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WNV

West Nile Virus (WNV) was first detected in the Western Hemisphere in 1999 in New York City and has since caused seasonal epidemics of febrile illness and neurologic disease across the United States, where it is now the leading cause of arboviral encephalitis.

In 2009, 38 states and the District of Columbia (DC) reported 720 cases of WNV disease. Of these, 33 states and DC reported 386 cases of WNV neuroinvasive disease for an incidence of 0.13 per 100,000 population. The five states with the highest incidence of WNV neuroinvasive disease were Mississippi (1.05 per 100,000), South Dakota (0.74), Wyoming (0.73), Colorado (0.72), and Nebraska (0.61).

Neuroinvasive disease incidence increased with increasing age, with the highest incidence among persons aged ≥70 years. A total of 33 WNV deaths were reported, 32 from neuroinvasive disease. Calculating from the number of neuroinvasive disease cases and projections from 1999 serosurvey data, CDC estimated that 54,000 persons were infected with WNV in 2009, of whom 10,000 developed nonneuroinvasive WNV disease.


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Dengue is caused by four antigenically related viruses (DENV-1, DENV-2, DENV-3, and DENV-4).

Dengue fever is endemic in most tropical and subtropical areas of the world. In 2007, nearly 1 million cases were reported in the Americas alone. Dengue infections commonly occur among U.S. residents returning from travel to endemic areas and are more prevalent than malaria among returning travelers from the Caribbean, South America, South Central Asia, and Southeast Asia.

During 2006-2008, a total of 1,125 unique reports were made to two CDC-maintained passive surveillance systems. Of these, the highest proportion of laboratory-confirmed and probable cases with known travel histories were in persons who reported travel to the Dominican Republic (121; 20%), Mexico (55; 9%), and India (43; 7%).

CDC advises that health-care providers should consider dengue in the differential diagnosis of patients with a history of travel to endemic areas within 14 days of fever onset.

Drug-Induced Immune Hemolytic Anemia Reviewed

Drug-induced immune hemolytic anemia (DIIHA) is rare, and a specialized laboratory is often required to provide the optimal serological tests to confirm the diagnosis. The most common drugs associated with DIIHA and the hypotheses for the mechanisms thought to be involved have changed during the last few decades. The drugs most frequently associated with DIIHA at this time are cefotetan, ceftriaxone, and piperacillin.

DIIHA is attributed most commonly to drug-dependent antibodies that can only be detected in the presence of certain drugs (e.g., cephalosporin antibodies). DIIHA can also be associated with drug-independent antibodies; such antibodies do not need the drug to be present to obtain in vitro reactions (e.g., fludarabine). In these latter cases, the drug affects the immune system, causing production of red cell (RBC) autoantibodies; the clinical and laboratory findings are identical to autoimmune hemolytic anemia (AIHA), other than the remission associated with discontinuing the drug.

Some of the mechanisms involved in DIIHA are controversial. The most acceptable one involves drugs, like penicillin, that covalently bind to proteins (e.g., RBC membrane proteins); RBCs become coated with drug in vivo, and a drug antibody (usually IgG) attaches to the drug-coated RBCs that are subsequently cleared by macrophages. The most controversial is the so-called immune complex mechanism, which has been revised to suggest that most drugs are capable of binding to RBC membrane proteins, but not covalently like penicillins. The combined membrane plus drug can create an immunogen; the antibodies formed can be IgM or IgG and often activate complement, leading to acute intravascular lysis and sometimes renal failure; fatalities are more common in this group. It is still unknown why and how some drugs induce RBC autoantibodies, sometimes causing AIHA.


Survey Finds Wide Variation in Transfusion Policies at U.S. and Canadian Children's Hospitals

Previous surveys have reported variation in transfusion practice or policies in specific pediatric populations. The objective of this study was to determine the current transfusion policies in U.S. and Canadian children's hospitals for both neonatal and pediatric general populations.

U.S. and Canadian blood bank personnel at 90 children's hospitals that provided blood products between the dates of October 2008 and January 2009 were surveyed; 51 (56.7%) blood bankers or their designees responded. There were 42 of 51 (82.4%) respondents from the United States and 9 of 51 (17.6%) from Canada.

