Inaugural Issue

Blood Bank Chronicles

The Quarterly Transfusion Medicine Update

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Index

'Quality Accreditation - A Paradigm Shift'

Editorial

Blood bank accreditation - A tool for quality improvement

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Accreditation is a process in which certification of competency, authority, or credibility is presented.

With increase in population and development of more advanced medical and surgical procedures, the need for blood is ever increasing. There is no substitute for blood and its safety can not be underscored or under-emphasized. Blood banking is integral part of health care requires uniform standards to deliver quality blood and products

'Quality is the ongoing process of building and sustaining relationships by assessing, anticipating, and fulfilling stated and implied needs.'

Accreditation provides a format to ensure work flow processes and reproducibility of results and hence improve quality. This is also ensured by participating in the External quality assurance programs where the results are compared with other testing labs.

Blood Bank Accreditation program being used as tool for quality improvement will promote the highest standards of care for both patients and donors in all aspects of blood banking and transfusion medicine.

Ref.:
http://www.qcin.org/nbqp/qualityindia/Vol-3-No2/bloodBank.php
http://www.qualitydigest.com/html/qualitydef.html

REMI GROUP

Special Coverage

Need of SOP's for Pre-Release Visual Inspection to Reduce Transfusion Related Reactions

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A blood transfusion is a special kind of transplantation and/or medical therapeutic intervention that carries with it great benefits and risks to the recipient. It involves the transfer of living tissue from one person to another and thus a recipient of a transfusion may experience an adverse reaction to the product during or after the transfusion.

Bacterial contamination occurs in approximately 1 in 3000 platelet concentrates (PCs) and may induce sepsis in approximately one in six recipients of the contaminated product. [1]* Microbial contamination accounted for the third most common cause of transfusion associated fatalities reported to the US Food and Drug Administration between 2005 and 2009. [2]*

Adverse reactions occur in 1 to 6 percent of all blood transfusions and are more frequent (10 percent) in patients with hematologic and oncologic disorders.Keeping the above in mind it is imperative to ensure that blood transfusion results in the ultimate benefit to the recipient while reducing the risk of adverse transfusion reaction.

Visual inspection before issuance of the blood component is the first step, which would contribute in minimizing transfusion related reactions. This can be achieved if a Standard Operating Procedure (SOP) is formulated and implemented.

The following point should be borne in mind in effecting the safest pre release visual inspection process:

1. **Visibility:** Inspection of the blood products should take place in a well-lit area.
2. **Hemolysis:** The degree of Hemolysis should be ascertained keeping the permissible limits in mind.
3. **Red Cell Contamination** relevant to platelets, plasma &cryoprecipitate
4. **Bacterial Contamination:** Some of the attributes of bacterial contamination are air bubbles, dark purple to black discoloration in red cells, clots & fibrin strands etc.
5. **Particulate matter:** Visible in the form of large to small colored masses that do not dissipate with gentle manipulation

Condition	Red cells*	Platelets*	Plasma & Cryoprecipitate*
Hemolysis	Acceptable levels of hemolysis as < 0.8% at expiry.	N/A	Some degree of Hemolysis is possible
Red cell contamination	N/A	AABB[3]* recommends compatibility testing, if SDP contains more than 2ml of red cells3	Yet No standards of acceptability criteria decided
Lipemia	Blood components with lipemia are acceptable for transfusion.		
Icterus	Blood components with lipemia are acceptable for transfusion.		
Bacterial contamination	Blood Components are not acceptable for transfusion		
	• Blood components containing clots / fibrin strands should not be transfused. • Blood components containing cellular aggregates should not be transfused.		
Particulate matter	• White Particulate Matter (WPM). Blood components containing WPM are acceptable for transfusion. WPM may dissipate with a change in temperature.		
Discoloration	like Hemolysis, Lipemia, bacterial contamination	• Discoloration due to icterus (yellow), oral contraceptives (green), vitamin A or large quantities of carrots (orange) are all acceptable for transfusion.	• Discoloration due to icterus (yellow), oral contraceptives (green), vitamin A or large quantities of carrots (orange) are all acceptable for transfusion.

If the above is adhered to, complications like Transfusion related Hemolysis; fatal septic reactions due to bacterial contamination may be minimized.

