



Kentucky Association of Blood Banks

CHANNELS

Winter 2009

The Editor's Corner:

We are pleased to bring you the 2009 Winter Edition of Channels. We have some exciting changes in store for 2009 and hope you find Channels to be an educational tool.

We challenge each of you to help us provide the best educational and informative newsletter possible. We want Channels to be a place for conversation and for free exchange of ideas. Share with us your challenging cases and what you did to solve them, or your unusual solutions to every day problems in the blood bank.

Please tell us what you think of the material we published, what you like and what you do not like, in other words, help us make Channels the voice of the blood bank community of Kentucky.

We welcome anyone interested in submitting an article or case study for the newsletter, suggestions for topics, or announcements of upcoming educational events to contact us at channels@kabb.org. Submissions are accepted year round.

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President's Message

Hello All,

I am very excited to be serving as President of KABB this year. On September 9th & 10th, 2008 KABB, in conjunction with Kentucky Society for Clinical Laboratory Science, held their Annual Fall Meeting at the Holiday Inn North in Lexington, KY. It was a very successful and educational meeting for all.

KABB is planning some exciting and challenging changes for the upcoming year. Beginning in 2009, KABB has decided to offer three 1-day meetings independent of KSCLS. We hope this will offer a more intimate and inviting setting for the blood banking community. We will still offer the same educational values as in the past and encourage any suggestions and assistance for interested participants.

KABB's first meeting of 2009 will be Saturday, April 18th at Somerset Community College in Somerset. Meeting Flyers are currently being sent out. Look for more information in the near future and please check our website at www.kabb.org.

KABB plans to have a summer and fall meeting. Dates and locations have not been set at this time.

If you have any suggestions, ideas for future educational topics, comments, or would like to become more active in KABB, please contact me at jprice@kybloodcenter.org.

I'd also like to thank Karla Smith and Dr. Elpidio Pena from Kentucky Blood Center. It is with their support and assistance; this issue of Channels has been published.

Sincerely,

Jami M. Price, MT(ASCP)
KABB President

MASSIVE TRANSFUSION

Dr. Leonard Boral, MD is a Professor in the Department of Pathology at the University of Kentucky and Associate Medical Director of Kentucky Blood Center.

The most common definition of massive transfusion is bleeding requiring more than 1 blood volume replacement (10 units in the average person) over a 24 hour period. Other definitions include replacement of 50% of blood volume in 3 hours or blood loss of greater than 150 ml/min. Massive transfusion can occur in trauma, ruptured abdominal aortic aneurysm, liver transplants, GI bleeding, postpartum hemorrhage, coagulopathy, and when things go wrong in the OR. Only 2 - 3% of trauma patients presenting to hospitals need massive red cell transfusion to replenish the oxygen carrying capacity of blood as a lifesaving measure.

Resuscitation of the patient with uncontrolled bleeding requires prompt action to return to hemodynamic stability by aggressively administering intravenous fluids and red cells to restore tissue perfusion/oxygenation and by minimizing further blood loss through surgery or radiologic intervention (arterial embolization of the bleeding site). Hemostasis is achieved by using blood components, pharmacologic agents, and coagulation factor concentrates. The practice of using the oldest dated red cell units for patients with massive transfusion has come into question because of markedly decreased 2,3,DPG in red cells older than 14 days. Red cells with diminished 2,3,DPG have difficulty in freely releasing oxygen to tissues.

If physicians cannot control bleeding within "the golden hour" (60 minutes from the initial time of severe trauma) an exsanguinating patient will have increased morbidity and mortality proportional to the length of time it takes to stop the uncontrolled hemorrhage. Physiologically, there is hypotensive shock (with tissue hypoxia and ischemia) caused by the "trauma triad of death" - hypothermia, lactic acidosis, and consumption coagulopathy - ultimately resulting in multiorgan failure and sepsis. Intervention with resuscitative fluids and red cells then creates a reperfusion injury in many tissues/organs and dilutes plasma procoagulation factors, plasma anticoagulation factors, plasma proteins (for

intravascular osmotic pressure) and platelets. Many inflammatory cytokines are released in this process. Red cells with their acid citrate anticoagulant further contribute to the patient's metabolic acidosis with ensuing hyperkalemia and to the serum ionized hypocalcemia and hypomagnesemia, because of the citrate binding of these two elements.

