Managing Ontario and Canada’s Precious O Rh Negative Red Blood Cell Supply

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Disclosure

• I have no conflict of interest with this event because I have no affiliations, sponsorships, honoraria, monetary support or conflict of interest from any commercial source

• I am an employee of Canadian Blood Services
Objectives

• To describe the current issues of O-Rh negative red cells

• To explain the challenges with the current supply of O-Rh negative red cells

• To identify strategies to increase the supply of O-Rh negative red cells

• To identify strategies to decrease the demand for O-Rh negative red cells
Demand for red cells
RBC Units Issued (per 1,000 Population)

Source: CBS internal distribution data. Represents ~75% of Canadian supply
RBC Units Issued
(Total and Growth Rates)

Source: CBS internal distribution data. Represents ~75% of Canadian supply
Factors Likely Influencing Red Cell Utilization in Canada

• Increased focus on blood conservation strategies

• Development of Provincial Blood Coordinating offices

• Changing hospital practice
  – Use of electronic crossmatch

• Changing paradigm of transfusion as a medical therapy

• Medical innovations
Demand for O-negative red cells
O-negative Red Cell Units Issued

Fiscal Period

Source: CBS internal distribution data. Represents ~75% of Canadian supply
O-negative Red Cells Issued (per 1,000 pop)

Source: CBS internal distribution data. Represents ~75% of Canadian supply
O-negative red cell units issued (% of total RBC Issues)

Source: CBS internal distribution data. Represents ~75% of Canadian supply
Factors likely influencing demand for O-negative red cells

- Use of massive hemorrhage protocols
  - “blood boxes” containing o-neg red cells, AB plasma, platelets

- Increased use of phenotype-matched blood

- Other???
Supply of O-negative red cells
O-negative Collections

- % of O-neg collections has increased
  - 0.6% increase over past 4 years

Slide from Dan Shavrnoch
% O Neg – Comparison of metrics (collections, orders, issues, donors)

• ~2.2% gap between O-neg orders and available O-neg active WB donors
• ~1.1% gap between O-neg orders and issues

Slide from Dan Shavrnoch
O-negative red cells – Order Fill Rate

- Over 16 Quarters, the (average) RBC O Neg Order Fill Rate has been **above 95% EIGHT times**, and **below 95% EIGHT times**
  - FY12/13 Q1, Q2 and Q3 were all above 95%
  - FY12/13 Q4 was below 95% (due to O Neg Advisory)

Slide from Dan Shavrnoch
The problem

- O-neg issues
  - ~12% of red cells
- CBS O-neg donors
  - ~10%
- General population
  - ~6-7%
The Solutions

- Increase supply of O-negative red cells
- Decrease demand for O-negative red cells
Strategies to increase the supply of O-negative red cells
Supply of O-negative red cells

• CBS has made a concerted effort to recruit and retain O-negative donors as well as encouraging frequent donations from these donors.

• CBS strives to collect a higher percentage of O-neg units than is present in the donor population.
O-negative active whole blood donors

- % of O-neg WB donors has increased
  - 0.4% increase over past 4 years
O-neg – Collections per active whole blood donor

- % of O-neg collections from O-neg active whole blood donors has increased
  - 19.1% to 19.6% over past 4 years
  - we are collecting more blood from our base of whole blood O-neg donors

Slide from Dan Shavrnoch
O-neg – average number of yearly collections per active whole blood donor

- O Neg Collections per Active WB Donor has increased over the past 4 years, from ~ 2.32 to 2.36 per year
Supply of O-negative red cells

- CBS needs to increase the number of O-positive and A-negative phenotyped units
  - This work is ongoing
Strategies to decrease the demand for O-negative red cells
Demand for O-negative red cells

- O-neg red cells need to be used appropriately to ensure availability for those patients for whom there is no alternative
Demand for O-negative red cells

• “The greater good of the community, including its patients who present as Rh-neg and cannot receive what they need, is compromised by wasting Rh-neg because a rare patient MAY be harmed”

Dr. Paul Schmidt, Florida Blood Services
www.cbbsweb.org
What the UK did to decrease demand for O-negative red cells...
UK and O-neg

• Concern that O-neg blood was being used inappropriately and that, at a time when levels of donated red cells are low, there was the possibility that demand would outstrip supply

• Conducted audit to determine whether stockholding and the use of O-neg red cells were appropriate
UK and O-neg

- Invited hospitals in England, Scotland, Wales and Northern Ireland to participate
  - 182/318 participated

- Collected transfusion data on first 40 transfusion episodes from June 1, 2008, patients only included once

- Hospitals asked to record stock levels of each blood group at same time each day in June
UK: O-neg--Indications for use

Mandatory indications

• O-neg patients with anti-D
• O-neg females ≤60 yr
• Emergency use for females ≤60 yr where blood group is unknown

Recommended indications

• O-neg patients who receive/are likely to receive repeated transfusions

Stainsbury and Murphy, 2003
NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells
UK: O-neg--Indications for use