*References are not printed due to space constrain, for details please contact the author on Email Id: chhabra.dr@gmail.com

Upcoming Events

2012 World Stem Cell Summit
3rd - 5th Dec 2012, Florida, USA
www.worldstemcellsummit.com

24th Regional Congress (ISBT)
1-4 December 2013, Kuala Lumpur, Malaysia

19th Annual ISCT Meeting
April 22-25, 2013, New Zealand
www.celltherapysociety.org

23rd Regional Congress(ISBT)
June 2 – 5, 2013, Amsterdam, Netherlands
www.isbtweb.org

Transfusion Medicine Chronicles

1628 : William Harvey first to demonstrate that blood circulate round the body.

Preventing Blood Transfusion Errors through Process Excellence

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Introduction:

A well defined blood transfusion service with excellent processes benefits the patient who avails of the service as well as the overall organization. Many serious risks of blood transfusion have been identified which includes near miss events that can result in patient adverse outcomes

SHOT UK 2011 reports that annually near miss events comprise of 1/3rd of the total and include wrong blood in tube (WBIT) and patient identification errors. In fact, half of the adverse events were preventable errors

Established Organizational Processes to prevent Errors:

1. Standardized transfusion order forms

The use of a pre-printed, controlled blood request form should be used to monitor and encourage clinically appropriate transfusions. Common practices observed today are incomplete request forms, and forms forwarded by Nurses on verbal orders of clinicians. It remains the responsibility of the clinicians to forward the blood requests as the practice of accepting incomplete, inaccurate and illegible requests could lead to potential legal implications. To encourage compliance the Blood Bank should not release blood products until the deficiency is met

2. Uniform Blood Sample collection process

a. Use two separate identifiers for patient identification eg: Full Name and registration number

b. Collect from only one patient at a time This reduces the risk of patient identification error and wrong blood in tube (WBIT), a major cause of ABO incompatible transfusions

c. Label the sample at the Patient bedside The practice of generating labels at the nursing stations after leaving the patient room, could lead to labelling errors when multiple amples are collected. Sample collection should involve only one patient at a time, abeled at patient bed side, after patient identification process is complete

3. Rejection of incorrectly labelled samples

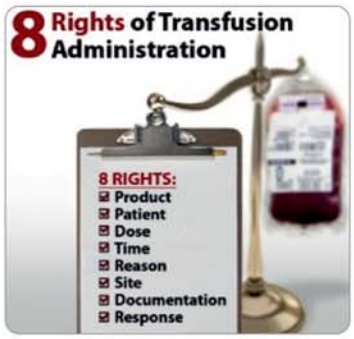
Samples for type and cross match that reach the blood bank with an incorrect label or which do not correspond with blood request form must be rejected and subjected to root cause analysis as a potential near miss event

4. Blood group confirmatory check

If the patient was grouped/received transfusion previously, a historic blood group confirmation is performed from previous records. If previously not grouped, a second sample is requested for testing prior to release of blood unit. A bedside group check just prior to start of transfusion should be established as the final check to prevent ABO mismatch transfusions.

5. Pre-transfusion checklist

Repeat emphasis on the need for the correct blood unit to reach the correct patient is vital to reduce risk of incompatible reactions. Good processes involve the use of a pre-transfusion checklist at the bedside to ensure a final check before start of transfusion, performed by two separate individuals. If the process is interrupted, the final check using the checklist is repeated from the beginning. Blood safety is enhanced when the 8 rights of transfusion administration are applied for every unit: Right product, Right patient, Right dose, Right Time, Right reason, Right site, Right documentation and Right response



6. Incident reporting of Near miss events

Incident reporting provides opportunity for process improvement by investigation and staff education with the ultimate aim that the event should not repeat itself. This involves documenting the incident and reporting to the hospital quality committee to ensure preventive actions/processes are implemented to correct the system that allowed the error to occur

7. Transfusion audits

Transfusion verification audits can be conducted in all clinical areas that provide transfusions to help ensure independent double checks on the process. A hospital Transfusion Nurse/ Officer can be appointed to work with the blood bank management and support clinicians in the safe and effective use of blood. Their role includes active promotion of good transfusion practice by facilitating transfusion audit, feedback, incident reporting, follow up of errors/near miss, encourage education and training and facilitate implementation of new technologies that enhance patient safety