The study found that there was a wide variation in beliefs regarding the effect of red blood cell (RBC) storage age on outcomes with 66.6% of respondents interested in a prospective randomized trial in critically ill children. There was also wide variation in policies restricting the storage age of RBCs according to patient age and clinical condition. In the United States, 28 of 33 (84.8%) respondents provide universal leukoreduction of RBCs, whereas 9 of 9 (100%) provide universal leukocyte reduction in Canada. Variation in policies existed for RBC irradiation and washing. The majority of respondents indicated that RBC transfusions were audited if the pretransfusion hemoglobin level was more than 8 to 10 mg/dL. Fresh whole blood is available at 6 of 40 (15%) responding children's hospitals.

Researchers concluded that there is a wide variation in blood bank policies regarding RBC transfusions at children's hospitals in the United States and Canada and that prospective randomized controlled trials are needed to allow for evidence-based standards of care regarding RBC transfusions.

On June 11, 2010, the Federal Advisory Committee on Blood Safety and Availability voted 9 to 6 against changing the ban on any man who has had sex with another man since 1977 from donating blood. This committee makes non-binding recommendations to the U.S. Food and Drug Administration.

This controversial rule has been in place since the early 1980s, when there were no tests for identifying HIV-positive blood. Since Men who have had Sex with other Men (MSM) are at higher risk for HIV, this policy was implemented as a safety measure to protect the blood supply.

The guidelines were put in place before HIV/AIDS screening tests were available, and they were designed to target specific subgroups where blood-borne pathogens were the most concentrated. However, current testing techniques have led many experts to question the need for this lifelong ban.

Gay rights groups said the blood donation policy discriminates against gay and bisexual men. They point out a heterosexual man or a woman having sex with an HIV-positive partner is restricted from giving blood for one year, while gay men face a lifetime ban.

Although the committee recommended keeping this policy, the group also called the rule "suboptimal" and suggested the need for further research into alternative strategies, including using criteria based on individual behavior instead of broad characteristics, such as men who have had sex with other men. Recommendations include studying whether questionnaires filled out by potential donors can be fine-tuned to identify gay men who are not high risk, as well as heterosexuals who are high risk and not excluded from blood donation by current methods. Panel members all agreed that the goal was to improve blood safety while seeking to diminish the discriminatory aspects of current blood donor policy.

The committee also called for studying the feasibility of setting up a protocol of prescreening—testing currently banned men to allow them to become donors—and studying donor demographics to determine which groups are at greatest risk for transmitting a range of bloodborne infectious agents, including newly emerging pathogens.

The controversial rule has been in place since the early 1980s when there were no tests for identifying HIV-positive blood.

The American Red Cross expressed disappointment with the decision, stating that "while the Red Cross is obligated by law to follow the guidelines set forth by the FDA, we also strongly support the use of rational, scientifically-based deferral periods that are applied fairly and consistently among donors who engage in similar risk activities."

The panel's proposals go to senior executives at the Department of Health and Human Services and the Food and Drug Administration, which has the final say on any change in policy.
The American Red Cross, AABB, and America’s Blood Centers issued this joint statement at the June 11, 2010 Advisory Committee on Blood Safety and Availability (ACBSA) hearing:

AABB, America’s Blood Centers (ABC) and American Red Cross (ARC) appreciate the opportunity to address the Advisory Committee on Blood Safety and Availability (ACBSA) regarding the deferral criteria for prospective male blood donors who have had sexual contact with another male (MSM).

In 2006, AABB, ARC and ABC presented a joint position to the Food and Drug Administration’s (FDA) Blood Products Advisory Committee (BPAC) stating our belief “that the current lifetime deferral for men who have had sex with other men is medically and scientifically unwarranted,” and recommending that the deferral criteria “be modified and made comparable with criteria for other groups at increased risk for sexual transmission of transfusion-transmitted infections.”

In addition, our organizations do not believe the data regarding quarantine release errors (QREs) justify a different deferral period for MSM than for individuals with similar high-risk behaviors. Blood centers and the vast majority of hospitals collecting allogeneic units now have systems allowing for computerized control of blood product release. We believe it remains critical for the transfusion medicine community to take steps to reduce the number of such errors whenever possible.

