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Surgery Quiz – Case 22

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2019, 36(6):849–850

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An otherwise healthy 25-year-old male, construction worker, presented to the emergency department complaining of low abdominal pain after lower half abdominal contusion with associated skin abrasion caused by direct impact from a fallen wall during a home renovation. At initial presentation, the patient was hemodynamically stable and afebrile. Clinical examination revealed the presence of low abdominal tenderness and involuntary rigidity suggestive of rectus abdominis injury (contusion or hematoma) or pelvic peritonitis. Emergency abdominal, pelvic computed tomography (CT) and CT cystography demonstrated: (a) The absence of solid organ injury, (b) the presence of adequate free low attenuating (35–40 HU) fluid in the pelvis without extravasation of IV contrast material (fig. 1), (c) the absence of free intraperitoneal air, and (d) the absence of urinary bladder injury on CT cystography.

What is the most prominent diagnosis?

(a) Rectus abdominis injury
(b) Small or large bowel perforation
(c) Mesenteric injury
(d) Intraperitoneal perforation of rectum

Comment

At initial presentation, our blunt abdominal trauma patient had typical clinical signs of pelvic peritonitis. Emergency abdominal, pelvic CT and CT cystography demonstrated: (a) The presence of low attenuating free fluid in the pelvis, (b) the absence of free intraperitoneal air, (c) the absence of solid organ injury, and (d) the absence of urinary bladder rupture. Watch and wait strategy was adopted for suspected bowel or mesentery injury. On the first day of hospitalization: (a) Repeated clinical examination revealed the persistence of clinical findings for pelvic peritonitis, (b) repeated laboratory examination revealed no alterations in WBC, amylase, hemoglobin and hematocrit serum levels. Due to the persistence of clinical findings for peritonitis, delayed abdominal, pelvic CT and CT cystography performed 16 hours after admission which depicted an increase in the amount of the free pelvic fluid along with free intraperitoneal air (fig. 2). Laparotomy performed for small, large bowel or intraperitoneal rectum perforation with or without mesentery injury which revealed pelvic enteric perforation peritonitis with pseudomembrane formation along with the presence of two adjacent full thickness 0.5 cm and 1 cm perforations at the antimesenteric border of the terminal ileum 40 cm proximal to the ileocecal valve without mesenteric injury (isolated grade II small bowel injury according to injury scoring scale of the American Association for the Surgery of Trauma) (fig. 3). Resection of the involved part of the terminal ileum with isoperistaltic side-to-side anastomosis