During the 1980's massive transfusion protocols usually consisted of 10 units of modified whole blood followed by 2 units of fresh frozen plasma and 10 units of whole blood derived platelets based on the studies of Dr. Richard Counts of Seattle¹. However, the wide spread production of red cells with additive solution (consisting mostly of saline) has recently made whole blood and modified whole blood a thing of the past. During the Iraq War II (2003), surgeons were not seeing as good results of blood resuscitative measures as before the extensive use of red cells with additive solution. There was more coagulopathy. They empirically began infusing FFP earlier and more frequently, in those battlefield casualties with the highest injury severity scores, with the outcome of decreased mortality. Those patients that survived had a 2-fold increased risk of acute respiratory distress syndrome. In 2007, the armed forces recommended a ratio of red cells: FFP: platelets of 1:1:1 for traumatic battlefield wounds expected to result in massive transfusion. Several civilian trauma centers have adopted a similar blood component ratio for coagulopathic patients with very high injury severity scores who are expected to need massive red cell transfusions². Perhaps there is a need for blood centers to again make whole blood available for restricted use in patients receiving massive transfusions.

Bibliography:

1. Counts, R., et. al.: Hemostasis in massively transfused trauma patients. *Ann. Surg.* 190: 91-99, 1979
2. Hess, JR, and Holcomb, JB: Transfusion practice in military trauma. *Transf. Med.* 18: 143-150, 2008.

BLOOD MANAGEMENT 101

Dr. Elpidio Pena, Medical Director, Kentucky Blood Center and University of Kentucky

Blood transfusions are very safe, we have made enormous progress in testing for transfusion-transmitted infections and the possibility of acquiring that type of infection is very low. Even with all the safeguards currently in place, during the years 2005 and 2006, 125 transfusion-related-deaths were reported to the FDA. Most of them were due to Transfusion Related Acute Lung Injury, Sepsis (bacterial contamination of blood products) and hemolytic transfusion reactions. During the last decade, we have become aware of other adverse events related to transfusions, including Transfusion Related Immunomodulation (TRIM). Given the complexities in the etiology of these transfusion complications, the first line of protection for the patient is to transfuse only when it is necessary. This is why a good hospital-wide blood management system makes sense. It is also worth noting that blood and blood components are usually a large budget item in the laboratory.

What is blood management? The best definition I found comes from the book *Basics of Blood Management* by Seeber and Shander, it reads: "blood management is the philosophy to improve patient outcomes by integrating all available techniques to reduce or eliminate allogeneic blood transfusions. It is a patient-centered, multidisciplinary, multimodal, planned approach to patient care".² As the definition says it is a multidisciplinary approach, that means everybody that deals with the blood needs to be involved, including hospital administration, physicians, nursing and of course the blood bank.

There are several "blood management techniques" available; in some of them the Blood Bank has a definite role, in others the Blood Bank has a more supportive role and the responsibility falls in other departments like Surgery.

One of the techniques that Blood Bank/Transfusion Service could use is to change the physicians ordering practice

behavior. This can be accomplished by establishing strict transfusion triggers (i.e. hemoglobin below 7 g/dl) and auditing transfusion practices either prospectively or retrospectively. Creating and sustaining a strong Transfusion Committee, with representation from most of the blood users and nursing can help in changing physician practices.

Many hospitals now have a computer order entry system in the hospital information system. It is extremely important for the Blood Bank to work with the information technology department to create a set of blood transfusion orders that include the transfusion triggers to discourage unnecessary transfusions.

