Pelvic fractures and associated injuries; Starship Experience

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Starship Children's Hospital

Et al
Mechanism
Classification

- Key and Conwell
  - Kane modification 1975
- Letournel 1980
- Bucholz 1982
- Tile 1983
- Torode and Zeig 1985
- Young and Burgess 1986
# Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Starship</th>
<th>Fracture Geometry</th>
</tr>
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<tbody>
<tr>
<td>I</td>
<td>58%</td>
<td>No break in pelvic ring</td>
</tr>
<tr>
<td>II</td>
<td>20%</td>
<td>Single break in pelvic ring</td>
</tr>
<tr>
<td>III</td>
<td>7%</td>
<td></td>
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Type I: Fracture of individual bones without break in pelvic ring. Examples shown above.
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<td>Double vertical fracture and dislocation of pubis</td>
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*variant of straddle fracture is that of both ipsilateral rami in conjunction with a symphyseal separation*

*Type II: Single break in the pelvic ring. See examples above.*
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Fractures vs Associated Injury

Frequency of associated injury (%)

Type of fracture

I  II  III  IV  Multiple
Predictors of associated injury

- Multiple fractures of the ring
  - Associated with higher abdo/GU injury

- Geometry of fracture
  - Predicts risk of haemorrhage
Associated Injuries

- Head
- Thorax
- Abdo
- GU
- Limbs

Legend:
- USA
- Sydney
- NZ
Mortality

- 6 patients (7%)
- 5 severe head injury
  - ped vs car
- 1 multiorgan failure
  - RTC passenger
Introduction

• 2.5 - 7.5% of blunt abdo trauma
• 9 year retrospective review
• 84 cases
• Mechanism, classification and associated injuries
Mortality

- Starship 7%
- Sydney 4%
- Philadelphia 3.6%
Management of Pelvic #

- 92% conservatively managed
  - 94% Sydney, 97% Philadelphia
- 7 patients had interventions
  - 3 ex fix
  - 3 acetabular # (ORIF)
  - 1 MUA + hip wash
Adult vs Child

- Adult > Child ~2:1
- Mechanism
- Role of fracture vs associated injury
- Mortality rate and cause
Pennsylvania Trauma Outcome Study*

- Early functional outcomes
- FIM score (functional independent measurement)
  - Feeding
  - Transfer mobility
  - Locomotion
  - Expression
  - Social interaction

Functional Outcome Study conclusions

- Short term function significantly impaired in a high percentage of children
- More FIM studies for long term morbidity required
- Aggressive rehabilitation program required
Conclusion

- \( \uparrow \text{fracture complexity} = \uparrow \text{associated injury} \)
- Children die from associated injuries
- Similar figures around the world
- Long term outcome
Thank you
Comparison Studies

- Chia 2004, Sydney
- Silber 2001, Philadelphia
- Lane-O’Kelly 1995, Ireland
- Reiger 1997, Germany
## Comparison of numbers

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<tr>
<th></th>
<th>Starship</th>
<th>Sydney</th>
<th>Philadelphia</th>
</tr>
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<tbody>
<tr>
<td>n / yr</td>
<td>9</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>Mean Age</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Age Range</td>
<td>1-14</td>
<td>1-16</td>
<td>1-18</td>
</tr>
<tr>
<td>Boys</td>
<td>67%</td>
<td>66%</td>
<td>57%</td>
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Ped vs Car

Based on a family saloon in normal driving conditions
Wear a seat belt!
Mechanism

Fracture Rate (%)

- Car vs Ped
- RTC Pass
- Cycle
- Fall
- Other

- Ride-on lawnmower
- Fell off mini-train
- Boogyboarding on sand-dunes
- Non-accidental injury
"Other Injuries"