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Bloody Good News

Newfoundland and Labrador Provincial Blood Coordinating Program

Special Interest Articles:

- Irradiation of Blood Components
- Autoimmune Hemolytic Anemia

Individual Highlights:

Blood Components and Blood Product Utilization – Can we sustain the growth rate?

Canadian Blood Services is the blood supplier for red blood cells, platelets, plasma components and blood products in Canada.

Fortunately, for Canadians, the associated costs of collection, distribution and transfusion of these products is borne by the Provincial and Territorial governments. However, the cost of blood is not cheap. Canadian Blood Services according to their annual report, collects in excess of 920,000 whole blood collections. The plasma protein products account for $489 million, which is an overall increase of 14.7% from 2008/2009. The Immune globulin products, including Intravenous Immune Globulin continues to increase at a rate of 7% annually. The use of Factor VIII and Factor IX equates to an increase of 6% and 11% respectively. The increase in distribution of Factor VIII accounts for an increase of 8,111,034 IU. Comparing the data for 2010/2011 and 2009/2010, the distribution of Factor IX increased by 16.9%, Factor VIII increased by 22.7% and Factor VWF increased by 44.1%.

We must begin to look deeper into our utilization practices and identify whether there are increasing numbers of sick patients and are these patients sicker over longer periods of time or whether the treatments they are receiving are prophylactic, enabling them to live longer with a better quality of life.

Over the next year, 2011/2012, we will be working more closely with physician user groups to gather a better perspective of why this utilization rate continues to gather speed.

New Transfusion Safety Officers

As we move into 2011-2012, we are pleased to announce that we have two new Transfusion Safety Officers (TSOs) who are replacing past officers. Kristen Ryan Roberts is assuming the TSO role for Labrador Grenfell Health and Wanda McCue is taking on the role for Eastern Health – Carbonear and Placentia area. We look forward to working with our new Officers.

We would like to say thank you to Miriam Rumbolt (Labrador Grenfell) for the work she has accomplished in the region. Labrador Grenfell RHA is a broad region and travel amongst the three sites to conduct educational sessions and implement processes and procedures has been challenging. Miriam worked diligently and succeeded in many of the initiatives brought forward by the Provincial Blood Coordinating Program.

Donna Sutton recently retired from Eastern Health and in her term as TSO, Donna was fortunate to bring strong leadership to the TSO position in the area of Carbonear and Placentia and facilities in between.

We wish Miriam success in her new role as Laboratory Team Leader for Labrador Health Center in Goose Bay and wish Donna a long and enjoyable retirement.

The roles of the TSOs are very challenging positions as these Technologists can attest. The TSO provide support to the Provincial Blood Coordinating Program initiatives by assisting in the development of transfusion standard operating procedures, and implementing guidelines that promote safe transfusion practice. The TSOs are the 'go to person' in the hospital when it comes to transfusion practice. They provide educational sessions to new employees and support current transfusion staff in their everyday patient care.

Irradiation of Blood Components

Edward Shanbrom
1924-present

Born in West Haven, CN, this hematologist became the vice president of medical and scientific affairs at the Hyland Division of Baxter Laboratories and amongst his group of colleagues developed a method to produce concentrated Factor VIII by pooling large volumes of plasma. By the mid-1970's he began conducting research at home and developed a purification process using mild detergents to remove viruses from blood plasma. In 1980, he received the patent for solvent detergent treatment process for viral inactivation of factor concentrates. The New York Blood Centre bought his patented processes in 1988.

Few people think more than two or three times a year, I have made an international reputation for myself by thinking once or twice a week.

George Bernard Shaw
Irish dramatist & socialist
(1856 - 1950)

Irradiation is a procedure recommended for preventing Transfusion Associated Graft versus Host Disease (TA-GvHD).The cellular blood components that require irradiation include red blood cells, platelets, platelet-pheresis and granulcytes-pheresis. Cellular blood components are irradiated to prevent the proliferation of T-lymphocytes and thus potential harm to recipients. Irradiation prevents the T-lymphocytes from invading the recipients' immune system which may cause TA-GvHD.

Irradiated blood components are required to be exposed to a minimum dose of 25 Gy up to a maximum of 50 Gy of gamma irradiation. Once irradiated, all blood components shall be labeled to indicate that the product has been irradiated, the facility performing the irradiation and the expiration date. The maximum expiration time for irradiated whole blood and red blood cells is 28 days after irradiation or original expiration date whichever is shorter.