Conclusion:

Subjecting all errors/near miss events to appropriate review, investigation, and root cause analysis is an essential element for improving transfusion safety. With continuous training and management support, the blood transfusion practice has the potential to improve practices in the safe administration of blood. **Prevention of transfusion errors is the need of the hour and through established processes this goal is now not beyond our reach**

***References are not printed due to space constrain, for details please contact the author on Email Id:lincy.jacob@hiranandanihospital.org**

1657 : Sir Christopher Wren first injected some fluids into the circulation of animals

Process Excellence

Reducing Chances Of Cross Contamination During The Blood Component Issue Process

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The primary function of a blood transfusion service is to provide an effective component of optimum quality to the patient while ensuring the safety of the donor. In order to achieve this goal the blood bank personnel must be vigilant at every step of the process so that quality is maintained from vein to vein.

Contamination of a blood component may occur at any of the stages from the collection process, component preparation, and storage to the issue process. This article focuses on the risk of cross-contamination during the issue process.

The issue process involves the following steps

1. Evaluation of the requisition form
2. Planning and retrieval of the components requested
3. Completing the serological testing (as per blood bank guidelines)
4. Final processing the components
   - Thawing Fresh Frozen Plasma/Cryoprecipitate
   - Pooling of Components
   - Lab Side Leucodepletion
5. Completion of documentation and final issue

The final processing of components is the stage at which contamination of the blood components is likely. Water baths/ thawers used for thawing plasma are a source of bacterial cross-contamination of plasma. The most commonly found organisms are *Pseudomonas cepacia* and *Pseudomonas aeruginosa.* [1,2]* The cause of this contamination is that blood bags often have leaky seals, damaged tubing or micro-punctures which have been linked to bacterial contamination.[3] The water in the thawer provide a medium for the transfer of bacterial contaminants from one bag to another and the plasma leaked from a blood bag provides a medium for bacterial growth. Over-wrapping of plasma bags reduces the risk of contamination provided the right types of plastic over-wraps are used in the correct manner.

The use of simple plastic bags or repeated use of the same over-wrap is not advocated as it is ineffective. In spite of the reduced risk of bacterial cross contamination there is a residual risk of micro tears and leakage in the plastic over-wraps. The proper cleaning and disinfection of the thawing baths along with sending samples of the water from bath for culture at regular intervals is required to prevent bacterial contamination of plasma. An SOP (Standard Operating Procedure) regarding use of the plasma thawed is imperative to this end. There have been repeated efforts to overcome the inherent disadvantages of wet plasma thawers. He The use of microwaves to thaw plasma has also been tried but there use declined due to reports of overheating and generation of hotspots.[4,5]* There have been efforts to revive this method it has not caught on due the inherent disadvantage of the short microwaves (poor penetration and preferential absorption by the liquid phase of plasma).[6,7]* Radio frequency (RF) heating of fresh frozen plasma has also been tried as an alternative to microwave thawing and shown some promise.[7]* A plasma thawer using heated air is being marketed by a German manufacturer but there are no studies in pub med on its efficacy.[7]*

Recently Plasma thawers with the water and plasma segregated by the use of plastic bladders filled with heated water streamed through them have been introduced into the market and may provide a safer way to thaw plasma. There efficacy, safety profile and ergonomics needs to be studied before using them becomes standard practice.

Pooling and making aliquots of components are also procedures fraught with the risks of contamination and should be done in a sterile environment using a sterile connecting device. If an open system is used the platelet component must be issued for use within 4 hrs and RBCs within 24 hrs (Canadian Blood Services Guidelines from the website). There is also a risk of one of the platelets components being contaminated with bacteria. Efforts are being made to develop a quick and reliable system to test for bacterial contamination prior to issue. [8, 9,10]*

If lab side leucodepletion is done using an open system, it should be done in a clean environment using all aseptic precautions and the components must be issued within 4hrs for platelets and within 24 hrs for red cells. In the intervening time the components should be stored at optimally (Blood bank refrigerator at 4°C for red cells and in a platelet incubator cum agitator at 22°C for platelets)

Blood safety is a priority issue for transfusion specialists. Bacterial contamination is an important complication and an impediment to a safe blood supply. An effective quality management plan and strict adherence to guidelines and SOPs is required to prevent bacterial contamination of blood components.

