

*Newfoundland and Labrador Provincial Blood Coordinating Program*

## Special Interest Articles:

- Therapeutic Apheresis
- Near Miss Reporting
- Blood Transfusion Administration Sets

## Individual Highlights:

|   |   |
|---|---|
| Therapeutic Apheresis                         | 2 |
| Maximum Surgical Blood Order Schedule (MSBOS) | 3 |
| Near Miss Reporting                           | 3 |
| Blood Transfusion Administration Sets         | 4 |
| Case Study # 14                               | 4 |
| Case Study # 13 Interpretation                | 4 |

## Annual Transfusion Medicine Symposium



The Annual Transfusion Medicine Symposium was held in St. John's on October 31, 2011. We were fortunate to have the Canadian Society for Transfusion Medicine (CSTM) Board of Directors present for our meeting. The knowledgeable members of the Board presented on a variety of topics. Each year CSTM offers to present educational topics in various parts of the country in conjunction with the face-to-face board meetings. It also provides an opportunity to ask questions and discuss common transfusion medicine practices with this diverse group of individuals who truly represent the cross section of transfusion medicine in Canada. The yearly event provides an educational opportunity for the transfusion community to gain a better comprehension of various transfusion strategies used throughout the country.

Ms. Ellie Kingsbury from Canadian Blood Services presented on the allocation of IVIG and why CBS uses this mechanism to ensure sufficient product distribution for all jurisdictions in Canada.

Dr. Lucinda Whitman, Chair of the National Advisory Committee on Blood and Blood Products provided an overview of the role of NAC and an update on the various NAC activities.

Ms. Cathy Escott from the NL Centre for Health Information spoke about standardization of health information and the impacts and complexities associated with multiple names for one condition or test request.

The symposium was well-attended and provided interesting question periods throughout the day.

## Transfusion Safety Officers & NL PBCP Staff



These happy folks meet face to face twice yearly to develop transfusion medicine guidelines and procedures for use in the Regional Health Authorities in the province. Patient safety is foremost.



Dr. Paddy Moore

**Dr.B.P.L. (Paddy) Moore** was a renowned scientist who recently passed away on December 5, 2011. Dr. Moore emigrated to Canada in 1948 and became the Assistant Medical Director at the Vancouver Depot of the Canadian Blood Transfusion Service. Appointed as the first National Director of the Red Cross Blood Group Reference Laboratory in Toronto in 1955, Dr. Moore introduced many new laboratory practices including automated testing of blood donations. He authored or co-edited the first Canadian text on laboratory aspects of transfusion medicine. Dr. Moore continued as consultant in blood group serology until 1992. He received many distinguished awards including the Ortho Award from the Canadian Society for Transfusion Medicine in 1996.

“Go as far as you can see; when you get there you will be able to see farther”.

Thomas Carlyle,  
Scottish Historian and  
Essayist, 1795- 1881

## Therapeutic Apheresis

Apheresis is the derivation of the Greek word *aphairesis*, which means removal or withdrawal. From a medical perspective, apheresis permits the separation of whole blood into various components that includes plasma, platelets, red cells and white cells. Therapeutic apheresis is an important treatment for patients with various disease states and includes plasma exchange, red cell exchange, platelet depletion, leukocyte depletion and photopheresis.

Plasmapheresis removes the plasma from the patient and a replacement fluid such as Fresh Frozen Plasma or Albumin is used. This reduces circulating antibodies and immune complexes. Diseases for which plasmapheresis is effective include Waldenstrom’s macroglobulinemia, Myasthenia Gravis and Guillain-Barré syndrome. In certain conditions such as thrombocytosis, plateletpheresis is effective in removing platelets to reduce the complication of thrombosis and bleeding.

The American Society for Apheresis (ASFA) in its 5<sup>th</sup> edition guidelines for therapeutic apheresis incorporates indication category, evidence and recommendation strength to guide the practitioner.

There are four categories that describe the use of therapeutic apheresis according to the ASFA 2010 categories. **Category I** identifies apheresis as first line therapy either as a stand-alone treatment (in Guillain-Barré) or in

conjunction with other treatment modalities (in the case of Myasthenia Gravis plasma exchange would be first line therapy in conjunction with medication). **Category II** describes disorders whereby apheresis is second line therapy either as stand-alone or in conjunction with other treatments. **Category III** identifies apheresis therapy as not established optimal therapy. **Category IV** categorizes apheresis as ineffective or harmful based on published evidence.

