Intraoperative Blood Product Administration by Specialized Trauma Nurse Clinicians Improves Adherence to Massive Transfusion Protocol

Christopher Bell, MD; L Andrew May, MD; Angela Basham-Saif, RN, BSN; Robert Maxwell, MD; Donald Barker, MD
University of Tennessee College of Medicine-Chattanooga

Disclosures

- The speaker has no financial relationships to any economic interest related to this topic.
Project Purpose

- To improve adherence to and delivery of Massive Transfusion Protocol (MTP) in the Operating room

Background

- What is a massive transfusion protocol (MTP)?
  - Activated greater than 10 units PRBCs
  - Dilutional coagulopathy and acidosis\(^1\)
  - Improved outcomes\(^2,3\)

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Background

- What ratio is best?
  - PRBCs:FFP:platelets between 1:1:1 and 2:1:1
  - Mortality benefits\(^2,^4\)
  - PROPPR trial 1:1:1
    - Reduction in 24h death from hemorrhage\(^5\)


Research Question

- Does intraoperative administration of MTP by dedicated trauma nurse clinicians improve achievement of 1:1:1 transfusion ratio compared to traditional resuscitation by anesthesia?
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Intervention and Process

- Trauma Nurse Clinicians (TNC) program
  - Started in 1997
    - Assist in initial care of all trauma patients
    - Respond to rapid response pages
    - MTP in trauma bay- 2007
    - MTP in OR- 6/2015.

Resources

- Two dedicated telephones were assigned to allow fast efficient communication between the Blood Bank and the TCCNC.
- Close communications with Blood Bank personnel is essential to ensure timely delivery of product and minimize wastage.

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Materials and Methods

- Single center, retrospective review of prospectively-maintained database
- Inclusion criteria:
  - Trauma patients ≥ 18 YOA requiring MTP and operative intervention for definitive control of hemorrhage during first 24h following admission

Materials and Methods

- Postintervention group: 6/2015-1/2017
Materials and Methods

- The following were compared between preintervention and postintervention groups:
  - Demographic data
  - Injury mechanism
  - ISS
  - Ratios of pRBC to FFP and pRBC to plt
  - Frequency pRBC: FFP >2:1
  - Volume of crystalloid administered

Results

- Preintervention group
  - N=53
- Postintervention group
  - N=44
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### Results

<table>
<thead>
<tr>
<th></th>
<th>Pre vs Post</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td>35.9623</td>
<td>15.71496</td>
<td>0.42</td>
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<tr>
<td>Post</td>
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<td>38.6364</td>
<td>16.98302</td>
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</tr>
<tr>
<td><strong>ISS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td>33.6604</td>
<td>14.66280</td>
<td>0.15</td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td>29.3864</td>
<td>13.98540</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Comparison of Age and ISS between preintervention and postintervention groups

<table>
<thead>
<tr>
<th></th>
<th>Preintervention</th>
<th>Postintervention</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td>72</td>
<td>81</td>
<td>0.24</td>
</tr>
<tr>
<td>Female (%)</td>
<td>28</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Comparison of Patient Gender between Preintervention and Postintervention Groups

<table>
<thead>
<tr>
<th></th>
<th>Preintervention</th>
<th>Postintervention</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blunt (%)</td>
<td>85</td>
<td>68</td>
<td>0.05</td>
</tr>
<tr>
<td>Penetrating (%)</td>
<td>15</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Comparison of Mechanism between Preintervention and Postintervention Groups
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Results

Intraoperative Ratios of BP Administration

- **pRBC:P**
  - ANES: 1.8 (SD: 0.6)
  - TNC: 1.2 (SD: 0.4)
  - P: 0.11

- **pRBC:Plt**
  - ANES: 1.2 (SD: 0.6)
  - TNC: 0.8 (SD: 0.4)
  - V: 0.4
  - P<0.001

Results

Percentage of Cases that PRBC: Plasma Ratio >2:1

- ANES: 13.9%
- TNC: 4.4%
- P: 0.17
Results

Mean Intraoperative Crystalloid (mL)

<table>
<thead>
<tr>
<th></th>
<th>ANES</th>
<th>TNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Intraoperative Crystalloid (mL)</td>
<td>4865</td>
<td>1651</td>
</tr>
<tr>
<td>P: &lt;0.001</td>
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</table>

Table 4: Comparison of 24h Mortality between Preintervention and Postintervention Groups

<table>
<thead>
<tr>
<th></th>
<th>Preintervention</th>
<th>Postintervention</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 h mortality (%)</td>
<td>40</td>
<td>25</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Results

24 h mortality (%)

Preintervention: 40
Postintervention: 25
P value: 0.15
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Lessons Learned

- Improved precision and compliance with MTP
- Reduction in intraoperative crystalloid
- Trend towards decreased mortality
- Barriers to implementation
  - Willingness of Blood Bank, Anesthesia and OR personnel to adjust to the process change in the OR.

Next Steps

- TNC leading all MTP hospital wide
- Continued education on importance of TNC and adherence to MTP
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References


Questions?