***References are not printed due to space constrain, for details please contact the author on Email Id: meenubajpai@hotmail.com**

Transfusion Medicine Chronicles

1666 : Richard Lower performs the first successful transfusion, albeit on an animal

Managing Donor Retention After Adverse events

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Donor safety is of paramount importance during blood donation and is assured, in so far as it can be, by donor selection guidelines, SOPs, adequately trained staff and appropriate facilities. Despite these measures, various adverse events and reactions can and do occur during and after blood donation. These complications can be a negative experience for donors. Preventing them must be a priority.

Complications related to blood donation occur in about 1% of all whole blood donation procedures 2. It is well recognized that certain categories of donors have higher reaction rates 3-6.

Description and classification: Adverse events and reactions can manifest themselves in several ways. The Working Group on Complications Related to Blood Donation, a joint working group of the International Society of Blood Transfusion and the European Haemovigliance Network was established for this purpose. They classify complications into two main categories: those with predominantly local symptoms and those with predominantly generalized symptoms.

A: Complications mainly with local symptoms. These complications are directly caused by the insertion of the needle.

(a) Complications mainly characterized by the occurrence of lood outside the vessels
- Hematoma, Arterial puncture, Delayed bleeding

(b) Complications mainly characterized by pain.
- Nerve irritation, Nerve injury, Tendon injury, Painful arm

(c) Other kinds of categories with local symptoms
- Thrombophlebitis, Allergy (local)

B: Complications mainly with generalized symptoms.
- Vasovagal reaction:
- Complications related to aphaeresis:
- Citrate reaction, Hemolysis, Generalized allergic reaction, Air embolism

Prevention strategies

Several strategies can be used to reduce the risk of complications occurring during and after blood donation.

Prevention of type (A) complications

Needle techniques: Good needle insertion techniques reduce the frequency and severity of Type A complications. Jorgensen and Sorensen give the following advice on needle insertion techniques [2].

- Always move the needle forward in a slow ongoing movement.
- If the needle is not inserted in the vein at the first attempt, it is not advisable to do a second try by moving the needle a little bit backwards, change direction, and then move forward again in a new direction, as this will increase the risk of injuries and occurrence of haematoma, and thereby the risk of a severe complication.
- Never try to insert the needle twice, using the same puncture site. Instead try the other arm.
- Never ask for or give help if insertion was not a success, as this will always include a try in a new direction.

Prevention of type (B) complications

Type B complications, characterized predominantly as generalized symptoms such as vasovagal reactions, require different precautionary measures. Jorgenson and Sorenson identify the following generally accepted, but not evidence-based, practices [2].

- **Gentle treatment** of the donor, providing refreshments before and after donation to reduce the risk of vasovagal reactions.
- Observing the donor during and after donation, treating the donor if a complication occurs and making sure the donor feels absolutely well before leaving the blood session.
- Giving advice to the donor on secondary bleeding, driving, rest and return to work after the donation. Asking the donor to contact the blood center if symptoms reoccur.
- Applying pressure to the venepuncture site and if necessary a pressure bandage if a haematoma is developing.

The prevention techniques for type B complications listed below have been suggested in several studies.

- **Muscle tension:** when a donor makes repeated and rhythmic contractions with the major muscle groups in his arms and legs, the blood flow to the brain can be increased in order to prevent fainting.[8,9]
- **Distracting the donor** during the bleeding procedure. Watching a movie could reduce stress in a donor [10].
- **Water or caffeine loading.** Several studies have reported fewer complications when donors drink water or coffee before their donation [11,12]

Management:

Adequate management of complications during blood sessions serves several goals. First, it is essential for the health and wellbeing of donors.

Second, proper management of complications helps to alleviate the negative effects complications may have on donor motivation and on donor return rates. Employees must be prepared and equipped to handle the most frequent complications. Protocols, training, first aid equipment and donor counseling are imperative. Some donors who have had severe complications may be advised not to donate again.

- **Staff training**
- **Managing emergencies**
- Donor counseling: It is an essential element of good donor care that each donor who suffers a complication of donation be given specific advice about the complication.
- **Donor advice:** Donors should be advised on measures they should take to prevent the complication from getting worse.

