INTRODUCTION

• In order to optimize patient care in cardiac surgery, hospitals are developing Blood Management strategies to minimize blood loss, reduce the need for allogeneic blood transfusions and reduce health-care costs¹.

• A network meta-analysis has been developed to determine the most effective therapy or combination of therapies in:
  - minimizing the exposure to homologous transfusions
  - minimizing the number of RBC units transfused
  - maximizing post-operative hemoglobin

METHODS

SEARCH METHODS

• The Australian Patient Blood Management Guidelines (PBMG) issued their recommendations basing on a thorough review of the literature published up to June 2009².

• Systematic literature review of randomized controlled trials (RCTs) from 2009 to 2015 using the same search string used in the Australian Patient Blood Management guidelines and having thoracic surgery as main surgical application.

• Search on Medline and PubMed of meta-analysis and reviews of papers published before July 2009, but not included in Australian Guidelines. Also a non-systematic search was performed using Google Scholar.

OUTCOMES INVESTIGATED

• Transfusion rate (TR): Percentage of patients who received allogeneic blood
• Packed red blood cells transfused (PRBCs): Total number of transfused RBC bags
• Post-operative Hemoglobin (PO Hb): Level of Post-Operative Hemoglobin

RESULTS

SEARCH RESULTS

• 86 RCT selected

• 48 different therapies identified grouped into 5 broad categories of active strategies for comparison:
  1. Autologous transfusion (AT): including the use of washed cell salvage (CS), Ultra Filtration (UF), or unwashed blood salvage (noCS)
  2. Administration of antifibrinolytics (AA): for example aprotinin, tranexamic acid, aminocaproic acid or desmopressin
  3. The combined use of autologous transfusion and antifibrinolytics (AT+AA)
  4. Acute normovolemic haemodilution (ANH)
  5. Decision to take no action to treat blood loss (NT)

ANALYSIS RESULTS

• The combined use of autologous transfusion and antifibrinolytics (AT+AA) has the highest probability (>90%) to best active strategy in reducing TR and PRBCS while reaching high PO Hb. The sole use of AT follows with a probability of ~40%.

• Among all the different autologous techniques to be used with antifibrinolytics, washed cell salvage results being the most effective. In fact the combined use of washed cell salvage and antyfibrinolytics (CS+AA) results the most effective therapy in terms of odds of TR, total PRBCs:

<table>
<thead>
<tr>
<th>Transfusion rate (Odds Ratio)</th>
<th>noCS + AA</th>
<th>UF + AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS + AA</td>
<td>0.36</td>
<td>0.31</td>
</tr>
<tr>
<td>noCS + AA</td>
<td>0.87</td>
<td></td>
</tr>
</tbody>
</table>

CS+AA reduces odds of transfusion by 64% compared to noCS +AA and by 69% compared to UF+AA

<table>
<thead>
<tr>
<th>PRBC Transfused (Mean Difference)</th>
<th>noCS + AA</th>
<th>UF + AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS + AA</td>
<td>-0.74</td>
<td>-0.90</td>
</tr>
<tr>
<td>noCS + AA</td>
<td>-0.16</td>
<td></td>
</tr>
</tbody>
</table>

CS+AA reduces the units of PRBCs by: ~1 bag vs. noCS+AA
~1 bag vs. UF+AA

<table>
<thead>
<tr>
<th>PO Hb (Mean Difference)</th>
<th>noCS + AA</th>
<th>UF + AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS + AA</td>
<td>-0.23</td>
<td>-0.23</td>
</tr>
<tr>
<td>noCS + AA</td>
<td>-0.00</td>
<td></td>
</tr>
</tbody>
</table>

The level of PO Hb is comparable between the strategies

CONCLUSION

• The use of Washed Cell Salvage in combination with Antifibrinolytics is the optimum strategy to address perioperative blood loss.

• Replacing Cell Salvage with other autologous techniques such as Unwashed Cell Salvage and Ultra filtration, or abolishing the combined use of antifibrinolytics, will increase the recourse to banked blood.