Therapeutic plasma exchange (TPE) removes plasma and all its constituents. Indications for TPE include Goodpasture syndrome, Thrombotic Thrombocytopenic Purpura. When TPE occurs, plasma volume is restored using either albumin and/or plasma. In TTP patients, the plasma exchange ranges between 1 and 1.5 plasma volumes daily until the platelet count exceeds 150,000/ul for 2-3 consecutive days based on 40-60 mL/kg body weight.

Cytapheresis is considered when removal of the cellular blood components in patients with symptomatic thrombocytosis, leucocytosis, or erythrocytosis.

Red cell exchange is primary treatment for patients with sickle cell disease. There is no consensus on the indications for red cell exchange for protozoal infections although red cell exchange has been adjunctive treatment for malaria and babesiosis.

The Canadian Apheresis

Group and the Canadian Association of Apheresis Nurses provide nursing practice guidelines that include apheresis quality assurance, apheresis unit orientation, information on disease categories, adverse reactions and patient education guidelines.

As with any procedure there is a risk of adverse events. Some of the adverse events that may occur during or after therapeutic apheresis range from mild to severe. Patients may also experience air embolism, allergic reactions, red cell hemolysis, red cell loss, shock or a reaction to sodium citrate that is used as an anticoagulant during the apheresis procedure. Arterial puncture or re-bleeding at the venipuncture site may also occur.

Patients must be informed of the purpose of the procedure, risks and side effects so as to be able to make an informed decision. Patients are required to provide informed consent for the procedure.

In Newfoundland and Labrador, therapeutic apheresis has increased annually since 2009 from 106 procedures to 226 currently in 2011. In Newfoundland and Labrador, apheresis procedures are performed annually for various conditions that include Myasthenia Gravis, Hemolytic Uremic Syndrome, Guillain-Barré, Good Pasture syndrome, hyperviscosity, Wegeners. Therapeutic plasma exchange, stem cell collections, leukapheresis are the most common procedures performed. Platelet reductions procedures are not done very frequently but have been done in the past when required.



## Maximum Surgical Blood Order Schedules

As the demand for blood resources continue to increase, it is important for health care facilities to implement and review utilization strategies that are useful in ensuring an adequate blood supply to meet the current demands of our health care facilities.

According to transfusion medicine literature, the development and revision of maximum surgical blood order schedules (MSBOS) have proven to be a beneficial utilization strategy.

MSBOS provide guidelines which recommend the maximum number of units of blood to be crossmatched and reserved for particular surgical procedures. It reports the maximum acceptable blood order required to meet 80 -90 percent of the patients

undergoing surgery.

Assessments of crossmatch to transfusion ratios and audits of past blood usage and blood utilization practices for surgical procedures, help in determining recommendations for future MSBOS. The development and revision of MSBOS require a collaborative working relationship among transfusion, surgery and anesthesiology services. The MSBOS for each healthcare facility should be based on the experiences of each individual health care facility. It is also important that in developing MSBOS exceptions be incorporated into the guidelines, as the transfusion of blood can be dependent on individual

symptoms, circumstances and or unique problems.

MSBOS have been documented as being beneficial in reducing the number of unnecessary crossmatches. When less blood is crossmatched for patients who probably will not require a transfusion, the outdate rate is often reduced. Reduced costs often result with fewer units of blood being crossmatched, in turn reducing processing, handling and outdate costs. With fewer units being crossmatched and reserved for surgical procedures, an increase in available inventory usually results. When inventory is maintained more closely with the facilities

transfusion needs, the overall blood supply increases. When facilities require less blood, this reduces the demand on the blood supplier and allows blood to be available when truly needed.

The ultimate goal of MSBOS is efficient utilization of the blood supply and enhanced quality of care. By promoting of more efficient use of blood stocks and technologists' time, the number of pre-operative crossmatches and unnecessary transfusions will be reduced without compromising patient safety.

## Near Miss Reporting

The SHOT report defines a near miss event as any error that, if undetected, could result in the determination of a wrong blood group or transfusion of an incorrect component, but was recognized before the transfusion took place. In the 2010 SHOT report, analysis of 863 reports identified 409 sample errors.