Donor follow-up: This is not only an essential element of good donor care, but is basic 'good customer relationships.' As the complication may have a negative effect on a donor's motivation to make a subsequent donation. The follow-up of the donor and the provision of adequate information play an important role in encouraging the donor to continue to donate.

Effect on donor motivation - next donation

A negative experience during blood donation can have a negative effect on donor motivation. Several studies have shown that experiencing a complication during the bleeding procedure is an important factor that prevents donors from making a subsequent donation 13,14. France et al. 15 found that for light vasovagal reactions in whole blood donors the likelihood of returning for a next donation reduced by 20% for first time donors and by 33% for experienced donors. For moderate and severe vasovagal complications, return rates reduced by 50%. Gorlin and Petersen found that the more severe a complication, the lower the return rate 16. Adequate handling of a complication, therefore, serves multiple goals: ensuring the donor's health and retaining the donor for a subsequent donation.

***References are not printed due to space constrain, for details please contact the author on Email Id: vermask1803@gmail.com**

1667 : Samuel Pepys First to experiment, transfusion from one dog to another dog

Best Practices

Model Blood Bank

Dr. Hitesh Pagare,
Dy. Medical Director,
Sir J J Mahanagar Blood Bank,
Byculla, Mumbai.

People have always been fascinated by blood: ancient Egyptians bathed in it, aristocrat drunk it, authors and playwrights used it as themes and modern humanity transfuses it. The road to an efficient, safe and uncomplicated transfusion technique has been rather difficult, but great progress has been made.

Donor Recruitment:

A vast progress is been made in collection of blood units from voluntary, Blood donors. The Blood Donation process has improved tremendously camps are organized in a completely Air conditioned vehicles with all the facilities. A Variety of Donor Educational and Information material is been available with help of which number of voluntary Blood donors has increased. The routine practice of checking Hemoglobin with Cuso4 specific gravity method is been replaced by rapid photometry method e.g. Hemocue which give exact value of Hb. This helps us to manufacture Blood product with good quality control values.

Transportation of whole Blood from the camp site to the Blood Bank for processing is done in temperature controlled boxes (waeco) in Blood transport vehicles.

Blood Component Separation:

Blood component separation is been helpful in targeted component therapy, Packed RBCs, Platlets, Fresh frozen plasma and cryoprecipitate are Blood component separated from whole Blood is helpful in treating various major disease. 100% component separation has been helpful for increased utilization and reduced discard of Blood units.

Testing for Transfusion Transmitted Infections:

Testing of the collected Blood units for infectious Virus & Parasites like HIVI & II, HbsAg ,Anti–HCV, VDRL and Malarial parasite is been done on complete automated system and using 4th generation Elisa kits with increased sensitivity & specificity which shortens the window period for transfusion transmitted Infections.

Nucleic Acid Detection Test (NAT):

Helps to identify the Nucleic Acid present in the RNA and DNA Viruses. NAT is been done along with Elisa to increase the safety of Blood Transfusion by shortening the window period for transmission of HIV I& II Hepatitis B&C viruses .

Donor Blood Grouping:

Blood donor grouping can be done using various automated systems available in market having different principles. Column agglutination technology is one of them, the documentation and interpretation of the results can be stored in the computer. Antibody screening along with Blood grouping of the donor's is helpful in identification and to doing electronic cross match if the antibody screen for the patient is negative.

Cross Matching :

Cross matching of the Blood units can be done on automated systems by routine serology method. If antibody screening and identification is done Electronic Cross match can be implemented.

Electronic cross match : advantages

To respond faster to request for blood

To cut wastage

To reduce workload

Aphaeresis:

Aphaeresis is a procedure Blood is withdrawn from a donor and separated into its components. One (or more) of the components is retained and the remaining constituents are returned to the individual. Platelet aphaeresis is done commonly for cases of thrombocytopenia, Malaria and viral fever like dengue.

Blood Component Storage Temperature Records:

Temperature records of the Blood component storage refrigerators and freezers can be maintained by using continuous monitoring system which can also give us alarm indicators.

Inventory Management:

Blood inventory management should be done by following the principle of first in first out. So the discard rate can be reduced.