Irradiated blood components are recommended for but not limited to the following recipients to reduce the risk of TA-GvHD:

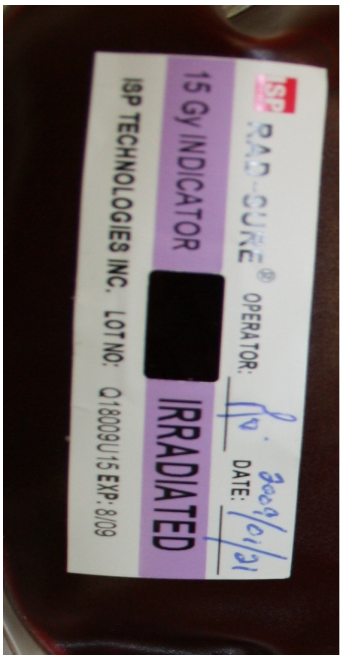
- All individuals with chronic graft-vs-host disease
- Individuals with congenital cellular immunodeficiency; thymic hypoplasia, Wiskott-Aldrich Syndrome, DiGeorge syndrome, infants with congenital cardiac aortic arch defects or intracardic anomalies, severe combined immune deficiency, purine nucleoside phosphorylase deficiency, reticular dysgenesis, and cell mediated immune deficiency of unspecified etiology.
- Allogeneic and autologous hematopietic stem cell transplant recipients.
- Individuals receiving HLA compatible platelets,
- Individuals with Hodgkin's disease or treated with purine analogs (Cladarbine, Fludarabine, 2-CDA, Penntastatin, Deoxycoforycin).
- Individuals receiving granulocyte transfusions.
- All individuals undergoing intrauterine transfusions and neonates who have previously received intrauterine transfusions.
- Individuals receiving a transfusion from a biological/blood relative.

Probable indications for irradiated blood components include:

- Infants weighing less than 1200 g at birth
- Individuals being treated with cytotoxic agents for hematologic malignancies other than Hodgkin's Disease
- Individuals receiving aggressive immunosuppressive therapy (chemotherapy, radiation therapy)
- Platelet donors chosen for crossmatch compatibility or HLA matching
- Individuals undergoing solid organ transplant.

Some common concerns raised regarding irradiation of blood comonents are related to increased costs associated with the irradiation procedure, delayed transfusions, impaired cell function and reduction in the lifespan of red cells and a potential for increased potassium, lactic dehydrogenase and plasma hemoglobin in irradiated components. Although these concerns may be considered drawbacks, the risks and cost of irradiated blood components are relatively low and are considered a reliable prevention of TA-GvHD.

Once established that a recipient requires irradiated cellular blood components, recipients should be made aware of their need for irradiated blood components for as long as clinically indicated. If irradiated blood components are not available and a delay in the transfusion is life threatening, the transfusion of regular blood components can proceed with documented approval of the recipient's primary physician.



Autoimmune Hemolytic Anemia

Autoimmune Hemolytic Anemia (AIHA) is an autoimmune disorder caused by an immune response where the body attacks and destroys its own red blood cells. The cause is diverse and is rarely a single simple cause. AIHA can be classified as: Warm Autoimmune Hemolytic Anemia (WAIHA), Cold Autoimmune Hemolytic Anemia, Paroxysmal Cold Hemoglobinuria, Atypical Autoimmune Hemolytic Anemia, Mixed and Drug Induced Hemolytic Anemia. Warm antibodies account for approximately seventy percent of AIHA and thus is the most common cause of AIHA. Warm refers to the temperature (37˚) at which red blood cell destruction occurs. It presents as both a primary and secondary disease. AIHA can affect all age groups, but it is known to affect women more than men.

The diagnosis of AIHA is based on clinical signs, symptoms and laboratory findings. The clinical signs and symptoms vary according to classification and from mild to severe, generally worsening when the destruction of red blood cells persists for extended periods. The clinical signs and symptoms include but are not limited to fatigue, weakness, jaundice, tachycardia, dyspnea, low blood pressure, dizziness, confusion, fever, swollen lymph nodes, abdominal bloating and an enlarged spleen.

The degree of hemolysis is reflected in the laboratory findings as decreased hemoglobin and hematocrit, increased reticulocyte count and lactic dehydrogenase, an elevated indirect bilirubin level, hemoglobinuria and urobilinogen and a positive direct coombs test.

The course of treatment for AIHA may vary depending on the cause and severity of the anemia and can be life threatening if left untreated. Common treatments include corticosteroid drugs and splenectomy. Patients who do not respond to steroids and splenectomy may be given immunosuppressive drugs. Plasma pheresis is sometimes used when all other treatments fail. Transfusion therapy is often dependent on the degree of hemolysis, the patient's ability to tolerate anemia, clinical benefit and is sometimes used as a temporary relief.

The presence of warm autoantibodies poses many challenges to providing compatible and/or optimal blood for transfusion therapy. Blood should never be denied when there is a justifiable need, even though the compatibility test may be positive. Patients with WAIHA are at an increased risk of transfusion complications related to hemolysis, volume overload and other potential risks and thus should be transfused with caution and closely monitored for adverse reactions.

Laboratory Investigation of an Autoimmune Hemolytic Anemia

When investigating an autoimmune hemolytic anemia (AIHA) it is important to have knowledge of the patient's symptoms as well as a complete medical history: recent drug, pregnancy and transfusion history. The serologic investigation performed in the Transfusion Medicine Laboratory is not to determine if a patient has a hemolytic anemia, but to determine what type of immune hemolytic anemia is present as the treatment is different for each type.