Other blood management techniques are centered on the management of anemia especially in the perioperative area. The interventions here go from the administration of Erythropoietin to the correction of iron or folate deficiency anemia in the preop period. During this period it is also important to avoid medications that could increase the risk of bleeding in the patient including aspirin, anti-platelet drugs and anticoagulants.

There are several practices that are currently used during surgery to avoid the transfusion of allogenic blood. These include normovolemic hemodilution, red cell salvage during surgery and other adjuvant techniques.

As I said at the beginning of this article, blood management makes sense, first for patient safety and as a financial issue for the hospitals. Having a good blood management program will make our patients safer.

Bibliography:

These two books are very good sources in this topic:

1. Waters, J (Editor): Blood Management: Options for Better Patient Care. AABB Press, Bethesda, Maryland 2008.
2. Seeber, P; Shander, A: Basics of Blood Management. Blackwell Publishing, Malden, Massachusetts 2007

BLOOD MANAGEMENT IN THE RARE PATIENT

Karla S. Smith, MT(ASCP)SBB

Reference Laboratory Technologist, Kentucky Blood Center

Managing regular blood product inventory can be challenging. What about supporting a patient with multiple antibodies or one that requires IgA deficient plasma? How about a refractory patient that requires HLA selected or crossmatched platelet products? Have you ever wondered what happens to these special requests you submit to your blood center? Or why it may take a day or two before blood becomes available?

Let's begin by looking at the blood center's process to provide rare blood products. Each year, blood center staff spends numerous hours testing donors to find rare red cell donor types. It's important to note that blood centers only have a small percentage of their donor pool typed. Generally, centers identify group A and O donors who donate at regular intervals to antigen type. Out of this small group of typed donors, an even smaller group is identified as being rare. These donors are usually contacted to let them know they are a rare type and how important it is for them to continue to donate. As these donors return, their red cells are typically set aside in a special area to fill requests as needed. Some facilities, depending on the rarity of the donor, will freeze the red cells for later use. It's important to notify your blood center when you have a patient with ongoing special transfusion needs. The center will often change the scope of their routine screening to identify additional donors for later transfusions.

HLA typing of platelet pheresis and testing for IgA deficient plasma vary depending on the patient population each blood center supports. Centers with active needs for this type of product may elect to test in-house. As donors are found that meet the established criteria, the donor records are tagged for future requests. Other centers may send testing out or rely on a national database search to import products for their patients.

Now we know how blood centers identify rare donors. What happens when you order antigen negative units? Let's identify additional things you can do to help your blood center supply these products for your patient's care.

When a request is received, current inventory is searched to see if a product is available that meets both the special needs and the timeframe for transfusion. If a product is found in current inventory, antigens are confirmed, depending on your supplier, either by testing or documenting they are from a historic record and sent to the requesting facility. When typing is from a historic record, any clinically significant red cell antigens must be confirmed at the facility prior to transfusion. If no unit is available, blood center staff will evaluate the request and decide the best course to provide units.

When the request is for an antigen combination in which the majority of the population type negative, staff may pull other donor units not previously screened and type for the antigens. These units are generally easy to find and sent to the requesting facility without delay.

When the patient's antigen combination is in the minority of the population, we classify these requests as rare. The definition of rare, for our purposes, is when 1 person in 1000 will be negative for a particular antigen or combination of antigens. As you can see, finding units for this type of patient can be quite challenging. When the blood center receives this type of request, they will typically contact the requesting blood bank for additional information.

Properly managing this type of patient requires communication between not only the blood center and the blood bank, but also the clinician and nurse taking care of the patient. Questions asked by your blood center will often include the following: When will the product be needed or transfused? Is this a one time transfusion or a chronic need for ongoing transfusion? Is this an outpatient with a set clinic schedule or a surgery patient? Often times, blood availability in

these cases is very limited. It's important to have all the necessary information to ensure these rare products are transfused when needed. In some cases, the blood product may be so rare, it can not be replaced. Discuss the facts about the rarity of the request and time it may take to find an acceptable blood product with the clinical staff. Ensure clinical staff understand when placing these orders, giving you as much notice as possible prior to the anticipated transfusion better their chances of receiving the requested product. Blood Bank Management may get involved in this process to effectively provide services for this type of patient.