After reviewing the data and publications available since the above mentioned 2006 BPAC meeting, our organizations, which represent the blood banking and transfusion medicine community, maintain our recommendation that FDA amend the indefinite deferral currently in place for a male who has had sex with another male since 1977 to a 12-month deferral. This change in policy would conform the deferral period for MSM with the deferrals for other similar high-risk sexual behavior. For example, the current deferral period for individuals who have had sexual contact with an individual with HIV or viral hepatitis is 12 months. There is no sound scientific justification for these different deferral periods. In each of these cases, the vast majority of donors with prevalent infections will be positive by both antibody tests and nucleic acid amplification testing (NAT). This remains true even with increased numbers of HIV-infected MSM, as recently reported by the Centers for Disease Control and Prevention. The current “window period” from the time an individual is infected and the time screening tests would detect infection—approximately nine days for HIV, 7.4 days for HCV, and 30-38 days for HBV (without NAT)—falls well within a one-year deferral period.

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Countries that have lifted the MSM blood donor exclusion:
- Russia

Countries that have a 6-month deferral for MSM donors:
- South Africa

Countries that have a 12-month deferral for MSM donors:
- Argentina
- Hungary
- Sweden
- Australia
- Japan

Countries that have a lifetime deferral for MSM donors:

Countries that have a 5-year deferral:
- New Zealand

Countries where blood donors are screened for high-risk sexual practices rather than MSM behavior:
- France
- Spain
- Italy

AROUND THE WORLD: MSM BLOOD DONATION POLICIES

Red Cross and Other Blood Centers Favor Change in Current MSM Blood Donor Exclusion Policy

The American Red Cross, AABB, and America's Blood Centers issued this joint statement at the June 11, 2010 Advisory Committee on Blood Safety and Availability (ACBSA) hearing:

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In 2006, AABB, ARC and ABC presented a joint position to the Food and Drug Administration's (FDA) Blood Products Advisory Committee (BPAC) stating our belief "that the current lifetime deferral for men who have had sex with other men is medically and scientifically unwarranted," and recommending that the deferral criteria "be modified and made comparable with criteria for other groups at increased risk for sexual transmission of transfusion-transmitted infections."

In addition, our organizations do not believe the data regarding quarantine release errors (QREs) justify a different deferral period for MSM than for individuals with similar high-risk sexual behaviors. Blood centers and the vast majority of hospitals collecting allogeneic units now have systems allowing for computerized control of blood product release. We believe it remains critical for the transfusion medicine community to take steps to reduce the number of such errors whenever possible. However, there is no sound rationale for focusing on QRE numbers as a justification for a near lifetime deferral for MSM and not for other high-risk behaviors.

AABB, ABC and ARC believe that the time is overdue for a change in the MSM deferral policy and urge the FDA to adopt a 12-month deferral period. As with other blood policies, it will be important to track the impact of this policy change. Our organizations remain willing to assist in collecting data regarding the actual impact of changes in MSM deferral periods on blood safety. Maintaining a safe and available blood supply continues to be our highest priority.
Leukocytes in allogeneic blood transfusions may cause several immunomodulatory events. This before-and-after cohort study evaluated clinical outcomes after adoption of prestorage leukoreduction program for blood transfusions, with particular focus on acute kidney injury.

Italian scientists studied 1,034 consecutive patients who underwent on-pump coronary artery bypass grafting between January 2004 and December 2007. Propensity score analysis for transfusion was performed in the whole population; patients who were actually transfused were then divided according to leukoreduction. From these 2 groups, 147 pairs matched for propensity score were considered to evaluate with bivariate and multivariable analyses the effects of leukoreduction, with all-cause in-hospital mortality and morbidity as main outcomes.

Unadjusted in-hospital mortalities were 6.6% for the entire cohort and 44.2% for those with acute kidney injury. In the matched population, after introduction of leukoreduction, mortality rates decreased to 5.4% (vs. 11.4%) and acute kidney injury (RIFLE [Risk, Injury, Failure, Loss of function, End-stage renal disease] class R or greater) dropped from 51.7% to 41.5% (relative risk -20%, P < .045).

