Blood Transfusion and Cancer Surgery Outcomes:  
A Reason for Concern

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Background

- Surgical resection remains the critical element of treatment for most solid malignant tumors

- Level I evidence has shown that recipients of blood transfusions during cancer surgery experience higher rates of operative mortality, cancer recurrences, and long-term deaths

- However, the adverse effects of blood transfusion during major non-cardiac surgery have been recently challenged in older anemic persons

- Because of the rising costs of blood bank operations and growing demand for cancer surgery in elders, the impact of blood transfusion on cancer surgery outcomes deserves further investigation

Objective

To assess the patterns and impact of blood transfusions on operative outcomes after cancer surgery in the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP)
Methods

• 2005-2008 ACS NSQIP data
• Patients treated for thoracic, abdominal, or pelvic neoplasms
• Classified patients according to total number of intra-operative RBC units (0, 1-2 U, ≥ 3 U)
• Multivariate analyses:
  Receipt of RBCs
  Outcome measures
  • 30-day operative mortality
  • Major postoperative events
  • Prolonged length of stay (LOS) (> 75th percentile of cohort LOS)
Covariates
  • Year, procedure-, pre-, intra- and post-operative-related factors
• Interaction and sensitivity analyses
Results

• 38,926 patients who underwent thoracic, abdominal or pelvic cancer surgery
• 15% received ≥ 1 unit RBCs
  • Of those, 60% received 1-2 units
• Older patients, those with a higher ASA score, or comorbidities were more likely to receive RBCs
• Patients with abnormal preoperative laboratory values including hematocrit and albumin were also more likely to receive intra-operative RBCs
Operative Outcomes
by Intra-operative Blood Transfusion Receipt

0%
10%
20%
30%
40%
50%
60%
70%

30-day operative mortality
Major complications
% of prolonged LOS

0
1-2 U
> 2 U

All p <0.001
# RBC Transfusion and Adverse Operative Outcomes
Stratified by Age Categories

<table>
<thead>
<tr>
<th>Age Category</th>
<th>30-Day Mortality</th>
<th>Major Complications</th>
<th>Prolonged LOS</th>
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<td>&lt;55</td>
<td>Ref.</td>
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<td>56-65</td>
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<td>1.34</td>
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<td>1.42</td>
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<td>&gt;75</td>
<td>1.75</td>
<td>2.47</td>
<td>2.52</td>
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</table>

All p <0.05
Discussion and Conclusions

• The present study demonstrates that intra-operative blood transfusions adversely impact short-term operative cancer surgery outcomes at ACS NSQIP hospitals.

• Limitations exist:
  • No information on blood product types other than RBCs
  • Absence of data on estimated blood loss
  • No data on cancer stage beyond disseminated disease
  • Transfusions may represent a marker of illness, advanced stage, or extensive surgical procedure

• Of cancer surgery patients who received blood, over 60% received only 1-2 units.

• Intra-operative blood transfusions continue to adversely impact cancer surgery outcomes across all age groups, even after adjusting for comorbidities.

• These results provide insights on the practice of blood transfusion during cancer surgery and uncover potential trends in need of further investigation.
Thank you

Collaborators

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