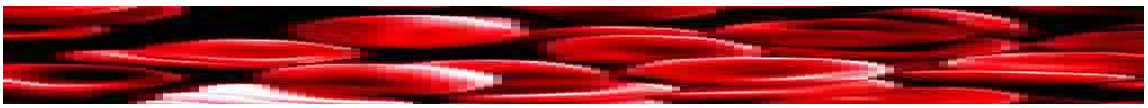
The direct antiglobulin test (DAT) is used in establishing immune hemolysis and the interpretation of the DAT will direct further investigation. The DAT detects in vivo sensitization of red blood cells and determines which type of protein (IgG and/or complement) is coating the red blood cells. If the DAT is positive with a polyspecific antiglobulin reagent, subsequent testing using a monospecific anti-IgG and anti-C3 should be performed. Although IgG and complement may be present in warm autoimmune hemolytic anemia (WAIHA), in most cases it is IgG that is present on the red cells. Complement, alone on the red cells usually indicates a drug-induced hemolytic anemia or cold autoimmune hemolytic anemia. If the DAT is negative, but the patient is hemolyzing, this could indicate that there is insufficient amount of IgG present on the red cells.

An elution should be performed if the positive DAT is due to IgG on the red cells. Elution is a deliberate manipulation of a red cell suspension to break an antigen-antibody complex. The dissociated antibody recovered through the process of elution can be used to identify the antibody responsible for the positive DAT. The methods for preparing eluates include elution by heat, freeze-thaw, alteration of pH and treatment with organic solvents.

When an eluate reacts with all the reagent red cells, the presence of IgG autoantibody on the red

Upcoming Events:

- CSTM Annual Conference
  May 12-15, 2011
  Toronto
- Massive Transfusion Consensus Conference
  June 9-11, 2011
  Toronto
- CSMLS LABCON 2011
  June 10-13, 2011
  Toronto



Massive Transfusion Consensus Conference June 9-11, 2011

Follow this link to the questions posed during this important event. http://mtcc2011.com/consensus-questions/

Registration deadline is May 10, 2011. To register: http://mtcc2011.com/registration/

The Program link is: http://mtcc2011.com/registration/

cells is most likely the reason for the positive DAT, especially if the patient has not been recently transfused. If a single specificity is identified, it is usually from the Rh system, often anti-e. If the results are all negative this could indicate insufficient amount of IgG present on the red cells or, there is a possibility of a drug-induced hemolytic anemia. If a DAT i is positive due to drugs the attending physician should be notified.

If a warm reactive autoantibody is present in the patient's plasma, it may mask the presence of a clinically significant alloantibody. To determine the presence of any alloantibody, a warm adsorption procedure (in which there are a variety of techniques) must be performed to remove autoantibodies from the serum and permit the detection of specific unexpected antibodies.

The results of a serological laboratory investigation can provide important information about the antibody (ies) coating the red cells and can help provide alternative treatment for the condition rather than a blood transfusion. If it is necessary for a patient with a warm autoantibody to be transfused, the attending physician and the transfusion medicine medical director must decide whether to administer blood that is not compatible in vitro.

Case Study #12

Post surgery, a 61 year old female patient with a decreased hemoglobin and hypotension was transfused a unit of packed red blood cells. It was unknown whether the patient had prior transfusions or pregnancies. The patient was not pre-medicated or transfused while under anesthesia.

The patient's vital signs pre-transfusion were stable. At approximately one and a half hours into the transfusion the patient complained of itchiness, developed chills and rigors, became tachycardic and her temperature increased from 37.1 to 38.5. The transfusion was stopped, antihistamines were administered and a product culture was performed. The results of the product culture were negative. The patient was transfused the following day with no further complications reported.

1. Classify type of reaction

2. What was the relationship of the adverse event to the transfusion?

3. What was the severity of the reaction?

4. What was the outcome of the adverse event?

Case Study #11 Interpretation

1. *Type of Reaction – TACO*
2. *Relationship of adverse event to transfusion – Possible*
3. *Severity of the reaction –Grade 1(Non-Severe)*
4. *Outcome –Minor*

Each newsletter will contain an interesting case study for you to review. The type of adverse event and answers to the questions will be provided in the next edition of the newsletter.

Newfoundland and Labrador Provincial Blood Coordinating Program

P.O.Box 8700
St. John's, NL
A1B 4J6

PHONE:
(709) 729-5246
(709) 729-6573
(709) 729-5250

FAX:
(709) 729-4009

E-MAIL:
marilyncollins@gov.nl.ca
sharonlinehan@gov.nl.ca
cheryljacobs@gov.nl.ca

We're on the Web!

See us at:

http://www.health.gov.nl.ca/health/bloodservices/index.html