No difference emerged regarding other major complications. At multivariable analysis, intra-aortic balloon pump, RIFLE score, and propensity score for transfusion proved independent predictors of in-hospital mortality. Intra-aortic balloon pump and nonleukodepleted transfusion emerged as independent predictors of acute kidney injury. Multivariable analysis on the overall cohort of transfused patients confirmed that nonleukodepleted transfusion was an independent predictor of acute kidney injury.

The researchers concluded that leukoreduction of allogeneic blood products is associated with decreased acute kidney injury and mortality in highly transfused patients.

Red blood cell (RBC) transfusion is common during cardiac surgical procedures. Empiric crossmatching, without attempting to estimate individual transfusion requirements, is typical. Duke University researchers hypothesized that a clinical prediction tool could be developed to estimate the number of units of RBCs needed for coronary artery bypass grafting (CABG) surgery.

The relationship between duration of platelet (PLT) storage, currently limited to 5 days, and surgical outcomes has not been established. Duke University researchers tested the hypothesis that PLT storage age was associated with adverse outcomes.

A retrospective cohort of aortocoronary bypass grafting (CABG) surgery patients from January 1996 to January 2005 receiving one or more PLT transfusions was selected for study. The composite primary ("short-term") outcome was 30-day mortality or prolonged hospital stay. Secondary outcomes included complications and survival to annual follow-up. Multivariable logistic regression models and Cox proportional hazards regression analysis evaluated the association between PLT storage age and outcomes, expressed as an odds ratio (OR) or hazard ratio with 95% confidence intervals (CIs), respectively.

PLT transfusion was administered to 3272 of 10,275 CABG patients and 2578 received units of known storage age, which ranged between 2 and 5 days (median, 4 days; 25th percentile, 3 days; 75th percentile, 5 days). The mortality rate for the 1637 patients receiving a single platelethpheresis transfusion was 3.8%, while 21.6% experienced a prolonged hospital stay or death. After adjusting for the number of PLT and red blood cell (RBC) units transfused, RBC storage age, and preoperative mortality risk, there was no association between PLT storage age and short-term outcome (OR, 1.01; 95% CI, 0.90-1.14), survival (hazard ratio [HR], 1.04; 95% CI, 0.96-1.13), or postoperative infections.

The study concluded that PLT storage age was not associated with adverse short-term outcomes, decreased long-term survival, or infections after cardiac surgery.


Team Creates Prediction Tool to Estimate Blood Units Needed in Coronary Surgery

Red blood cell (RBC) transfusion is common during cardiac surgical procedures. Empiric crossmatching, without attempting to estimate individual transfusion requirements, is typical. Duke University researchers hypothesized that a clinical prediction tool could be developed to estimate the number of units of RBCs needed for coronary artery bypass grafting (CABG) surgery.

With institutional review board approval, detailed demographic, risk factor, and transfusion data of primary elective CABG procedures (n = 5887) from September 1, 1993, to June 20, 2002, were studied and the data set was divided into development and validation subgroups. Multivariable ordinal logistic regression was used to develop and validate transfusion risk factors, assign them a relative weight, and create a model to stratify patients into groups depending on predicted need for 0, 2, 4, or more than 4 RBC units. The model was compared with current standard practice of crossmatching 4 RBC units in terms of observed blood product usage over the study period.

Demographic and transfusion risk factor variables in the development (n = 3876) and validation (n = 2011) data sets were similar. The predictive value of the model was good for the development and validation groups, with a c-index of 0.79 and 0.78, respectively. Applying the predictive model reduced the number of crossmatches by 30% without underproviding RBC units and increased the percentage of patients crossmatched exactly for the required number of units from 11% to 21%.

The team identified predictive factors for RBC transfusion which were used to construct a clinical tool to conserve blood bank resources without increasing patient risk.

Since prior studies of transfusion recipients have lacked details on specific hematologic malignancies (HM) subtypes, National Cancer Institute researchers evaluated the risk of HM after blood transfusion in a U.S. population-based case-control study (77,488 elderly HM cases identified through cancer registries, 154,509 controls). Transfusions were identified using linked Medicare hospitalization claims. Polytomous logistic regression was used to calculate odds ratios (ORs) associating transfusion and HM subtypes by features suggestive of a causal relationship.

