Blunt Trauma To Spleen: Can On-Admission CT Scan Predict The Need For Early Non-Surgical Intervention?

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Purpose

The spleen is the most commonly injured organ following blunt abdominal trauma\(^1\); splenic trauma can be life threatening due to the organ's high vascularity. Over the last three decades the management of blunt splenic injuries has shifted towards non-operative management\(^2\). This has been shown to increase splenic salvage, but the failure rate of conservative management in multi-institutional EAST trial was between 5-75%, with high failure rate associated with high grades of injury\(^6\). Transcatheter splenic artery embolisation has been shown to be safe and effective in increasing splenic salvage and as an adjunct to non-surgical management, reduces its failure rate\(^5\).

Contrast enhanced CT has been extensively used to diagnose splenic injury and various grading systems have been developed based on CT findings to guide further management. However, these systems have poor inter-rater reliability\(^3\).

In 2006 Thompson et al proposed a CT grading system with high sensitivity and specificity to predict the need for intervention (surgical or angiographic) following splenic injury\(^4\). The findings that correlated with the need for intervention were: a) Devascularisation or laceration involving 50% or more of the splenic parenchyma; b) Contrast blush greater than one cm; c) Large haemoperitoneum.

We aim to determine if on-admission CT can predict the need for early non-surgical intervention and prevent complications that require emergency intervention.

Methods and Materials

Patient included in this study were admitted at Royal Perth Hospital between 2009 and 2011.

We looked at the data of patients admitted with blunt injury to the spleen, who were managed non-surgically and underwent follow up imaging. These patients were divided into two groups:

- Group 1 included patients undergoing non-surgical intervention (angiography +/- embolisation) based on findings noted on follow up imaging.
- Group 2 included patients who were managed conservatively with bed rest.
The admission CT scans of patients undergoing non-surgical intervention were analysed and findings correlated with the subsequent need for non-surgical intervention and compared with the CT findings in patients managed conservatively.

Features documented were: hilar injury, sub-capsular haematoma>50% of surface area (figures 1&2), shattered spleen (figure 3), active extravasation (figures 4&5), pseudoaneurysm (figures 7&9), deep laceration 3-10cm and more than 10cm, devascularisation or laceration involving 50% or more of parenchyma, contrast blush greater than 1cm in diameter, large haemoperitoneum and phase of imaging.

Results

35 patients were admitted at Royal Perth Hospital between 2009 and 2011 with blunt injury to spleen, were managed non-surgically and underwent follow up imaging. Follow up imaging was performed in these patients as an emergency or routine. Emergency indications include abdominal pain, hypotension, tachycardia, drop in haemoglobin and sepsis.

7 patients did not meet the criteria (on-admission images were unavailable for review, follow up imaging performed for non-splenic pathology), hence, excluded.

Of the remaining 28 patients:

- 7 required angiography+/-embolisation for suspected complications on follow up imaging.
- 18 patients were managed conservatively. These patients were discharged after a period of bed rest and never readmitted with complications secondary to splenic injury.
- 3 patients had angiography+/-embolisation immediately following the presentation CT and all had large haemoperitoneum. Pseudoaneurysm and active extravasation were seen in one patient each.

The majority of scans (24 out of 28) were performed in portal venous phase following administration of IV contrast.

<table>
<thead>
<tr>
<th>Intervention required (n=7)</th>
<th>No intervention required (n=18)</th>
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<tbody>
<tr>
<td>Hilar or segmental vessel laceration</td>
<td>5</td>
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</table>
Deep laceration 3-10cm  4  10
Large haemoperitoneum  7  4

The findings on the admission CT are shown in the Table (above)

Conclusion

In this limited study, we have shown that admission CT scan is unable to predict early (but not immediate) non-surgical intervention in blunt spleen trauma. However this study is limited by small patient number and its retrospective nature.

Further prospective studies are required to determine:

1. The value of arterial or multiphase imaging in admission CT in suspected blunt trauma to spleen. It is currently uncertain whether all pseudoaneurysms are present on admission CT and may not be seen if only portal venous phase imaging is performed or whether some form after an unknown interval.
2. Radiological signs that correlate with the need for delayed intervention.
3. The role of routine follow up CT in patients with higher grades of injury prior to discharge.

Personal Information

References


