

# The ORBCoN Report

Ontario Regional Blood Coordinating Network

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## Welcome to the fifth edition of the ORBCoN Report

Our focus for this edition is the “Management of the Bleeding Patient”, this year’s theme for transfusion education in Ontario.

### Autumn was a busy season at ORBCoN with the following projects reaching completion:

- Ontario Guidelines for the use of IVIg
- Pilot of the Ontario Transfusion Benchmarking Website – one stop shopping for site specific utilization reports
- Assessment Live -Version 2 questions and accompanying learning insights were launched
- Release of the final report from the Provincial Plasma Audit
- A revised version of the SWIM was completed
- “Bloody Easy for Nurses” was provided to hospitals in CD format
- A French version of the pamphlet for patients: Blood Transfusion: A patient’s perspective was made available to Ontario hospitals

### Coming soon:

- Provincial Contingency Plan “Mock Exercise”
- The Ontario Transfusion Benchmarking Website
- A blood administration handbook to complement “Bloody Easy for Nurses”
- The 2nd automated audit tool for the audit of transfusion processes at the bedside
- A Special Needs Transfusion card and letter template

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## Making Sense of Massive Transfusion Protocols

*By: Dr. Katerina Pavenski, Medical Director Transfusion Medicine, St. Michael’s Hospital and Member of the Ontario Blood Advisory Committee (OBAC)*

Massive transfusion (MT) is defined as transfusion of 10 or more packed red blood cell (PRBC) units in a 24 hour period and occurs in up to 15% of civilian trauma patients (Huber-Wagner 2007). MT is associated with a mortality rate of 20-50% (Huber-Wagner 2007). Most patients requiring MT die within 6 hours of admission (2007). Three models guiding blood product management in a massively bleeding patient have been described. They are: ratio-based administration, laboratory-based administration and real-time involvement of a transfusion medicine physician. Due to the limited availability of transfusion medicine physicians, the other two approaches are most commonly used. Both approaches have their strengths and weaknesses. Fourteen studies involving over 3500 patients showed some benefit in patients receiving blood products at high plasma to PRBC ratio. However, the studies were mainly retrospective and did not have adequate controls. Moreover, most of these studies were subject to a survivorship bias. On the other hand, laboratory-based resuscitation is not based on good evidence either

## Making Sense of Massive Transfusion Protocols *continued*

with a number of recommendations based on expert opinion alone. The laboratory-based model relies heavily on the rapid availability of laboratory test results. It also assumes that coagulopathy in a bleeding trauma patient develops late along with dilution, hypothermia, and acidosis. However, at least 30% of critically

injured patients are coagulopathic on arrival (Maegele 2007). These patients are at high risk of dying within 4-6 hours and perhaps may benefit from the higher plasma to PRBC ratio-based resuscitation despite the increased risk of plasma-related complications such as TRALI and volume overload. Unfortunately, it is very difficult to predict which patients

require early aggressive resuscitation with plasma and which can wait. The debate is certainly not settled, and more evidence is needed. In the meantime, a sound clinical judgment on a case-by-case basis should be the preferred approach. Perhaps, having more transfusion medicine physicians is the answer.

## The Ontario Provincial Plasma Audit

*By: Troy Thompson, Regional Field Officer, ORBCoN - Central*

A provincial plasma audit was conducted in Ontario from September 22 to October 19, 2009. The purpose of the audit was to collect baseline data on the ordering and utilization practices for plasma in Ontario hospitals. Out of 158 hospitals with Transfusion Services, 76 sites agreed to participate, representing over 80% of plasma transfused in Ontario. The participating sites could choose any 5 days (not necessarily consecutive) during the four week period to perform data collection.

Worldwide, inappropriate transfusion of fresh frozen plasma probably represents the largest avoidable risk for transfused patients (McClelland, 2001). Although guidelines for fresh frozen plasma (FFP) use have been published, many transfusions are considered inappropriate and the use of FFP has been growing steadily. In order to capture data related to plasma orders, a web based audit tool was developed. A working group comprised of six hematologists reviewed current plasma guidelines and developed

criteria which were used to rate the orders into three categories: Appropriate, Inappropriate and Indeterminate. Each transfusion order was rated independently by two physicians and any discrepancies in rating were resolved by consensus. The data and ratings were reviewed by the Plasma Audit Steering committee. The most common indication for plasma use was surgery. The median dose transfused was only 2 units (range 1 to 9). Based upon the established rating criteria, approximately 30% of the orders were deemed inappropriate and a further 18% were indeterminate due to insufficient information (e.g. no pre/post coagulation testing). While 52% of the doses were deemed appropriate for the clinical indication, only 29% had both an appropriate indication **and** an adequate dose of plasma ordered. The proportion of inappropriate orders was significantly smaller in hospitals that use "guidelines" versus those that do not. Based upon the audit findings the following recommendations have been proposed:

- The introduction of clinical practice recommendations

including strategies for their implementation

- A clear statement of conditions for which frozen plasma transfusion is **not** indicated should be issued
- A clear statement concerning the adequacy of the dose of frozen plasma required to produce a significant improvement in hemostatic function
- Dissemination of advice on the use of vitamin K and/or prothrombin complex for urgent reversal of the effects of vitamin K antagonists (VKA) ("warfarin effect");
- Enhanced general awareness of the potential adverse consequences of transfusion of frozen plasma.

Recommendations from the audit were approved by the Ontario Blood Advisory Committee (OBAC) in October and a copy of the final report was distributed to all Ontario hospitals with Transfusion Services in November 2009.

**Next Steps:** A working group of the Provincial Plasma Audit Steering Committee will develop Ontario clinical practice recommendations for the use of plasma and oversee the implementation of these recommendations.

# Case Report - Acute Hemolysis Secondary to ABO incompatible Platelet Transfusion

By: Janet Sharun, Charge Medical Laboratory Technologist Thunder Bay Regional Health Science Centre

**Background:** Our patient was a 79 year old male diagnosed with myelodysplastic syndrome who we have supported with weekly platelet and red cell transfusions since diagnosis in 2006. He has a history of angina and under went CABG in 1998.

**Blood Group:** A Rh Negative, Antibody Screen: no antibodies detected

**Case:** The patient presented April 9/09 with a platelet count of  $13 \times 10^9 /L$  - one unit of Group O Rh positive buffy coat pooled platelets was issued at 14:31. At 15:20 patient showed signs of distress and the following symptoms were noted:

- sitting forward with severe back pain
- O<sub>2</sub> saturation at 69%
- dyspnea
- chest pain
- slight rise in temp from 36.0 °C pre transfusion to 36.3 °C at time of reaction

The patient was admitted to the cardiology ward and a transfusion reaction work-up was started.

## Results:

Test	Normal range	Pre transfusion Sample (product issued at 14:31)	Post transfusion (17:53) Sample April 9/09	Further test results April 10/09
Sample description	No icteris No hemolysis	No icteris or hemolysis	No icteris Gross Hemolysis	No icteris No hemolysis @07:20hrs
DAT (Diamed Gel card)			Anti-IgG weak Anti-C3d 3+	
Total Bilirubin	3-22umol/L	20umol/L	74umol/L	
LDH	313-618U/L	1022U/L	1996U/L	
Hgb	135-180g/L	99 g/L	81 g/L	
Blood smear			Spherocytes schistocytes	
Haptoglobin	0.3-1.7 g/L		Less than 0.12	
Urinalysis			Gross hemolysis	Clear urine 10/4/09 @ 01:39 hrs
Troponin	<0.034ng/mL		0.093ng/mL	0.267ng/mL @21:09hrs 0.973ng/mL @01:05hrs

## Discussion:

Attempts to give ABO compatible platelets are not always possible because our institution is 8 hours away from our CBS supplier, as a trauma centre we always have "stock" on hand. To best use and conserve/maintain supply we attempt to give ABO compatible but expiration is always the priority.

To prevent reactions some transfusion centres perform titres when giving ABO incompatible Platelet Pools or Apheresis units. There is no generally agreed 'critical' titre or precise guidelines for testing. In Europe and Asia, high titre-isoagglutinins are variously defined as either IgM greater than 1:32 to 1:100, an IgG greater than 1:256 to 1:512. In the U.S., agglutination titres of IgM greater than 1:50 to 1:64 and/or IgG greater than 1:256 are classified as high-titre<sup>1</sup>. A document on the Internet shows the National Blood Service (NBS) in the United Kingdom perform a 1/100 dilution on the Olympus which is equivalent to a 1/128 titre.<sup>2</sup> Other

## Case Report *continued*

laboratories are specialized enough to perform a plasma reduction before issue if ABO incompatible plasma is present in the platelet pool.

In Thunder Bay, as a result of this reaction we adopted a cut off of 64 by immediate spin if ABO incompatible platelets are to be issued. If titre is below 64 we do not worry, if above 64 we would give an alternate ABO compatible or low titre unit, if no alternative unit is available the physician is contacted to inform them of a potentially increased risk of hemolytic reaction.

### Conclusion:

This reaction was an acute hemolytic reaction resulting from a high titre anti-A isohemagglutinin contained in the donor plasma used to pool the buffy coat platelets. Because the plasma source is from one donor, if that donor has a high titred anti-A or anti-B and the unit is transfused to a recipient whose red cells have the corresponding antigen, an

acute hemolytic reaction can result.

Clinical staff caring for the patient should be aware that there is a possibility of such a reaction occurring, particularly when group O pooled or apheresis platelets are transfused to group A recipients

To reduce the risk of such reactions, hospitals may choose to use various strategies such as:

- Performing titration on the plasma of the platelet units prior to issue to a recipient with incompatible blood group
- Reducing the volume of incompatible plasma transfused through centrifugation
- Avoiding transfusion of group O pooled or apheresis platelets to group A recipients.

### Acknowledgments:

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### References:

<sup>1</sup> AABB September/October 2005 Q&A; Laura Cooling MD

<sup>2</sup> High Titre Anti-A/B Testing of Donors within the National Blood Service (NBS); S. MacLennan; 04/12/2006; INF/MED/MA/004/01

### Questions:

1. What are the most common laboratory indications of hemolysis?
2. Is a high titre in the donor plasma always related to a hemolytic reaction in the recipient if there is ABO incompatibility?
3. Name one alternative strategy to reduce the incidence of this type of reaction that was not mentioned in this case report?
4. This type of hemolytic reaction seems to be happening more frequently according to published and anecdotal reports, what is the reason for the increase?

Please refer to our website [www.transfusionontario.org](http://www.transfusionontario.org) February 15th, 2010 for a posting of the answers.

## Upcoming Educational Events Calendar

Event	Where	When
North East CBS / ORBCoN 5th Transfusion Medicine Symposium	Videoconference	April 14, 2010
CBS / ORBCoN/ONTraC Spring Symposium	Renaissance Hotel, Toronto, ON	April 16/17, 2010

*For more information related to these events or any of our resources, please visit our website at [www.transfusionontario.org](http://www.transfusionontario.org).*

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