A history of transfusion was present in 7.9% of HM cases versus 5.9% of controls. Associations for most HM subtypes suggested reverse causality: ORs were elevated only during the shortest latency periods; ORs for unspecified anemia and gastrointestinal bleeding, which may be related to undiagnosed HM, were stronger than for surgeries, which are unlikely to be related to HM; and/or there was no dose response. In contrast, risk for lymphoplasmacytic lymphoma (1397 cases) was elevated at long latency (OR, 1.56 at 10+ years after transfusion), after transfusions related to surgeries (OR, 1.22-1.47), and in a dose-response relationship with number of transfusion-related hospitalizations (OR, 1.53 with one hospitalization; OR, 1.80 with two or more hospitalizations, p trend < 0.0001). Risk for marginal zone lymphoma (1915 cases) was also elevated at 10+ years after transfusion (OR, 1.80).

Consistent with prior studies, blood transfusions did not increase risk of most HM subtypes. Patterns of elevated risk for lymphoplasmacytic and marginal zone lymphomas suggest an etiologic role for transfusion.


**CANCER AT A GLANCE**

Cancer is the general name for a group of more than 100 diseases in which cells in a part of the body begin to grow out of control. Although there are many kinds of cancer, they all start because abnormal cells grow out of control.

The oldest description of cancer (although the word cancer was not used) was discovered in Egypt and dates back to about 1600 B.C.

The origin of the word cancer is credited to the Greek physician Hippocrates (460-370 B.C.), considered the “Father of Medicine.” Hippocrates used the terms carcinos and carcinoma to describe non-ulcer forming and ulcer-forming tumors. In Greek, these words refer to a crab, most likely applied to the disease because the finger-like spreading projections from a cancer called to mind the shape of a crab.

Half of all men and one-third of all women in the US will develop cancer during their lifetimes.

1,529,560 men and women (789,620 men and 739,940 women) are estimated to be diagnosed with cancer this year.

Cancer is the second leading cause of death in the United States.

569,480 men and women are predicted to die of cancer in 2010.

—National Cancer Institute, American Cancer Society
Platelet Transfusion Reviewed

Most platelet transfusions are given to prevent bleeding in thrombocytopenic patients undergoing chemotherapy for malignancy or hematopoietic stem cell transplant.

In stable, uncomplicated patients the risk of bleeding is similar until the platelet count falls to <5,000/microL. However, many patients have clinical complications that necessitate transfusion at higher counts. Therefore, the recommended indication for prophylactic transfusion is a platelet count of 10,000/microL. The usual dose of platelets is 1 apheresis unit or a pool of four to six concentrates from individual units of whole blood. The likelihood of bleeding is the same if half or double the usual dose is given, but half-dose transfusions must be given more often and double-dose transfusions less often than the standard dose.

For patients with inherited defects of platelet function or acquired defects such as due to drugs or uremia, the platelet count is usually normal and prophylactic transfusion is not recommended. Transfusion may be helpful to treat serious bleeding. Patients undergoing cardiopulmonary bypass may be slightly thrombocytopenic but usually have platelet dysfunction. Transfusion is helpful to treat nonsurgical serious bleeding. In idiopathic thrombocytopenic purpura, platelet survival is short and transfusion is useful only for severe bleeding.

Lean Sigma Used to Reduce Blood Wastage

Red blood cell (RBC) product wastage in hospitals is reported to range from 0.1% to 6.7%. Wastage at Johns Hopkins averaged 4.4% of 63,000 issued RBC products. Data indicated that approximately 87% of wasted RBC units were either individual units that were out of blood bank for more than 30 minutes (dispensed but not administered) or units packed in transport containers that had temperature indicators affixed to each unit. Johns Hopkins scientists hypothesized that Lean Sigma methodology could be used to reduce RBC wastage by 50%.

An interdisciplinary hospital team (transfusion medicine, nursing, and anesthesiology) used Lean Sigma methodology as a tool to reduce RBC product wastage, with a focus on container wastage, which was determined to yield the largest impact. Using the five-part Lean Sigma process—define, measure, analyze, improve, and control—the team collected baseline wastage data, identified major factors affecting RBC product wastage, and implemented interventions to reduce amount of wastage.