Near miss events provide reliable information as they occur more frequently than, but have the same characteristics and causes as an actual error. The frequency allows the information to be analyzed and a root cause to be determined. Once the root cause has been established, we can then implement a corrective action to eliminate the

chance of an actual transfusion error occurring.

There are a number of reasons why health care professionals do not report near misses: they do not understand the concept of near miss reporting, fear they will be penalized or blamed, they believe that reporting may not result in improvements and reporting near misses generate additional work.

Several factors must be present to ensure that near miss events are reported: there must be a near miss reporting system, near miss reporting must be understood by all employees, and near miss events must be investigated and corrective action taken to prevent their reoccurrence.

Information collected from near miss reporting can expose possible system weaknesses, unsafe practices that have been present for sometime (e.g. pre-labeling of tubes for specimens), lack of training, or there are outdated or no procedures in place for certain processes in the laboratory. The data provided can be used to develop strategies for patient safety improvements.

Education on how valuable the information collected from near miss reporting is to continuous quality improvement is a key to getting staff to report near misses. The ultimate goal for near miss reporting in transfusion medicine is to get the right blood to the right patient.

### Upcoming Events:

- ◆ **CSTM – Halifax, NS**  
May 24- 27, 2012

As Transfusion Safety Officer for the St. John's hospitals, I was very excited to attend my first Canadian Society for Transfusion Medicine Conference held in Toronto. For 3 days I attended the very informative lectures and had many opportunities to meet other professionals working in Transfusion Medicine. I truly enjoyed the lectures on difficult antibody case studies and transfusion reactions. The conference was an excellent educational experience and I look forward to attending many more.



**Inventory Management**

There are many inventory management tools available to ensure inventory levels are appropriate for facilities without compromising patient safety while at the same time effectively and efficiently using a valuable resource.

Over the next few months, work will begin to assist NL hospitals to determine ideal inventory levels of red blood cells thus ensuring sufficient supply and minimizing discard outdate rates.

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We're on the Web!

See us at:

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

**Blood Transfusion Administration Sets**

Filtered blood transfusion sets are required to administer all blood components intravenously. According to the Canadian Standards Association (CSA) a standard blood administration set for adult transfusions is a sterile, pyrogen-free administration set. The administration set is available in a straight or y-tubing and contains a 170-260 micron filter. The filter is designed to remove and retain debris and fibrin particles that could potentially be harmful to the recipient being transfused.

Immediately prior to initiating

the blood component transfusion, the blood administration set must be primed with the blood component or sterile 0.9 % sodium chloride (NaCl) solution. Infusion sets must be changed after a maximum of 4 units of Red Blood Cells have been infused, if the administration set becomes occluded, every 24 hours or according to the manufacturers recommendations and according to facility policy. A new administration set shall be used prior to administering a different blood component, for example, platelets and/or

plasma components.

An understanding of the use of the standard blood administration sets is important for ensuring safe blood component administration. As the blood transfusion sets may vary from facility to facility, and manufacturer instructions, facility policy should always be followed for proper use. When administering blood products, please refer to the manufacturers insert for the required tubing, filters and for compatible solutions as they vary among blood products and manufacturers.

**Case Study #14**

A 77 year old female hematology patient with a history of acute renal failure was ordered 2 units of packed red blood cells with 20 mgs of Lasix to be administered between the 2 units of blood.

The patient's blood group was O negative, it was unknown whether she had a previous pregnancy and she was transfused within the past three months. She did not receive premedications prior to starting the transfusion and her vital signs were stable.

The first unit of blood was

transfused over two and a half hours and lasix 20 mg IV was administered after the completion of the first unit of blood as per doctors orders. Within two and a half hours into the second unit with approximately 20-30 mls remaining to be infused the patient began to complain of shortness of breath and a racing pulse.

The transfusion was stopped. The patient's temperature and respirations were stable; the patient's pulse increased from 100 to 124 and her blood pressure from 116/56 to 130/70. The

patient's oxygen saturation was noted to have decreased from 98% to 92%. Additional Diuretics, a chest x-ray and a product culture were ordered. The Diuretics were effective, the chest x-ray showed slight edema in the left lower lobe, IV fluids were held overnight and the results of the product culture were negative.

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 #13 Interpretation**

1. *Type of Reaction – Severe Allergic*
2. *Relationship of adverse event to transfusion – Probable*
3. *Severity of the reaction –Grade 2 (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.*