Blood Bank Software:

Blood Bank software and linking the major equipments in the Blood Bank to the system with UPS will help to capture and store the data.

Accreditation:

One of the most important best practices is to get our Blood centre Accreditated from the Government Agency.

For blood banks National Accreditation Board for Health can provides (NABH) provide the Accreditation certificate NABH comes under Quality Council of India.

Hemovigillance in the Blood transfusion services i.e. vein to vein from collection to transfusion of blood units records to be maintained.

To conclude in the modern practices of Blood Bank the prominent issues are Automation of all your laboratories and software which generates, maintains all the records to be followed.

Blood Bank Chronicles Important Links

American Association of Blood Banks(AABB)	www.aabb.org
British Blood Transfusion Society (BBTS)	www.bbts.org.uk
American Society for Quality (ASQ)	www.asq.org
Quality council of India (QCI)	http://qcin.org
National Accreditation Board for Hospitals & Healthcare Providers (NABH)	www.nabh.co
National Accreditation Board for Testing and Calibration Laboratories (NABL)	http://qcin.org/nabl

Transfusion Medicine Chronicles

1818 : Dr James Blundell conducted transfusion in cases of haemorrages after childbirth

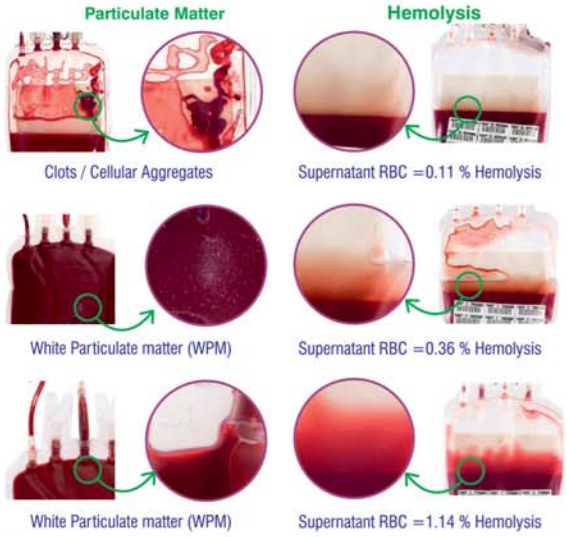
Blood Bank Chronicles Gallery

Pre-Release Visual Assessment

(Whole Blood / Packed Blood Cells)

The CSA standard define: -

1. Clot / Cellular Aggregates are not acceptable. Violet / Black discoloration of aggregate due to microbial contamination.
2. White Particulate Matter (WPM) is due to lipids may dissipate with a change in temperature.
3. Acceptable levels of hemolysis as < 0.8% at expiry.



CSA standard, Z 902-04 Blood and Blood components

Quiz

Q. What is the complete meaning of abbreviation NABH?

a) National Accreditation Board for Hospitals
b) National Accreditation Board for Hospitals & Healthcare Providers
c) National Association & Board of Hospitals
d) National Association of Broad Healthcare practices

To enroll yourself for the lucky draw, Send us the Mail to us on supportggn@remilabworld.com

you have to type the following

1. Mention the subject = Lucky Draw Registration
2. Type the correct option in the mail
3. Mention your mobile no., Blood Bank Name & Contact details

Send the Answer for the question to us to win lucky draw (5 Nos)

Transfusion News Track

AABB issues new RBC transfusion guidelines

The American Association of Blood Banks (AABB) has issued new guidelines, published in Annals of Internal Medicine, recommending that transfusion of red blood cells be considered at a hemoglobin threshold of 7 to 8 g/dL for stable adults and children. This recommendation to use a restrictive approach not only saves blood, but also reduces the costs related to unnecessary transfusions.

The AABB recommends adhering to a restrictive transfusion strategy as follows: -

1: In hospitalized, stable patients Hemoglobin thresholds is 7 to 8 g/dL

2: In hospitalized patients with preexisting cardiovascular disease and considering transfusion for patients with symptoms or a hemoglobin level of 8 g/dL or less

3: No recommendation for or against a liberal or restrictive transfusion threshold for hospitalized, hemodynamically stable patients with the acute coronary syndrome

4: Transfusion decisions to be influenced by symptoms as well as hemoglobin concentration

Though the clinical judgment is critical in the decision to transfuse; therefore, transfusing RBCs above or below the specified hemoglobin threshold may be dictated by the clinical context.

