Solid Organ Bleeding Syndrome: The Role of Imaging

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• No relevant financial relationship reported
Introduction

• First etiology = Trauma

• Mortality cause of patients < 40 years old

• Their frequency is increasing because of the development of sport and leisure

• Quick decision = best organization
Rates of NOM and overall mortality for splenic, hepatic, and renal trauma from 1994 to 2003 (Hurtuk, J Trauma 2006)
role of the radiologist?

• Radiologist and interventional physicians has a central role
  – Make diagnosis = US / CT exam
  – Make therapy = embolisation

• So, the interventional radiologist must be present at the patient's arrival and must participate in making therapeutic decision at the same level as the anesthetists and surgeons.
Diagnosis

• CT has high sensitivity and specificity for the detection of blood

• CT Protocol
  – No contrast
  – Arterial phase
  – Portal venous phase

• Vascular lesions
  – Active extravasation
  – False aneurysm
  – Arterio-venous fistula

Renal hemorrhage
Active extravasation and Arterio suprahepatic vein fistula
Renal false aneurysm
<table>
<thead>
<tr>
<th>Grade</th>
<th>Renal trauma</th>
<th>Spleen trauma</th>
<th>Liver trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>Subcaps hematoma without fracture and Perirenal hematoma</td>
<td>Subcaps hematoma &lt;10%</td>
<td>Idem</td>
</tr>
<tr>
<td></td>
<td>Laceration &lt; 1 cm</td>
<td>Laceration &lt; 1 cm</td>
<td></td>
</tr>
<tr>
<td>Grade 2</td>
<td>Laceration &lt; 1 cm with perirenal hematoma</td>
<td>Subcaps hematoma 10-50% Intraperitoneal hematoma &lt; 5cm Laceration 1-3 cm</td>
<td>Subcaps hematoma 10-50% Intraperitoneal hematoma &lt; 10 cm Laceration 1-3 cm</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Laceration &gt; 1 cm without collecting system lesion</td>
<td>Subcaps hematoma &gt; 50% Intraperitoneal hematoma &gt; 5 cm or expanding Laceration &gt; 3 cm</td>
<td>Subcaps hematoma &gt; 50% Intraperitoneal hematoma &gt; 10 cm or expanding Laceration &gt; 3 cm</td>
</tr>
<tr>
<td>Grade 4</td>
<td>Laceration &gt; 1 cm with collecting system lesion</td>
<td>Laceration involving vessels with devascularisation (&gt; 25% spleen)</td>
<td>Hepatic disruption 25-75% of a lobe or 1-3 segments</td>
</tr>
<tr>
<td>Grade 5</td>
<td>Shattered kidney or vascular lesion of the pedicle</td>
<td>Shattered spleen Complete devascularisation</td>
<td>75% parenchymal disruption Lesions of major veins</td>
</tr>
</tbody>
</table>

AAST (American Association for the Surgery of Trauma) Injury Scale
Embroidization

• Angiography with embolization should be considered in a hemodynamically stable patient with evidence of active extravasation (a contrast blush) on abdominal CT scan.

• Where?
  – The closer to the leak to limit parenchymal necrosis

• Which embolic agent?
  – Temporary or definitive
Results

• Embolization:
  – Efficacy: 85-100%
  – Re-intervention rate ≈ 0%
  – Complications: <5%
    gallbladder necrosis for liver
    abscess for spleen, ± kidney – liver
    loss of parenchyma for spleen and kidney

• Miscellaneous:
  – drainage, derivation, urinary stents for kidney
  – drainage of bilomas, abscesses for liver
Take home message

• IR is helpful for NOM of solid bleeding organ.

• Radiologists must be included in the strategy of management of these patients.

• Reduce time management.