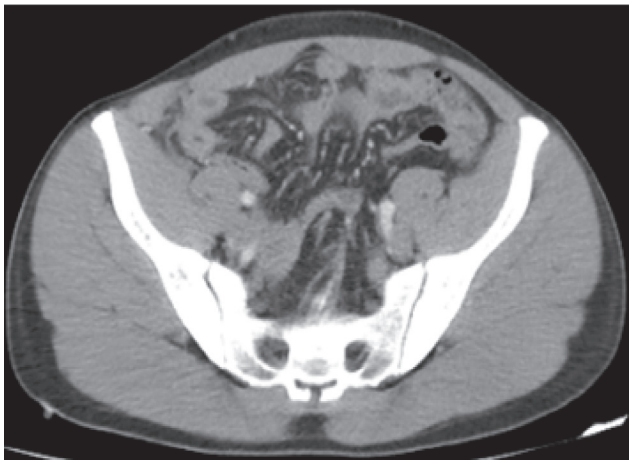

Figure 1

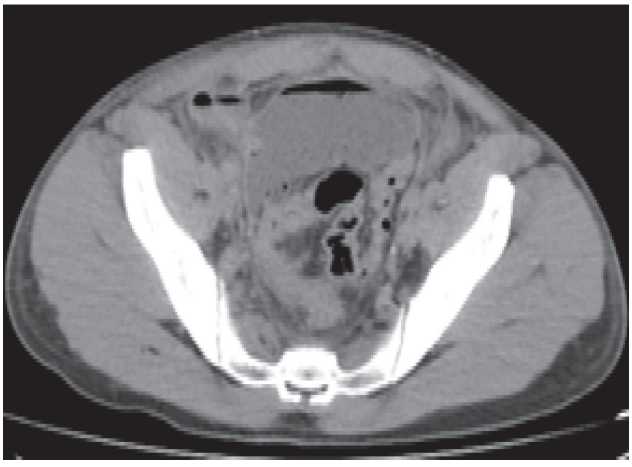

Figure 2

Figure 3

performed. Postoperative period was complicated by superficial incisional surgical site infection and the patient discharged home on the 8th postoperative day.

Blunt abdominal trauma can cause bowel injury with an incidence of 0.3–5%. Although not so rare, bowel injury is the most common abdominopelvic injury after blunt trauma missed at initial evaluation. Blunt abdominal trauma can cause bowel perforation by compression of the bowel against a fixed point, usually the vertebral column resulting in rapid increase of intraluminal pressure and perforation at the antimesenteric border of the bowel wall. Signs and symptoms of peritonitis require several hours to become clinical apparent due to the slow accumulation of fluid and or air in the abdominal cavity. Clinical examination at initial presentation is reliable for early diagnosis in only 30% of abdominal blunt trauma patients and should always be accompanied by further imaging to enhance diagnostic accuracy. The presence of free subphrenic air in plain abdominal radiographs, a radiologic sign indicative of hollow viscus perforation, can lead to early diagnosis in only 7–8% of patients. Focussed assessment sonograph trauma (FAST) can detect the presence of free fluid with a sensitivity of 91–100%. Diagnostic peritoneal lavage (DPL) can identify peritoneal effusion positive for bowel content in full thickness bowel perforation or transaction with 100% sensitivity, but relatively low specificity.

As CT is the principal diagnostic tool in blunt abdominal trauma, FAST and DPL have been reserved mainly for patients with hemodynamic instability. CT findings of small bowel perforation include free intraperitoneal fluid in the setting of solid organ injury absence with or without the presence of free air, bowel wall thickening, mesenteric streaking and dilated bowel loops. Fakhry et al in a large retrospective multicenter study of 275,557 trauma patients reported that the most common CT finding in blunt abdominal trauma patients was free intraperitoneal fluid. However, only 30.5% of the patients with free fluid without solid organ injury had small bowel perforation resulting in sensitivity of 55.9% and specificity of 81.8%. A more aggressive approach suggesting exploratory laparotomy based solely on the presence of free intraperitoneal fluid without solid organ injury has not gained widespread support. On the contrary, there is growing evidence supporting the use of diagnostic and therapeutic laparoscopy as laparotomy can be avoided in 40% of cases and laparoscopy related morbidity in the absence of peritonitis is less than 1%.

Small bowel perforation after blunt abdominal trauma is associated with significant morbidity and mortality (26–28.1% and 3–3.3%, respectively). Postoperative complications include wound infection and dehiscence, anastomotic leak, intraabdominal abscess, acute respiratory distress syndrome and sepsis. The most important prognostic factor is time from presentation to diagnosis and surgery, as delayed surgery increases the risk of bacterial contamination and the incidence of postoperative complications two to three times higher than early surgery. Indeed, the majority of patients with isolated small bowel perforation remains undiagnosed for many hours and eventually can demonstrate increased morbidity and mortality in comparison with patients with early diagnosis and treatment.

In conclusion, isolated small bowel perforation in blunt abdominal trauma is difficult to diagnose. High clinical and imaging suspicion is required for early diagnosis and surgery which are imperative to prevent increased morbidity and mortality. Clinical signs of peritonitis along with free intraperitoneal fluid in the absence of solid organ and urinary bladder injury at CT should raise high suspicion of bowel perforation. However, the rarity of this type of injury and the relatively high false negative rate of emergency CT can lead to delayed diagnosis. In-hospital repeated clinical and laboratory examinations along with delayed CT scans are the cornerstones for early diagnosis of isolated small bowel perforation after blunt abdominal trauma.

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