Ref: Ann Intern Med. 26 March 2012

Synthetic Platelets Offer Potential Benefits for Platelet Associated Disorders

Professor Nishit Doshi and colleagues from the University of California, Santa Barbara, the Scripps Research Institute, and Sanford-Burnham Medical Research Institute have reported progress in developing synthetic platelets.

They synthesized platelets, imitating the size, shape, and adhesive properties, among other attributes, of mammalian platelets, and concluded that the synthetic particles were highly successful and could have major therapeutic applications.

Ref: Platelet Mimetic Particles for Targeting Thrombi in Flowing Blood. Adv Mater 2012.

The most effective way of promoting blood donation

According to the American Red Cross, only 3% of the US population donates blood.

A systematic review of 29 studies, published in the journal Transfusion Medicine Reviews, found that interventions to promote blood donation which focus on psychosocial cognitions, altruism or reminders were the most effective.

Face-to-face contact and telephone solicitations were the most effective delivery modes. The authors noted that further study may be warranted to assess the efficacy of newer communication technologies.

Ref : A systematic review, Transfus Med Rev 2012;26: 224-37 e6

1900 : Dr Karl Landsteiner, First to classify blood groups - 'A', 'B', 'AB' and 'O'

Facts Compendium

Component Quality Control

S. No.	Component	Specifications & Standards*
1.	Red Blood Cells(RBC)	Hematocrit ≤80% (in all)
2.	Red Blood Cells Leukocytes Reduced	Retain 85% of original red cells, 95% of tested units $<5 \times 10^6$ leukocytes in the final container
3.	Platelets	$\geq 5.5 \times 10^{10}$ platelets per unit and pH ≥6.2 in 90% of units tested
4.	Platelets Leukocytes Reduced	$\geq 5.5 \times 10^{10}$ platelets in 75% of units tested, ≥6.2 pH in 90% of units tested, and $<8.3 \times 10^5$ leukocytes in 95% of units tested
5.	Platelets Pheresis	$\geq 3.0 \times 10^{11}$ platelets in final container of components tested; and pH ≥6.2 in 90% of units tested
6.	Platelets Pheresis Leukocytes Reduced	$<5.0 \times 10^6$ leukocytes in 95% of components tested and $\geq 3.0 \times 10^{11}$ platelets in the final container and pH ≥6.2 in 90% tested units
7.	Cryoprecipitated AHF	Factor VIII: ≥80 IU/bag (100%) Fibrinogen ≥150mg/bag (100%)
8.	Granulocytes Pheresis	$\geq 1.0 \times 10^{10}$ granulocytes in at least 75% of components tested
9.	Irradiated components	25 Gy. delivered to the central portion of the container; minimum of 15 Gy. at any point in the component

*The specification is the threshold value; the standard is the percentage of tested units meeting or exceeding this threshold. The manufacturing procedures used should be validated as capable of meeting these standards before implementation and routine QC. The number of units tested during routine QC should be such as to have a high level of assurance that conformance with these standards is being achieved.

Ref : Silva MA, ed. Standards for blood banks and transfusion services 23rd ed. Bethesda, MD: AABB, 2005.

Humor

Quotes

"The best blush to use is laughter: It puts roses in your cheeks and in your soul".

- Linda Knight

"Laughter is a tranquilizer with no side effects".

- Arnold Glasow

Effect of Tranquilizer

A man was just coming out of anesthesia after a series of tests in the hospital, and his wife was sitting at his bedside.

His eyes fluttered open, and he murmured, "You're beautiful." Flattered, the wife continued her vigil while he drifted back to sleep.

Later, her husband woke up and said, "You're cute." Startled, she asked him, "What happened to 'beautiful?'" He replied, "The drugs are wearing off."

Brave Woman

A man & wife entered a dentist's office. The Wife said, "I want a tooth pulled. I don't want gas or Novocain because I'm in a terrible hurry. Just pull the tooth as quickly as possible."

You're a brave woman said the dentist. Now, Show me which tooth it is.

The wife turns to her husband and says, "Open your mouth and show the dentist which tooth it is, dear."