Traumatic Diaphragmatic Injuries

PURPOSE:

Traumatic diaphragmatic injuries (TDI) pose both diagnostic and therapeutic challenges. As it is a thoracoabdominal structure, injuries to the diaphragm may be approached through either the chest or the abdomen. The choice of operative approach is determined by associated injuries.

The most common mechanism for TDI is a penetrating injury, with gunshot wounds outnumbering stab wounds 2:1. In blunt injuries, motor vehicle crashes are the most common mechanism. Delayed diagnosis of TDI can lead to significant morbidity and even mortality.

Management of these injuries should take into consideration hemodynamic stability, anatomic location, associated injuries, and surgeon operative experience.

DEFINITIONS:

The current AAST grading scale is included below.

<table>
<thead>
<tr>
<th>Grade*</th>
<th>Description of injury</th>
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<tbody>
<tr>
<td>I</td>
<td>Contusion</td>
</tr>
<tr>
<td>II</td>
<td>Laceration &lt;2cm</td>
</tr>
<tr>
<td>III</td>
<td>Laceration 2-10cm</td>
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<tr>
<td>IV</td>
<td>Laceration &gt;10 cm with tissue loss ≤ 25 cm²</td>
</tr>
<tr>
<td>V</td>
<td>Laceration with tissue loss &gt; 25 cm²</td>
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</tbody>
</table>

*Advance one grade for bilateral injuries up to grade III.

RECOMMENDATIONS:

- All left sided TDI should be repaired
- In left thoracoabdominal stab wound patients who are hemodynamically stable and without peritonitis, laparoscopy is recommended over CT to decrease the incidence of missed diaphragmatic injury
- A CT first approach may be appropriate when trajectory in proximity to the diaphragm is questioned
- Injuries above and below the diaphragm signify TDI
• Thoracoscopy is an appropriate screening tool and possibly better than laparoscopy for right sided and posterior TDI
• In penetrating thoracoabdominal trauma patients in whom a right diaphragm injury is confirmed or suspected, and who are hemodynamically stable without peritonitis, nonoperative management is recommended weighing the risks of delayed herniation, missed thoracoabdominal organ injury, and surgical morbidity (procedural complications, LOS, surgical site infection, and empyema). Exceptions would be those incidentally found at surgery or large defects.
• In hemodynamically stable trauma patients with acute diaphragm injuries, the abdominal approach is preferred over the thoracic approach to decrease mortality, delayed herniation, missed thoracoabdominal organ injury, and surgical approach-associated morbidity (procedural complications, LOS, surgical site infection, empyema)
• In patients who present with delayed visceral herniation through a TDI, either the abdominal or thoracic approach may be used to decrease mortality and surgical approach-related morbidity (procedural complications, surgical site infection, LOS, empyema)
• In patients with acute penetrating diaphragmatic injuries without concern for other intraabdominal injuries, a laparoscopic approach is preferred to an open approach in weighing the risks of mortality, delayed herniation, missed thoracoabdominal organ, and surgical approach-associated morbidity (procedural complications, LOS, surgical site infection, empyema)
• 6-24 hours of observation can be considered to rule out concomitant abdominal injuries before TDI addressed
• Surgeon training and specialization should be considered in choosing an open vs. laparoscopic approach.

REFERENCES:


