ORIGINAL RESEARCH PAPER

Surgery

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BLUNT MESENTERIC INJURY: TWO CASE REPORTS

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ABSTRACT

Two cases of blunt mesenteric injury were presented. In both cases, contrast-enhanced CT of the abdomen showed contrast extravasation in the intraperitoneal cavity (indicating injury of the superior mesenteric artery), bowel Wall thickening, hemoperitoneum and mesenteric hematoma. Under impression of mesenteric injury, emergency laparotomy was performed in both of the patients: two lacerations of the jejunal mesentery were identified in patient I and one laceration of the ileal mesentery was found in patient 2. Bowel resection was carried out in both of the patients. The course was uneventful during the 12 days and 11 days of hospitalization for patients 1 and 2 respectively

INTRODUCTION

Blunt abdominal trauma is frequently encountered in the emergency department, leading to intraabdominal injury in 12-15% of cases [1]. Bowel and mesenteric injuries are present in approximately 5% of patients with blunt abdominal trauma at laparotomy [2-5]. In blunt abdominal trauma, mesenteric injury is rare and accounts for less than 1% of all injuries [6], and is two to three times more common than bowel injury detected on computed tomography (CT) [7]. Small bowel mesentery is injured about five times more common than colonic mesentery (mesocolon) [8]. Mesenteric injury is difficult to diagnose due to nonspecific clinical features, leading to delayed diagnosis, higher morbidity and mortality, and increased length of hospital stay [1,9]. Nowadays, multidetector row CT (MDCT) replaces diagnostic peritoneal lavage and becomes the modality of choice for diagnosing abdominal injuries [2, 4, 10]. The specific CT signs of significant mesenteric injury include intraperitoneal active intravenous contrast extravasation and occlusion and beading of mesenteric vessels [2,3,10]. Herein, we present two case reports of blunt abdominal trauma causing mesenteric injury; both of the cases were diagnosed by MDCT, managed by emergency surgical exploration, and had the lengths of hospital stay of 12 days and 11 days respectively.

CASE REPORTS

Case 1

A 40-year-old male worker suffered from abdominal pain after a fall injury over the abdomen from a two-floor height. At the emergency room. The blood pressure was 100/60 mmHg, and the blood hemoglobin was 10.6 g/dL. Contrast-enhanced 64-row MDCT of the chest and abdomen without oral contrast administration showed hyperdense intraperitoneal fluid (attenuation value, 42.5 HU), extravasation of contrast medium from the branch of the superior mesenteric artery, mucosal fold thickening of the jejunum, fractures of the left transverse processes of L1 to L3 vertebrae, and compression fracture of L1 vertebra (Fig. 1a and 1b). Therefore, CT diagnosis of active bleeding from the branch of the superior mesenteric artery was made. Emergency exploratory laparotomy revealed two 6x6 cm lacerations over the jejunal mesentery at 110 and 200 cm distal to the ligament of Treitz respectively (Fig. 1c). Repair of the mesenteric lacerations and resection of 60 cm jejunum with end-to-end anastomosis were performed. The patient had an uneventful course during the 12-days of hospitalization.

Case 2

A 35-year-old male farmer experienced abdominal pain caused by a crush injury during operation of a farm machine. At the emergency room, the blood pressure was 120/80 mmHg, and the blood hemoglobin was 13.3 g/dL. Contrast-enhanced MDCT of the abdomen without oral contrast administration demonstrated hyperdense intraperitoneal fluid (attenuation value, 52.4 HU), extravasation of contrast medium from the branch of the superior mesenteric artery, and mucosal fold thickening of the small bowel loop (Fig. 2a). Therefore, CT diagnosis of hemoperitoneum and active bleeding from mesenteric vessel was made. Emergency surgical exploration showed a laceration of the ileal mesentery at 140 cm from the ileocecal valve and associated gangrene of the ileum (Fig. 2b). Laceration of the mesocolon of the cecum and ascending colon with partial gangrene was also noted. About 3450 mL of intraperitoneal blood was removed. Resection of 120 cm of ileum and 12 cm of cecum and ascending colon and ileocolic anastomosis were carried out. The patient was discharged 11 days later with an uneventful course.

DISCUSSION

In blunt abdominal trauma, mesenteric and bowel trauma is the third most common type of injury, seen in about 5% of cases during laparotomy, and is less common than solid organ injuries [2-5], in which splenic injury is most frequently encountered and makes 40% of abdominal organ injuries [5]. Solid organ and large vessel injuries account for the majority of cases of hemoperitoneum, while mesenteric laceration is an uncommon etiology of hemoperitoneum [1]. Mesenteric injury is rare, accounting for less than 1% of all injuries [6].

The causes of bowel and mesenteric injuries during blunt abdominal trauma are related to direct crush force on the bowel loop and mesentery against a fixed structure such as the spine (as in case 2), rapid deceleration producing shearing force at a transition between the fixed and mobile bowel loops (such as a fall injury noted in case 1), and burst injury of the diseased bowel loop (such as ileus, obstruction, or inflammatory bowel disease) due to a sudden increase in intraluminal pressure [2,3,6].

Clinically, the bowel and mesenteric injuries are difficult to detect due to nonspecific symptoms and signs such as abdominal pain, tenderness, bowel distension, decreased bowel sound, hypotension and even shock [1,4,6,11]. The physician's attention may be distracted when the patient experiences other associated clinical manifestations, such as conscious disturbance due to concomitant head and spinal cord injuries, or hemodynamic change due to concomitant pelvic fractures.

Early detection and surgical intervention are essential to improve the outcome of the patient [4,11]. Delayed diagnosis of bowel and mesenteric injuries as short as 8-12 hours leads to increased morbidity and mortality due to hemorrhage from the injured mesenteric vessels and sepsis from peritonitis caused by the bowel wall perforation [3,10,11]. Delayed diagnosis also leads to longer hospital stay and the number of postoperative complications such as wound infection and small bowel obstruction [6,9].

In the hemodynamically unstable patients, diagnostic

peritoneal lavage (DPL) and ultrasound (focused assessment with sonography for trauma; FAST) may be used for the assessment of abdominal injury [3,11,12]. However, DPL is nonspecific and not reliable to evaluate the retroperitoneal injuries, and FAST is nonspecific in the assessment of organ injury [3].

MDCT is more sensitive and specific than DPL and FAST for diagnosis of bowel and mesenteric injuries [3], and nowadays is the diagnostic modality of choice for evaluation of blunt abdominal trauma in hemodynamically stable patients [3,4]. Routine use of oral contrast medium is no longer indicated [2]. The CT protocol includes non-enhanced and contrast-enhanced biphasic or triphasic scans. The non-enhanced images can detect hyperdense intraperitoneal fluid (hemoperitoneum; attenuation above 35 HU) [2]. Using bolus tracking technique, the arterial phase can show extravasation of contrast medium from the solid organs and the vessels. The portal venous phase obtained at about 70 seconds after intravenous contrast administration can assess bowel perfusion and parenchyma of solid organs. The delayed phase acquired at 3-10 minutes can evaluate the urinary tract injury including the urinary bladder. The specific CT signs of mesenteric injury include active bleeding (that is, extravasation of contrast medium) from the mesenteric vessels, abrupt termination of mesenteric vessels, and mesenteric vascular beading [2-4]. The less specific CT signs of mesenteric injury are mesenteric infiltration (mesenteric fat stranding), mesenteric hematoma, bowel wall thickening, and abnormal bowel wall enhancement indicating vascular compromise due to mesenteric injury. Mesenteric hematoma indicative of mesenteric vascular laceration is not a surgical indication and can be managed conservatively [3,11,13]. In both of our cases, active contrast extravasation (active bleeding) from the mesenteric vessels indicated life-threatening mesenteric injury, and emergency surgical interventions were required to cure the patients without post-operative complication.

In conclusion, mesenteric injury is a rare traumatic event, and may go unnoticed in diagnosis even in minor trauma. Hemoperitoneum without solid organ injuries and mesenteric contrast medium extravasation are two important factors for exploratory laparotomy. A high index of suspicion and recognition of the specific CT signs are required for definite diagnosis. Prompt early surgical intervention without delay is a must to prevent morbidity and mortality of the patients.

Figure legends

Figure 1. Case 1. Contrast-enhanced, axial (a) and coronal reformatted (b) CT images show contrast extravasation around the bowel loop and in the dependent site of the peritoneal cavity (arrows), wall thickening of the jejunum (open arrows), and hemoperitoneum (ladder arrows). Compression fracture of L1 vertebra (asterisk in b) is seen. (c) Exploratory laparotomy demonstrates two lacerations of the jejunal mesentery (arrows).

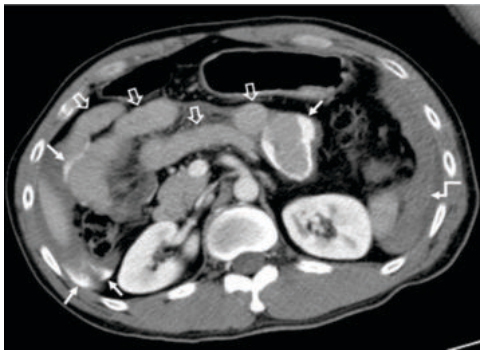

Figure 1a

Figure 1b

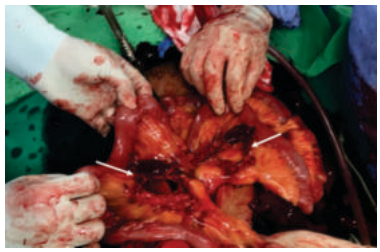

Figure 1c

Figure 2. Case 2. (a) Contrast-enhanced, axial CT image reveals contrast extravasation in the peritoneal cavity (arrows), wall thickening of the small bowel loop (open arrows), and mesenteric hematoma (double ended arrows). (b) Surgical exploration unveils a laceration of the ileal mesentery (arrow), and gangrenous change of the distal ileum, cecum and ascending colon (open arrow).

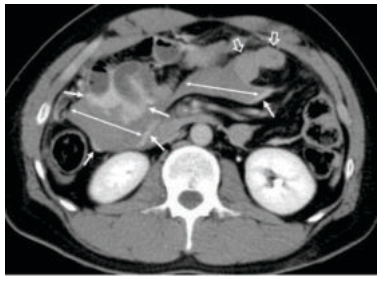

Figure 2a

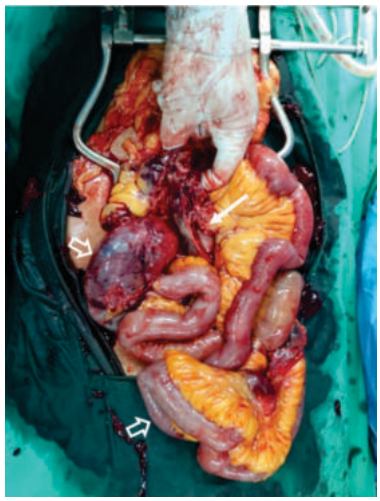

Figure 2b

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