Management of gunshot pelvic fractures with bowel injury: is fracture debridement necessary?

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Background

- Historical treatment of open fractures and gunshot induced fractures
- Not all GSW are equal
  - High velocity
  - Intra-abdominal
- Potential complications with pelvic GSW
  - Bowel injury with contamination
  - Hip joint violation
Background- Relevant Literature

- GSW to spine with concomitant intestinal injury is conflicting
  - Higher infection rate after I+D? (Quigley 2006)

- Hip joint involvement with intestinal injury
  - High risk for septic arthritis
  - I+D if retained bullet (Long, 1995)
Questions

- Do stable pelvic fractures due to low velocity gunshot wounds require a formal orthopaedic debridement?

- Are we risking deep infection by not debriding pelvic fractures contaminated by intestinal flora?
Methods

- IRB approval obtained
- Five year retrospective review at one level one trauma center
- Patients screened via orthopaedic and state trauma database
- Medical records and radiographic studies reviewed
  - Type, location of fracture
  - Presence of abdominal injury
  - Antibiotic use
  - Trauma surgery intervention
  - Orthopaedic intervention
  - Development of deep infection
Design

- **Inclusion criteria**
  - Patients over age 12
  - Low velocity GSW with fracture of pelvis or sacrum

- **Exclusion criteria**
  - Death within 48 hours
  - GSW to hip joint without concomitant fracture
Results

- 84 study patients met criteria over 5-year period
  - 19 additional excluded for death within 48 hours

- All treated with varying courses of antibiotics
Intestinal Injury

- 50/84 cases involved an intestinal injury
- All 50 underwent trauma team laparotomy and repair
- 6 involved intra-articular acetabular fracture
  - 2 of which involved bowel perforation and retained bullet in joint.
  - Both underwent formal orthopaedic I&D
Orthopaedic I&D

- Done in seven cases of hip joint involvement with retained bullet fragments.
  - Open and arthroscopic

- Not performed in any cases or extra-articular fractures or intra-articular extension without retained bullet fragments
# Results

<table>
<thead>
<tr>
<th>Total patients</th>
<th>Intestinal perforation</th>
<th>SI joint injury</th>
<th>Hip joint injury</th>
<th>Underwent I+D</th>
<th>Deep infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td>50</td>
<td>3</td>
<td>15</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>
Results

- Infection
- Bowel Injury
- Hip Joint Involvement

Numbers:
- Infection: 0
- Bowel Injury: 50
- Hip Joint Involvement: 15
- Overlapping:
  - Bowel Injury and Infection: 0
  - Bowel Injury and Hip Joint Involvement: 1
  - Infection and Hip Joint Involvement: 0
  - All three: 6
Discussion

- 59% of gunshot induced pelvic fractures had intestinal injury.

- The only reported infection occurred with a retained bullet in the hip with a concomitant bowel perforation.
Discussion- shortcomings

- No long term outpatient follow-up
  - Chronic infection?

- Antibiotic use varied greatly

- Different degrees of contamination based on large versus small bowel injury?
Questions

- Do stable pelvic fractures due to low velocity gunshot wounds require a formal orthopaedic debridement?

- Are we risking deep infection by not debriding pelvic fractures contaminated by intestinal flora?
Conclusions

- I&D is indicated in cases of retained bullet in the hip joint.

- I&D not mandatory for extraarticular gunshot induced pelvic fractures even if potential contamination by bowel injury.
Thank you!