Factors identified as contributors to RBC wastage most amenable to improvement were lack of awareness and training of staff ordering and handling RBC products, management of temperature-validated containers, inconsistent interpretation of RBC temperature indicators, and need for accountability when ordering blood products. Overall RBC product wastage decreased from 4.4% to a sustained rate of less than 2%. This reduction decreased the number of RBC units wasted by approximately 4300 per year, saving approximately $800,000 over the 4-year period of the study.

The researchers concluded Lean Sigma methodology was an effective tool for reducing RBC wastage in a large academic hospital.


deaths each year. From 1946 to 1980, no cases of dengue acquired in the continental United States were reported, and there has not been an outbreak in Florida since 1934.

"We're concerned that if dengue gains a foothold in Key West, it will travel to other southern cities where the mosquito that transmits dengue is present, like Miami," said Harold Margolis, chief of the dengue branch at CDC.

Since 1980, a few locally acquired U.S. cases have been confirmed along the Texas-Mexico border, which coincided with large outbreaks in neighboring Mexican cities. In recent years, there has been an increase in epidemic dengue in the tropics and subtropics, including Puerto Rico.

"These cases represent the reemergence of dengue fever in Florida and elsewhere in the United States after 75 years," Margolis said. "These people had not traveled outside of Florida, so we need to determine if these cases are an isolated occurrence or if dengue has once again become endemic in the continental United States."

For more information on dengue, please visit www.cdc.gov/dengue.

reference: Science Daily July 14, 2010

Red Cross Scientist and Colleague Honored with Lifetime Achievement Award

American Red Cross Southern California Blood Services Region Scientific Director George Garratty, PhD, FRCP, and Lawrence Petz, MD, have been honored with the AABB’s Bernard Fantus Lifetime Achievement Award. The award is only given every five or more years. There have been four previous awardees.

The award commemorates Fantus, who established the first hospital blood bank in the United States in 1937.

The award was created in 1987 to recognize individuals who have made numerous outstanding contributions to the scientific basis or clinical practice of blood banking and transfusion medicine during the last 50 years.

Garratty is the Scientific Director of the American Red Cross, Southern California Blood Services Region and a Clinical Professor of Pathology and Laboratory Medicine at the University of California, Los Angeles. He started his Red Cross research program in 1978. Garratty’s research is mainly concerned with immune red cell and platelet destruction. He has published more than 300 papers, is co-author of three textbooks, and editor of six textbooks. The latest book, co-authored with Petz, *Immune Hemolytic Anemias*, was published in 2004.

Petz is the Chief Medical Officer at StemCyte International Cord Blood Center. He is Emeritus Professor of Pathology and Laboratory Medicine and Former Director of Transfusion Medicine at UCLA Medical Center where he also served as Director of Transfusion Medicine and Professor of Pathology & Laboratory Medicine.

Holland Lab Bids Farewell to Dr. Moroff

Gary Moroff, PhD, head of the Blood Components Department in the Holland Laboratory, retired in July after almost 36 years of service to the American Red Cross. He led the Holland Laboratory’s Blood Components Department since 2005, while continuing to supervise his own long-established research and development program on the preparation, storage, and quality control of platelets and other blood components for transfusion. From 1993 to 2003, Moroff supervised a research program investigating the storage and quality control of blood-derived stem cells.

Since joining the Red Cross in 1974, Moroff provided leadership and support to many programs. In 1979, he established the Research Blood Program, which collects and processes blood for use in the lab’s research. He provided oversight and guidance of the program until 1981, and again, since 2004. Moroff was also a major proponent of the Biomedical Sciences Library, and chaired the Library Committee for 13 of the 16 years of his membership. He has also been a key, long-standing member of the Institutional Review Board on the use of human subjects in research, and has overseen all aspects of the annual Graham A. Jamieson Lectureship in Blood Research from 2004 until 2010.

Moroff was recognized by AABB with the 2008 Tibor Greenwalt Award and Lectureship. He has received numerous awards from the Red Cross, including the Charles C. Lund Award, presented by the New England Region, in 1998. Moroff also served on the editorial boards of the journals *Transfusion* and *Immunohematology*. He has published more than 90 articles during his career and has presented his research at national and international meetings.

"Gary has made tremendous contributions to transfusion medicine and his work on blood cell storage has had a significant impact on practice and regulation. The Red Cross has been fortunate to have enjoyed Gary’s contributions for so long and we wish him a happy and productive retirement," Roger Dodd, American Red Cross Biomedical Services Vice President of Research and Development, stated.

--Donna Sobieski
Creating a Massive Transfusion Protocol for Trauma Patients May Improve Patient Outcomes

The majority of trauma patients (>90%) do not require any blood product transfusion and their mortality is <1%. However, 3% to 5% of civilian trauma patients will receive a massive transfusion (MT), defined as >10 units of packed red blood cells (PRBC) in 24 hours. In addition, more than 25% of these patients will arrive to emergency departments with evidence of trauma-associated coagulopathy. With this combination of massive blood loss and coagulopathy, it has become increasingly more common to transfuse trauma patients early and with a combination of PRBC, plasma, and platelets.

Given the inherent uncertainties common in the early care of patients with severe injuries, the efficient administration of massive amounts of PRBC and clotting factors tend to work best in a predefined, protocol driven system. In this study, researchers from Brooke Army Medical Center, Fort Sam Houston, Texas; Vanderbilt University School of Medicine, Tennessee Valley VA Medical Center, Nashville, Tennessee; University of Texas Health Science Center, and the Center for Translational Injury Research strove to:

1) define the problem of massive hemorrhage and coagulopathy in the trauma patient,  
2) identify which group of patients this type of protocol should be applied to,  
3) describe the extensive coordination required to implement this multispecialty MT protocol,  
4) explain in detail how the MT was developed and implemented, and  
5) emphasize the need for a robust performance improvement or quality improvement process to monitor the implementation of such a protocol and to help identify problems and deliver feedback in a “real-time” fashion.

The researchers emphasize successful implementation of such a complex process can only be accomplished in a multi-specialty setting. Input and representation from departments of Trauma, Critical Care, Anesthesiology, Transfusion Medicine, and Emergency Medicine are necessary to successfully formulate (and implement) such a protocol. Once a protocol has been agreed upon, education of the entire nursing and physician staff is equally essential to the success of this effort. Once implemented, this process may lead to improved clinical outcomes and decreased overall blood utilization with extremely small wastage of vital blood products.


Researchers Find Benefits in Developing Rapid Emergency Hemorrhage Panels

The evaluation of hemostasis in bleeding patients requires both accuracy and speed.

As an alternative to point-of-care testing, University of Washington researchers developed an emergency hemorrhage panel (EHP: prothrombin time [PT], fibrinogen, platelet count, hematocrit) for use in making transfusion decisions on bleeding patients with a goal of less than 20-minute turnaround time (TAT) when performed in the clinical laboratory on automated instruments. Because point-of-care samples are not checked for clotting or hemolysis, they evaluated their effect on automated testing.

TAT was reduced by moving the sample immediately to testing and shortening centrifugation times. Clotting in samples was rare (1.1%) and shortened the PT by only 0.7 seconds. It lowered fibrinogen on average 18%, but resulted in only one of 2300 samples changing from normal to low fibrinogen. Hemolysis had no clinically significant effect on the PT or fibrinogen. Therefore, hemolysis checks were eliminated and clot checks minimized. Initially TAT averaged 15 ± 4 minutes (range, 8-30 min), but 9% of samples exceeded the 20-minute goal due to low fibrinogens that slowed testing. A revised fibrinogen assay with expanded calibration range resulted in a TAT of 14 ± 3 minutes (range, 6-28 min) with only 2% of samples exceeding the 20-minute goal.

By limiting EHPs to patients that were actively bleeding, EHPs accounted for only 8 of 243 coagulation samples per day. The researchers concluded that limiting EHPs to bleeding patients and modifications to the process and assays used for hemostasis testing lead to TATs of less than 20 minutes for critical testing in the clinical laboratory.

