Conservative Management of Solid Organ Injury

INJURY 2003
SPLENIC TRAUMA
History of splenic trauma

- 90% mortality with non-op management (NOM) in 1912!
- 30-40% mortality with operative management, 1940
Why save the spleen?

- 1919
  Morris, Bullock. The importance of the spleen in resistance to infection. Ann Surg; 70: 153

- 1952
  King, Schumaker. Susceptibility to infection after splenectomy performed in infancy. Ann Surg; 136: 239
Overwhelming Post-Splenectomy Infection - OPSI

- Pneumococcus
- Meningococcus
- *H. influenzae*

- 0.5% splenectomized patients
- 50-80% mortality
Who is eligible for NOM?

- hemodynamically normal after initial fluid bolus
- transfusion of 2 units of packed red blood cells, or 40ml/kg (children)
- absence of other intra-abdominal injury requiring surgery
- management by a general surgeon
- 24-hour operating room capability
- intensive monitoring availability
Who is excluded from NOM?

- High grade injury? No
- Head injury? No
- Elderly? No
Splenic Grade

- **I** < 1cm deep lac.
- **II** 1-3cm lac
- **III** > 3cm
- **IV** Segmental or hilar vessels, or > 25% devascularisation
- **V** Completely shattered or devascularised

AAST Organ Injury Scale
Sanders MN. Civil I.

Trauma Services, Auckland Hospital


30% failed NOM

CT grading of splenic injury is a predictive indicator
How else can we predict failure of NOM?

- Computed Tomographic Contrast Blush Predicts Failure of Nonoperative Management.

- ‘Blush’ in 67% failed NOM, 6% success NOM
How can success rate be improved?

- Improved Success in Nonoperative Management of Blunt Splenic Injuries: Embolization of Splenic Artery Pseudoaneurysms

- Aggressive surveillance for and embolization of posttraumatic splenic artery pseudoaneurysms improved the rate of successful nonoperative management of blunt splenic trauma...
<table>
<thead>
<tr>
<th></th>
<th>Schurr</th>
<th>Davis</th>
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<tbody>
<tr>
<td><strong>1995</strong></td>
<td><strong>1998</strong></td>
<td></td>
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<tr>
<td><strong>Attempted NOM</strong></td>
<td>29% → 66%</td>
<td></td>
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<tr>
<td><strong>Successful NOM</strong></td>
<td>87% → 94%</td>
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<tr>
<td><strong>Overall successful NOM</strong></td>
<td>25% 61%</td>
<td></td>
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<td></td>
<td>1995</td>
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<td>Overall successful NOM</td>
<td>25%</td>
<td>61%</td>
</tr>
<tr>
<td>Splenorrhaphy</td>
<td>20%</td>
<td>7%</td>
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<tr>
<td>Total spleens saved</td>
<td>45%</td>
<td>68%</td>
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Success rate - children

- NOM 95%
- Success 95%
Complications of NOM?

- Delayed haemorrhage (4-8 days) 1.7%
- Splenic abscess 0.7%
- Missed intraabdominal injury 1%
LIVER TRAUMA
History of liver trauma

- 1886, Edler. NOM → 67%
- WW1 66%
- WW2, early laparotomy 28%
- Vietnam 15%
While small lacerations of the liver substance may be, and no doubt are, recovered from without operative interference: if lacerations be extensive and vessels of any magnitude are torn, haemorrhage will, owing to the structural arrangement of the liver, go on continuously.

JH Pringle, 1908
Non-operative management

- Children 1980’s
- Adults 1990’s
Who is eligible for NOM?

- hemodynamically stable
- transfusion of 2 units of packed red blood cells, or 40ml/kg (children)
- absence of other intra-abdominal injury requiring surgery
What complications can occur?

- Bile leak
- Haemorrhage
- Hepatic abscess
- Hepatic necrosis

\{ \text{Haemorrhage} \} \quad \sim 10\%
Can an injury be missed?

- Bowel
- Pancreas
- Diaphragm
- Bladder

5%
High success with nonoperative management of blunt hepatic trauma: the liver is a sturdy organ.

Archives of Surgery. 138:75; 2003

HYPOTHESIS: Nonoperative management of liver injuries is highly successful and rarely leads to adverse events.

SETTING: High-volume academic level I trauma center.

RESULTS:
- 78 patients
- 23 (29%) were operated on immediately
- NOM failed in 8
- The success rate of NOM was 85%

CONCLUSIONS: Nonoperative management of liver injuries is safe and effective regardless of the grade of liver injury...
How are liver and splenic injury patients managed non-operatively?

<table>
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<tr>
<th>OIS Grade</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
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<tbody>
<tr>
<td>ICU stay</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Hospital stay (d)</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Activity restriction (w)</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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Routing follow-up imaging? No .................