in Blunt Trauma
Bowel and Mesenteric Injury

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5% of blunt abdominal trauma at laparotomy

- Bowel and/or Mesenteric Injury is found in abdominal injuries.

Incidence is estimated at 1-5% of all blunt abdominal injuries.

- In one study, 74% of patients with surgically important solid organ injuries surgically...
important BMI did not have (2)
(3) to operative intervention• In patients with near-isolated SBI, the incidence of mortality increased with time
   within 8 hours: 2%
   8-16 hours: 9.1%
   16-24 hours: 16.7%
   greater than 24 hours: 30.8%
Surgical Indications

• Bowel Injury
  Full-thickness perforation
  Serosomuscular tear
  Devascularized bowel

• Mesenteric Injury
  Active mesenteric bleeding
Injury resulting in ischemic bowel loop
Imaging Modalities

- **Ultrasound**
  FAST exam has high sensitivity for free fluid
  Significant intra-abdominal injury, particularly BMI, may present without hemoperitoneum

- **Direct Peritoneal Lavage**
  Relies on detecting hemoperitoneum, free floating intestinal contents, and/or leukocytosis
injury can occur without transmural rupture. In BMI, bleeding is typically minimal, and significant
<table>
<thead>
<tr>
<th>CT Sign</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowel wall defect</td>
<td>11%</td>
<td>100%</td>
</tr>
<tr>
<td>Extraluminal contrast material</td>
<td>8%</td>
<td>100%</td>
</tr>
<tr>
<td>Mesenteric vessel extravasation</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>Thickened large-bowel wall</td>
<td>18%</td>
<td>97%</td>
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</table>
Intraperitoneal Fluid 100% 26% 84% 66%

Mesenteric fluid “Triangle Sign” and/or stranding
Vessel beading or irregularity

- Specificity: 95%
- Sensitivity: 50%

vessels

Abrupt termination of mesenteric

Termination of SMV

• Sensitivity:
Specificity: 93%

Our Patient: Z.Z.

Emergency Department...Let’s look at a patient seen in the
Our Patient: History and Exam

oncoming car at 30-40mph
• 77 y.o. female pedestrian struck by an
• ?LOC at scene, GCS 15 on arrival
on 100% O
• VS: T 95.6°F, HR 69, BP 104/47 RR 27
2
Abdomen soft, NT/ND
• Exam: RUE deformity,
2+ distal pulses.

- Hematocrit: 25.6
Our Patient: CT Abdomen & Pelvis

Dilated loops of small bowel
Mesenteric Fat stranding
Coronal Contrast-enhanced CT Abdomen & Pelvis - PACS, BIDMC
Liver laceration with fluid in Morrison’s Pouch
Adenoma
Incidental Adrenal
Mesenteric fat stranding
rupture into the peritoneal cavity, worrisome for intraperitoneal bladder
• Extravasation of the contrast most likely from the urinary bladder
  associated with hemorrhagic fluid.
• Extensive liver laceration extending to the liver surface posteriorly
laceration rounded low density which can possibly represent small splenic
• Small amount of hemorrhagic fluid surrounding the spleen with small
due to mesenteric injury.
• Mesenteric hematoma in the left lower abdomen with fat stranding
small bowel loops.
• Dilated loops of small bowel measuring up to 2 cm. This finding with associated mesenteric hematoma is worrisome for blunt injury to the
represent hematoma in the setting of trauma. • Right adrenal lesion, probably representing adenoma, however, may
associated with hemorrhagic bilateral pleural fluid and atelectasis.

- Acute fracture of the T11 vertebral body with oblique fracture line, and hematoma.
- Extensive comminuted fracture of the pelvis, with bladder rupture, represent small amount of extravasation in this area.
- Small foci of hyperdensity in the left pectineus muscle, which can
  - Small anterior medial pneumothorax on the left.
  - Renal cysts.
Our Patient: Operative Findings

- Hemoperitoneum
- Avulsion of distal bowel from mesentery
- Intact Bladder
Our Patient Course

- HD2: ORIF of R humeral fracture
- T11 fracture
- HD3: Transfer to floor, TLSO brace for
- Pelvic fractures were non-displaced; patient was advanced to weight-bearing status
• HD10: Repair of R medial condyl fracture
• HD11: Discharge
Jejunum Comparison Patient #1: Perforated

Pneumoperitoneum
Blood in Morrison’s Pouch
Mesenteric Vessel Beading

Axial Images from Contrast-enhanced CT Abdomen & Pelvis - PACS, BIDMC
Hemoperitoneum

Axial Images from Contrast-enhanced CT Abdomen & Pelvis - PACS,
Comparison Patient #1:
Comparison Patient #2: Free Fluid

cavity. corners abdominal

Notice the triangular Collection of fluid within the...
Patient #2: Fat

- Mesenteric Fat Stranding

Axial Images from Contrast-Enhanced CT Abdomen & Pelvis - PACS, BIDMC
The “Normal” CT mesenteric injury on CT? What if we don’t see bowel or
Accuracy of CT Evaluation

Overall incidence of missed injury on CT evaluation is low (2 SBI out of 7 total missed injuries in 833 patients over 3 years at one level).

CT detection of BMI without oral contrast: A larger study found 99% NPV and 64% PPV for finding that abdominal trauma with a negative CT patient can be safely discharged following blunt trauma.
prior
multi-center study
References

Acknowledgements

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