Dismounted complex blast injuries: Patterns of contralateral limb injuries in patients with lower extremity amputations

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Disclaimer

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Background

• Blast injuries cause different patterns of injury based on whether casualties are vehicle-bound or on foot\(^1\)

• There has been an increase in service members sustaining blast injuries while on foot\(^2\)
Background

- Survival from blast injuries has also increased\textsuperscript{3-6}
- Dismounted Complex Blast Injury
  - “Traumatic amputation of at least one leg, a minimum of severe injury to another extremity, and pelvic, abdominal, or urogenital wounding”
Purpose

- Evaluate patterns of injury in the non-amputated limbs in service members with a single lower extremity amputation secondary to blast injury.
Methods

• Retrospective Review of prospectively collected data
  – Consecutive series of IED blast patients at Camp Bastion, Afghanistan from 2009-2012
  – US and UK Joint Theater Trauma Registries (JTTR)
  – Only military service members arriving alive were included in this database
  – IRB Approved

• Full body CT obtained on every patient and reviewed by MSK radiologist and 2 Orthopedic Surgeons
Results

• 295 service members suffered a lower extremity injury
  – 201 with traumatic lower extremity amputation
  – 140 double lower extremity amputations
  – 61 single lower extremity amputations

• 52 with single lower extremity amputation and complete data
  – One excluded due to DOA,
  four additional excluded due to incomplete data
Results: Level of amputation

<table>
<thead>
<tr>
<th>Significant groin injury</th>
<th>Symes n=4 (Count, %)</th>
<th>Through Ankle n=2 (Count, %)</th>
<th>BKA n=29 (Count, %)</th>
<th>Through Knee n=13 (Count, %)</th>
<th>AKA n=7 (Count, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1 (50%)</td>
<td>10 (34%)</td>
<td>6 (46%)</td>
<td>2 (29%)</td>
</tr>
</tbody>
</table>

- BKA most frequent
- 29-50% occurrence of a significant groin injury with amputation levels through the ankle and proximal
Results: Injury type vs. amputation level

<table>
<thead>
<tr>
<th>Injury Type</th>
<th>Symes Wald, p value</th>
<th>Ankle Wald, p value</th>
<th>BKA Wald, p value</th>
<th>Through Knee Wald, p value</th>
<th>AKA Wald, p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contralateral upper extremity skeletal injury</td>
<td>0.745, p = 0.388</td>
<td>0.355, p = 0.551</td>
<td>0.416, p = 0.519</td>
<td>0.009, p = 0.924</td>
<td>5.628, p = 0.018, e(b) = 0.128</td>
</tr>
</tbody>
</table>
Discussion

• Defining patterns of injury = quicker and better care for patients

• Groin injuries
  – Common in multiple-limb amputations and single-limb amputations

• Spine injuries
  – Rare in dismounted blast injuries

• Proximal single leg amputation
  – Look for distal upper extremity injury
Conclusions

• Genitourinary injuries are common with amputation levels proximal to the ankle

• Hindfoot level amputation is significantly associated with contralateral foot fractures

• Proximal amputation level is significantly associated with distal upper extremity skeletal injury