Acceptable indications

- O-neg males or females > 60 yr with no anti-D where ≤ 8 O-neg units are transfused
- Non-O-neg infants ≤ 1 yr of age where group specific units are unavailable
- Emergency patients where the blood group is unknown at the time of transfusion, up to 2 units
- Non-O-neg patients requiring special phenotype d blood where group specific units are unavailable

Stainsbury and Murphy, 2003
NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells
UK: O-neg--Indications for use

Unacceptable indications

• O-neg males and O-neg females > 60 yr with no anti-D where > 8 units are required
• Emergency where group is unknown and patient receives > 3 units

Stainsbury and Murphy, 2003
NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells
UK and O-neg

• Average stockholding in hospitals of O-neg red cells was 16.7% of red cell stock
  – Only 2.7% of sites reported having levels <8%
  – 17.3% of sites were >20%

• 77.6% of O-neg transfusions were given for mandatory, recommended or accepted reasons

• In 11.3% of documented transfusion episodes, O-neg was transfused non-emergently to known non-O-neg recipients to avoid outdating
O-Negative Red Cells: General Principles/Recommendations

• Hospitals should regularly review policies for use of O-neg RBC for emergencies and investigate incidences where use is considered inappropriate

• Hospitals should regularly review practice of emergency transfusion of O-negative red cells to non-O-neg patients
  – UK: in some cases patients being unnecessarily transfused with >3 units

• Hospitals must provide group specific red cells rapidly to avoid unnecessary use of emergency group O-neg RBC

NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells
O-Negative Red Cells: General Principles/Recommendations

- For group O-pos recipients with alloantibodies, all efforts must be made to identify phenotypically matched group specific blood.

- The blood supplier should provide a sufficient number of extensively phenotyped O-pos units of blood in order to enable the appropriate selection of group specific blood for patients with alloantibodies.

NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells.
O-Negative Red Cells: General Principles/Recommendations

• Adequate inventory policies should be in place to minimize wastage of O-neg RBC (UK: reduce stockholding level to <10.5%)
  – Avoid wastage due to:
    • Expiration
    • Electively transfused to non-group O recipients

• Appropriate policies which guide use of O-neg RBC should be introduced in order to reduce unnecessary high stockholding levels

NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells
Raising awareness of the issue
Range of O-neg issues by hospital type
GOAL:
Promote optimal utilization of O Rh negative red blood cells by heightening hospital awareness of issue trends over time.
• Issue a ‘status report’ to top 50 hospital users:
• 3 years of issue data
  – O neg as % of:
    • All blood groups
    • Total group O blood
  – Ranking (1st, 2nd, 3rd etc)
Current Ranking:

1

# O Rh negative Red Blood Cells received from CBS

<table>
<thead>
<tr>
<th></th>
<th>Total O neg RBC units issued</th>
<th>O neg as % of all blood group RBC units issued</th>
<th>O neg as % of group O RBC units issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013</td>
<td>4475</td>
<td>13.5%</td>
<td>26.5%</td>
</tr>
<tr>
<td>2011-2012</td>
<td>4255</td>
<td>11.9%</td>
<td>24.3%</td>
</tr>
<tr>
<td>2010-2011</td>
<td>4498</td>
<td>12.6%</td>
<td>25.7%</td>
</tr>
</tbody>
</table>

O Negative RBC Ranking (within list of top 50 hospital users)

<table>
<thead>
<tr>
<th></th>
<th>Per absolute # of O neg units received</th>
<th>O neg as % of all bld groups</th>
<th>O neg as % of all grp O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013</td>
<td>1st</td>
<td>15th</td>
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<td>2011-2012</td>
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<td>2010-2011</td>
<td>1st</td>
<td>11th</td>
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Engagement

Hospital Transfusion Committees

- Letter addressed to Chair, TM Director cc’d
- Physician to Physician correspondence
- Also will copy: Centre MD, Hospital Liaison Specialist, Production Manager, PBCO, Ministries of Health
Progress

• First set of Blood Brief reports sent out September 2013
  – Several hospitals requested data for all hospitals within their centre

• Follow-up survey (30 hospital sites)
  – 84% influenced to review transfusion practice
One Canadian Hospital example
One hospital’s example

- All males (regardless of age) and all females > 50 years receive O-pos red cells for unmatched support

- No ER has stock inventory
  - All unmatched inventory is held under blood bank control
One hospital’s example

- Inventory levels are assessed on a daily basis at blood bank rounds

- If the CBS local numbers are <3.5 DOH
  - If hospital inventory is good, standing orders are cancelled
  - Screening practice is initiated of patients requiring O-neg RBC

- Redistribution program in place to receive O-neg units with 7 days or less until expiry to ensure no wastage
Conclusions

• O-negative red cells are a precious resource
  – Despite increased donations from a limited number of donors, O-neg demand, at times, exceeds supply

• O-neg red cells need to be used appropriately to ensure availability for those patients for whom there is no alternative
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