Does a “Blush” on CT following Blunt Abdominal Injury Necessitate an Invasive Intervention?

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Financial Disclosures

• None
Background

• Debate: Does blush on CT dictate automatic intervention in children?

• Varying clinical outcomes

• Lack of Standardized Protocols for intervention in patients with blush after blunt abdominal trauma
Methods

- Retrospective Review of an Institutional Trauma Registry (2008-2014)

**Variables:**
- Injured Organ
- Injury Grade/Severity
- Operative vs. Non-operative Management
- Angio/Embolization

**Outcomes:**
- Overall Mortality
- Need for Intervention
- Admission to ICU
- Blood Transfusion
- Length of Stay
# Demographics

<table>
<thead>
<tr>
<th>Patient Characteristics</th>
<th>CT Blush (N=32)</th>
<th>No CT Blush (N=289)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years), median (IQR)</td>
<td>11 (5 – 14)</td>
<td>9 (6 – 13)</td>
<td>0.083</td>
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<td>Gender</td>
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<td>Male</td>
<td>7 (21.9%)</td>
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<td>Seatbelt Sign</td>
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<tr>
<td>Grade of injury, median (IQR)</td>
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Blush and the Need for Intervention

- **All Patients, N=321**
  - 88%: No Blush, Intervention
  - 10%: No Blush, No Intervention
  - 2%: Blush, Operation
  - 9%: Blush, Angio/Embolization

- **Blush, N=32**
  - 70%: No Blush, No Intervention
  - 21%: Blush, No Intervention
Blush and the Need for Intervention

Blush, N=32

- Blush, Non-operative Management: 70%
- Blush, Operative Management: 21%
- Blush, Op (Visceral perforation): 9%
- Blush, Non-op + Angio/Embolization: 6%

Operation for Visceral Perforation: 15%
Operation for Hepatic or Splenic Injury: 6%
ICU Admission and Blush

% Patients admitted to ICU

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<td>% Patients admitted to ICU</td>
<td>91%</td>
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Blood Transfusion and Blush

% Patients receiving transfusion

- Blush: 52%
- No blush: 12%

P < 0.001

ICU Admission

- Blush (N=32): 91%
- Non-blush (N=289): 41%

P < 0.001
Length of Stay and Blush

Days in Hospital

Blush

No Blush

P<0.001

P<0.001

ICU Admission

% Patients admitted to ICU

Blood Transfusion

% Patients receiving transfusion

91%

41%

52%

12%

Children’s Healthcare of Atlanta | Emory University
Adjusted Odds Ratio for Intervention*

*Adjusted for age, gender, injury (spleen vs liver), grade of injury
Mortality: Blush vs Non-Blush

P = 0.14

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P < 0.001
Conclusions

• Patients with blush have higher grades of injury

• They are more likely to receive blood products, be admitted to the ICU, and be considered for invasive intervention

• 70% of patients with blush did not require any intervention
  • 80% of isolated splenic or hepatic blush did not require intervention

• The decision to move forward with intervention should be dictated by physiology and changes in overall clinical picture

• Future studies include identification of predictive factors for failure of NOM and cost/effectiveness studies
Acknowledgements

• Dr. Matthew Santore
• Dr. Ragavan Siddharthan
• Dr. Andrew Morris
• Dr. Sarah Hill
• Dr. Kurt Heiss
• Courtney McCracken, PhD and Curtis Travers, MPH
• Patients and Families of Children’s Healthcare of Atlanta
References