Once the patient needs are identified by the hospital, blood center staff will generate a list of eligible donors that meet the request. Typically, lists of donors fitting the needed requirements are very small. From this list, staff will contact these donors to ask them if they are willing to take the time to come in to donate a unit for this request. It's important to remember these few donors may not always be available or eligible to come in at the time the product is needed. If neither of the above options provides units, the blood center may perform a national search. National searches can be costly due to importing a unit from another area of the country or nation. If a product is found, it can take several days to import the unit and have it available for transfusion.

When working with patients with special blood product needs, we now understand what goes on behind the scenes at the blood center and the amount of time involved in ensuring availability of this type of product. We can also see the importance of how good communication between hospital staff and your blood center can ensure you provide the best care for your patient.

Welcome to our new Q&A section. Our purpose is to initiate an open dialog between the readers of Channels and the editors. Please send us your questions on blood bank issues and we will ask the experts to get the best possible answers. Take the time to be involved with Channels and submit your questions to Channels@kabb.org

Ask Miss Blood Bank

To conserve costs, my hospital is considering Thawed Plasma. What is Thawed Plasma and how does it compare to Fresh Frozen Plasma (FFP) or Plasma Frozen within 24 hours (FP24)?

Thanks,
Mary

Mary,

There has been much discussion in the industry over the last couple years as to the use of Thawed Plasma. Facilities are beginning to research and use this product.

1. **What is Thawed Plasma?**

Thawed Plasma is Fresh Frozen Plasma (FFP) or FP24 relabeled as such after the 24 hours expiration date. The expiration date is extended up to five days from thawing and the plasma is kept at 1-6°C.

2. **Are Thawed Plasma and FFP equivalent?**

Pretty much, they contain therapeutic amounts of all the coagulation factors, except for factor VIII. Thawed plasma can be use as an alternative to FFP, however is not recommended to use in infants and during liver transplants. Major Trauma Center Hospitals keep thawed plasma mostly for emergency cases like trauma and operating room bleeds where there is little time to wait for the FFP to be thawed.

3. **Is thawed plasma a licensed product?**

No, it is not a licensed product by the FDA. It is currently used in many hospitals to shorten the turn around time and to decrease the wastage of FFP.

TRANSFUSION RELATED FATALITIES

Every year the Food and Drug Administration (FDA) issues a report of the transfusion associated fatalities reported to them during the previous year (From October 1, 2007 to September 30, 2008). Here is a summary of the report.

Seventy-two possible transfusion-related deaths were reported. Of those, 46 were considered due to the transfusion, in eight cases transfusion could not be ruled out and sixteen cases were considered not related to transfusion.

The causes of transfusion associated fatalities were:

1. Transfusion Related Acute Lung Injury
2. Hemolytic Transfusion Reaction (non-ABO)
3. Microbial Infection
4. Hemolytic Transfusion Reaction (ABO)
5. Transfusion Associated Circulatory Overload
6. Anaphylaxis

This is the third year in a row that TRALI is the number one cause of transfusion related fatalities. Most of the fatal hemolytic transfusion reactions were due to ABO incompatibility. There were ten reports of fatal hemolytic transfusion reactions due to ABO-incompatible blood transfusions:

- 5 cases: recipient identification error at the time of transfusion
- 1 case: blood bank clerical error (incorrect sample used for testing)
- 3 cases: sample collected from incorrect patient
- 1 case: transfusion of high-titer anti-B in group O Apheresis Platelets following group B bone marrow transplant

The analysis of the above data shows how important it is to have strict identification policies about drawing specimens for crossmatch and for the administration of blood. The blood bank must work with hospital administration and nursing to prevent errors in patient identification that could cause unnecessary morbidity and mortality.