Plasma components from female donors were responsible for most cases of transfusion-related acute lung injury (TRALI) reported to the American Red Cross (ARC) between 2003 and 2005. Consequently, the American Red Cross began preferentially distributing plasma from male donors for transfusion in 2006 and evaluated the effect on reported TRALI cases in the ensuing 2 years.

Suspected TRALI cases reported to the American Red Cross Biomedical Services Hemovigilance Program in calendar years (CY) 2006, 2007, and 2008 are described. Any case involving a fatality was also independently reviewed by three American Red Cross physicians and classified as probable TRALI or not TRALI.

The study found that the percentage of plasma collected from male donors and distributed for transfusion increased each year from 55% in CY2006 to 79% in CY2007 and 95% in CY2008. Independent medical review of the 77 reported TRALI cases involving a fatality identified 38 cases as probable TRALI. Plasma was the only component transfused in six of these cases in 2006, five in 2007, and zero in 2008. Overall, the analysis of reported fatalities and nonfatal cases demonstrates that TRALI involving only plasma transfusion was significantly reduced in 2008 compared to 2006 (32 vs. 7 cases; odds ratio [OR] = 0.21; 95% confidence interval [CI] = 0.08-0.45), to a level that was no longer different from the rate of TRALI observed for RBC transfusion (4.0 vs. 2.3 per 10^6 distributed components; OR = 1.78; 95% CI = 0.67-4.36).

The researchers found that reported TRALI cases from plasma transfusion decreased in 2008 compared to the prior 2 years simultaneously with the conversion to male-predominant plasma for transfusion.


For the Record...
We apologize for an error that appeared on page 5 in the Summer 2010 edition of Plus. In the article “Study Looks At HIV and HCV Infections Among US Blood Donors Since the Introduction of Nucleic Acid Testing”, four figures should have appeared in superscript text.

The article read, “During 2007 through 2008, HIV incidence was 3.1 per 105 person-years (py), with an RR incidence of 0.68 per 106 (1:1,467,000) donations; HCV incidence was 5.1 per 105py; with an RR estimate of 0.87 per 106 (1:1,149,000).”

The article should read, “During 2007 through 2008, HIV incidence was 3.1 per 105 person-years (py), with an RR incidence of 0.68 per 106 (1:1,467,000) donations; HCV incidence was 5.1 per 105py; with an RR estimate of 0.87 per 106 (1:1,149,000).” We regret the error.

Leukoreduced Blood Transfusions May Reduce TRALI and TACO
Cardiopulmonary adverse events after transfusion include transfusion-related acute lung injury (TRALI) and transfusion-associated circulatory overload (TACO), which are potentially lethal and incompletely understood.

To determine whether the incidence of TRALI and TACO was affected by leukoreduction, University of Rochester researchers conducted a retrospective, before-and-after study of acute transfusion reactions for the 7 years before and after introduction of universal leukoreduction in 2000, involving 778,559 blood components.

The researchers found that substantial decreases occurred in the rates of TRALI (-83%; from 2.8 cases per 100,000 components before to 0.48 after universal leukoreduction; p = 0.01), TACO (-49%; 7.4 to 3.8 cases per 100,000; p = 0.03), and febrile reactions (-35%; 11.4 to 7.4 cases per 10,000; p < 0.0001). The incidence of allergic reactions remained unchanged (7.0 per 100,000 before and after universal leukoreduction). These outcomes were primarily attributable to decreased TRALI and/or TACO associated with red blood cell (RBC) and platelet (PLT) transfusions (-64%) with notably smaller decreases associated with fresh-frozen plasma or cryoprecipitate transfusions (-29%). The incidence of TRALI and/or TACO after 28,120 washed RBC and 69,325 washed PLTs transfusions was zero.

The researchers concluded that further studies are needed to determine if TRALI or TACO is mitigated by leukoreduction, if the mechanism of TACO is more complex than excessive blood volume, and if washing mitigates TRALI and TACO due to PLT and RBC transfusions.

Blumberg N, Heal JM, Gettings KF, Phipps RP, Masel D, Refaai MA, Kirckley SA, Faikow LB. An association between decreased cardiopulmonary complications (transfusion-related acute lung injury and transfusion-associated circulatory overload) and implementation of universal leukoreduction of blood transfusions. Transfusion. 2010 [Ahead of print].