell mobilization: unraveling interactions between stem cells and their niche. Ann N Y Acad Sci. 2020 Apr;1466(1):24-38. doi: 10.1111/nyas.14059. Epub 2019 Apr 21. PMID: 31006885; PMCID: PMC7217176.

5.Suárez-Álvarez B, López-Vázquez A, López-Larrea C. Mobilization and homing of hematopoietic stem cells. Adv Exp Med Biol. 2012;741:152-70. doi: 10.1007/978-1-4614-2098-9_11. PMID: 22457109.

6.Bensinger W, DiPersio JF, McCarty JM. Improving stem cell mobilization strategies: future directions. Bone Marrow Transplant. 2009 Feb;43(3):181-95. doi: 10.1038/bmt.2008.410. Epub 2009 Jan 12. PMID: 19139734.

7.De Clercq E. Mozobil® (Plerixafor, AMD3100), 10 years after its approval by the US Food and Drug Administration. Antivir Chem Chemother. 2019 Jan-Dec;27:2040206619829382. doi: 10.1177/2040206619829382. PMID: 30776910; PMCID: PMC6379795.

8.Lyman SD, Jacobsen SE. c-kit ligand and Flt3 ligand: stem/progenitor cell factors with overlapping yet distinct activities. Blood. 1998 Feb 15;91(4):1101-34. PMID: 9454740.

9.Domingues MJ, Nilsson SK, Cao B. New agents in HSC mobilization. Int J Hematol. 2017 Feb;105(2):141-152. doi: 10.1007/s12185-016-2156-2. Epub 2016 Nov 30. PMID: 27905003.

10.Liu W, Li Y, Wang Q, Su H, Ding K, Shuang Y, Gao S, Zou D, Jing H, Chai Y, Zhang Y, Liu L, Wang C, Liu H, Lin J, Zhu H, Yao C, Yan X, Shang M, Wang S, Chang F, Wang X, Zhu J, Song Y. YF-H-2015005, a CXCR4 Antagonist, for the Mobilization of Hematopoietic Stem Cells in Non-Hodgkin Lymphoma Patients: A Randomized, Controlled, Phase 3 Clinical Trial. Front Med (Lausanne). 2021 Feb 2;8:609116. doi: 10.3389/fmed.2021.609116. PMID: 33604348; PMCID: PMC7884449.

11.Shaw BE, Confer DL, Hwang W, Pulsipher MA. A review of the genetic and long-term effects of G-CSF injections in healthy donors: a reassuring lack of evidence for the development of haematological malignancies. Bone Marrow Transplant. 2015 Mar;50(3):334-40. doi: 10.1038/bmt.2014.278. Epub 2015 Jan 19. PMID: 25599171.

12.Veerappan R, Morrison M, Williams S, Variakojis D. Splenic rupture in a patient with plasma cell myeloma following G-CSF/GM-CSF administration for stem cell transplantation and review of the literature. Bone Marrow Transplant. 2007 Aug;40(4):361-4. doi: 10.1038/sj.bmt.1705736. Epub 2007 Jun 11. PMID: 17563733

Lighter Moments:
Aap Itne Khush Kaise Rehete Ho?

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Greetings to all respected faculty, seniors, staff of DTM and BDC and especially juniors currently in the Dept. (I hope you all have heard a lot about me from all ma'ams in BDC and especially Manju ma'am, Sukrita ma'am and Renu ma'am !). I am feeling nostalgic penning down my happy and " lighter " moments in PGI.

The first thing that totally bowled me was the UT Chandigarh itself, mountain peaks visible into the distance, amazing flower filled campus, lush fields and water filled canals, like which I had never seen in water starved Vidarbha (my hometown). My first day was the evening in which Dr. Neelam ma'am patiently told my husband and me that TM was an upcoming branch and I more impatiently told him, no way I was going to give another PG entrance EVER.

I learned very soon an important lesson in my life that I still follow till date " IF YOU WANT TO BE HAPPY, KEEP THE COMPANY OF HAPPY PEOPLE ".I immediately noticed my seniors esp. Manish sir, Dr. Kshitija, Dr. Daljit, Dr. Vijay and then Gopal were one of the most cheerfullest and jolly people I ever met in life.Oh ! the days began to pass merrily enough. I enjoyed throughly the " Honeymoon phase " of BDC, and delightful company of Dr. Anita and Dr. Anuradha and all BDC staff. I enjoyed every camp that gave me a chance to fulfil my yearning for travel, fresh air and hills !

Being married into a strictly vegetarian family, I never lost any opportunity to eat chicken with my friends and seniors ! Being brought up conservatively and a strict salwar-kurta dress code in MBBS, I understood it was ok to dress in jeans to hospital. And noticed that you can wear sports shoes with salwar ! I tried to take most cultural differences in my stride and even enjoyed them. I remember all my seniors telling (forcing !) me to put lipstick, as I was "married" and me reasoning a bindi / mangalsutra was enough and my husband getting a shock every-time he saw me wearing a red lipstick to hospital !

Holi celebrations were definitely rough and " colourful " with visits to all faculty's homes and all birthday celebrations were a midnight affair with a grand cake cutting under the sky outside the canteen !

Down the memory lane in PGIMER

Years passed cheerfully with seniors becoming my SRs but continuing to cover up our mistakes, scolding a little in private but praising freely in public. All lab staff esp. ma'ams were a Bible on " Hands on work " and kept a continued flow on all juicy stories and updated gossip about the Dept. in general.

The compassionate and emphatic side of Dr. Neelam ma'am, Dr. RR Sharma sir, Dr. Ashish sir was most evident when ,on call duty, I got a shock that our dear junior had fallen from 4th floor of his hostel and was subsequently no more. Even those distressing days passed and exam times came.

Most of my friends and family know that I am a 5am to 10 pm person...no exams could ever keep me awake more than that...! Though my written papers were..err..kind of " brief " and err..to the point...practicals went heavenly and I passed out much more a cheerful person that the one that had entered PGIMER. Still, seeing a positive pregnancy test in my final days in PGI gave me much more joy than the news that I had passed out well..Ha..Ha !! I still remember with immense gratitude the help and care given by my seniors and their families, esp. Kalpana and Bhoomika when I was incapacitated by a surgery on my right hand and had no family. Today having settled (finally !!) in Hyderabad, many people ask " maam, aap itne khush kaise rehete ho? " I tell them, I simply am not able to SEE any prolonged difficulty in life. I can immediately make out some workable solutions...SO THERE !

Ever in gratitude and cheerfully yours,

PGI Chandigarh Alumni Association

PGIMER Chandigarh has launched its alumni association Website. Visit at https://pgialumni.org/ to connect to your alma mater.Register at website and become a member.

Culture of Voluntary Blood Donation Camps at PGIMER Chandigarh

A prominent memory of our residency days is attending voluntary blood donation camps. Department was a pioneer in the country in establishing blood collection through voluntary blood donation camps. The above photograph shows how Prof. JG Jolly has led from the front for participating in social activities and generated awareness for voluntary blood donation in the region. Because of his social outreach, he has started many long associations with camp organizers from which the institute is being benefited to date. The culture of voluntary blood donation camps have grown in the department under the leadership of our successive HODs, and from around 100 camps in year 2K, we have grown to 419 camps last year in spite COVID-19 pandemic situation.

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