Other antibodies causing fatal hemolytic transfusion reactions were anti-Jka, anti-Jkb and anti-Fya.

The microbial infections related fatalities were associated with platelets (apheresis) and to red blood cells. During 2008, there were no fatalities associated with pooled platelets, probably due to the fact that many blood centers do not make pooled platelets. The infections associated with red cells were mostly caused by Babesia. Other microorganisms reported were Staphylococcus aureus and Staphylococcus epidermidis.

The full report can be viewed at <http://www.fda.gov/cber/blood/fatal08.htm>

Coming Soon, May 2009
Spring Edition of Channels
Topics include:

- Hemolytic Disease of the Fetus and Newborn
- Weak D Testing: when is it necessary?
- Pediatric Blood Banking
- Case Studies
- Ask Miss Blood Bank



Medical Technologist – University of Kentucky, Lexington, KY

The University of Kentucky Hospital Blood Bank seeks an enthusiastic, highly motivated, reliable individual to work half time, night shift, 2 out of 3 weekends, 11p-730a, with occasional hours through the week, evenings/nights. This job requires a Medical Technology or Clinical Laboratory Science background, ability to work under pressure, organizational and data entry skills, the ability to work independently and to work well with others. Minimum requirements are a BS in Medical Technology or Clinical Laboratory Sciences. Registry or registry eligible with ASCP. Experience preferred but not required. Salary range 18.53-28.04. For more information contact Blood Bank Supervisor at 859-323-6941 or apply on-line at <http://www.uky.edu/HR/UKjobs>, Medical Technologist/UKHC, Requisition No. SA525448.



Kentucky Blood Center Overview

Founded in 1968, Kentucky Blood Center (KBC) is a non-profit community blood center providing to 67 hospitals and clinics serving 59 central and eastern Kentucky counties. KBC operates three donor centers in Lexington, Somerset and Pikeville and holds five to seven mobile blood drives each day.

Components Laboratory Supervisor – Second Shift

Kentucky Blood Center seeks detail-oriented professional to oversee and ensure daily production requirements are met, review component production records, ensure all components are accounted for on a daily basis, participate in continuing education, perform training, and conduct performance evaluations. Will assist with maintaining, filing, and storing Component Lab records; writing, updating, and analyzing procedures for Components Lab SOPs; and ensuring Quality System Essentials are implemented for the Components Lab. Monday – Friday, 2nd shift (2 - 11 pm).

College degree or equivalent work experience in medical/health field and experience in supervisory capacity required. MT, MLT, or CLS, previous experience in component production and GMP experience preferred.

Strong written and oral communication skills, a do-what-it-takes work ethic, and a team player attitude are required. Competitive salary, comprehensive benefits including health/dental/life, LTD, paid vacations/holidays, EAP, 403(b) retirement savings plan, and pension plan. **Apply online at www.kybloodcenter.org.** Drug free and EOE/AAP.

Laboratory Technologist – Third Shift

Kentucky Blood Center seeks detail-oriented, self-motivated lab professional (MT, MLT or CLS) needed to perform required testing of products in accordance with guidelines. Other responsibilities include antigen typing, QC/calibration of reagents and equipment, quarantine and release of products, auditing of processes, general lab duties, and compliance with policies and procedures. Monday – Friday, 11 pm - 7 am, must work 2 holidays per year.

BS in Medical Technology (MT), Clinical Laboratory Science (CLS), or AS in Laboratory Sciences.

Strong written and oral communication skills, a do-what-it-takes work ethic, and a team-player attitude are required. Job-specific training provided. Competitive salary, comprehensive benefits including health/dental/life, LTD, paid vacations/holidays, EAP, 403(b) retirement savings plan, and pension plan. **Apply online at www.kybloodcenter.org.** Drug free and EOE/AAP.

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