Providing the Evidence for Patient Blood Management

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Clinical Guidelines

Red Blood Cell Transfusion: A Clinical Practice Guideline From the AABB

Jeffrey L. Carson, MD; Brenda J. Grossman, MD, MPH; Steven Kleinman, MD; Alan T. Tinmouth, MD; Marisa B. Marques, MD; Mark K. Fung, MD, PhD; John B. Holcomb, MD; Orieji Illoh, MD; Lewis J. Kaplan, MD; Louis M. Katz, MD; Sunil V. Rao, MD; John D. Roback, MD, PhD; Aryeh Shander, MD; Aaron A.R. Tobian, MD, PhD; Robert Weinstein, MD; Lisa Grace Swinton McLaughlin, MD; and Benjamin Djulbegovic, MD, PhD, for the Clinical Transfusion Medicine Committee of the AABB*
Some Key Considerations in Developing Guideline

• Start with systematic review of the literature

• We only included randomized controlled trials because observational studies evaluating the effect of transfusion are especially prone to confounding by indication and may give biased results
A MULTICENTER, RANDOMIZED, CONTROLLED CLINICAL TRIAL OF TRANSFUSION REQUIREMENTS IN CRITICAL CARE

Paul C. Hébert, M.D., George Wells, Ph.D., Morris A. Blajchman, M.D., John Marshall, M.D., Claudio Martin, M.D., Giuseppe Pagliarello, M.D., Martin Tweeddale, M.D., Ph.D., Irwin Schweitzer, M.Sc., Elizabeth Yetisir, M.Sc., and the Transfusion Requirements in Critical Care Investigators for the Canadian Critical Care Trials Group*
Hébert et al TRICC Trial NEJM 1999
Original Article

Liberal or Restrictive Transfusion in High-Risk Patients after Hip Surgery


N Engl J Med
Volume 365(26):2453-2462
December 29, 2011
Primary Outcome: Not Walking or Dead at 60 days

<table>
<thead>
<tr>
<th></th>
<th>Liberal N=1007</th>
<th>Restrictive N=1009</th>
<th>Risk Difference (95% CI)</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 days</td>
<td>351 (35.2%)</td>
<td>347 (34.7%)</td>
<td>0.5% (-3.7% to 4.7%)</td>
<td>1.01 (0.84 to 1.22)</td>
</tr>
<tr>
<td>30 days</td>
<td>459 (46.1%)</td>
<td>481 (48.1%)</td>
<td>-2.0% (-7.7 to 3.8)*</td>
<td>0.92 (0.73 to 1.16)*</td>
</tr>
</tbody>
</table>

*99% Confidence Intervals for secondary outcomes
Composite In-Hospital Outcomes

Liberal  
Restrictive

Death, MI, UA: 4.3%, 5.2%
Death, MI, Pneu: 8.9%, 8.9%
Death, MI, Pneu, Stroke, DVT/PE: 10.5%, 9.6%

all p=NS

Sunday, June 10, 12
## 30-Day Mortality

Carson JL, Carless P, Hebert PC. Cochrane Database of Systematic Reviews Update 2012

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Restrictive Events</th>
<th>Total</th>
<th>Liberal Events</th>
<th>Total</th>
<th>Weight</th>
<th>Risk Ratio M–H, Random, 95% CI</th>
<th>Risk Ratio M–H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blair 1986</td>
<td>0</td>
<td>26</td>
<td>2</td>
<td>24</td>
<td>0.4%</td>
<td>0.19 [0.01, 3.67]</td>
<td></td>
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<tr>
<td>Bracey 1999</td>
<td>3</td>
<td>215</td>
<td>6</td>
<td>222</td>
<td>1.9%</td>
<td>0.52 [0.13, 2.04]</td>
<td></td>
</tr>
<tr>
<td>Bush 1997</td>
<td>4</td>
<td>50</td>
<td>4</td>
<td>49</td>
<td>2.1%</td>
<td>0.98 [0.26, 3.70]</td>
<td></td>
</tr>
<tr>
<td>Carson 1998</td>
<td>1</td>
<td>42</td>
<td>1</td>
<td>42</td>
<td>0.5%</td>
<td>1.00 [0.06, 15.47]</td>
<td></td>
</tr>
<tr>
<td>Carson 2011</td>
<td>43</td>
<td>1009</td>
<td>52</td>
<td>1007</td>
<td>23.4%</td>
<td>0.83 [0.56, 1.22]</td>
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</tr>
<tr>
<td>Foss 2009</td>
<td>5</td>
<td>60</td>
<td>0</td>
<td>60</td>
<td>0.4%</td>
<td>11.00 [0.62, 194.63]</td>
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</tr>
<tr>
<td>Hajjar 2010</td>
<td>15</td>
<td>249</td>
<td>13</td>
<td>253</td>
<td>7.0%</td>
<td>1.17 [0.57, 2.41]</td>
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<tr>
<td>Hebert 1995</td>
<td>8</td>
<td>33</td>
<td>9</td>
<td>36</td>
<td>5.3%</td>
<td>0.97 [0.42, 2.22]</td>
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<tr>
<td>Hebert 1999</td>
<td>78</td>
<td>418</td>
<td>98</td>
<td>420</td>
<td>52.0%</td>
<td>0.80 [0.61, 1.04]</td>
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<tr>
<td>Lacroix 2007</td>
<td>14</td>
<td>320</td>
<td>14</td>
<td>317</td>
<td>6.9%</td>
<td>0.99 [0.48, 2.04]</td>
<td></td>
</tr>
<tr>
<td>Lotke 1999</td>
<td>0</td>
<td>62</td>
<td>0</td>
<td>65</td>
<td></td>
<td>Not estimable</td>
<td></td>
</tr>
</tbody>
</table>

Total (95% CI) 2484 2495 100.0% 0.85 [0.70, 1.03]

Total events 171 199

Heterogeneity: $\tau^2 = 0.00; \chi^2 = 5.90, df = 9 (P = 0.75); I^2 = 0$

Test for overall effect: $Z = 1.66 (P = 0.10)$

Favours Restrictive Favours Liberal
Funded by
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JL Carson, Principal Investigator
Conclusions

• To successfully implement any program to influence physician behavior, high quality evidence is needed.

• For blood management, there is high quality evidence that supports the use of a restrictive transfusion strategy in many clinical settings where blood is widely used.

• However, additional clinical trials are needed.