

Jejunal Perforation following Gaelic Football Game

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ABSTRACT

Blunt abdominal trauma leading to jejunal perforation during a football game is very rare, especially in children. This is a case report of this unusual condition is presented under an umbrella of literatures. In-game evaluation did not identify this injury. The athlete completed the game, and the injury was ultimately identified with peritoneal signs and a negative Carnett sign, making abdominal wall injury less likely. The athlete underwent surgical repair of the perforation without complication and has since returned to full activity. It is important to maintain a high index of suspicion and to be observant with serial examinations, advanced abdominal examination maneuvers, and to have a broad differential diagnosis in the case of significant impact to the abdomen during athletics.

Keywords: Jejunal, Perforation, Following, Gaelic, Football Game.

INTRODUCTION

Bowel injuries after a blunt abdominal are usually related to a motor vehicular accidents^{1,2,3}. Only 3 cases of jejunal rupture have been reported in American football and one in soccer^{4,5}. This was described by Geil in 1899, and the incidence of major intestinal injuries is around 11%⁶. The intestine is the third most commonly injured organ in a blunt abdominal trauma, and the incidence ranges from 5-15% reported in other series^{7,8,9,10}. In our modern-day era, small bowel injuries are more common than before but still relatively infrequent. Small bowel injury following blunt abdominal trauma is the commonest presentation in road traffic accidents. The isolated blowout perforation of the jejunum is extremely rare. We came across two cases of isolated jejunal perforations following blunt abdominal injury during 2010–2011 in our hospital. Samuel Annan reported the first case of intestinal perforation following blunt abdominal trauma in 1837.

Punctate or slit like perforations often occurring on the anti mesenteric border are probably the consequence of a sudden increase in the intraluminal pressure in a fluid or air-filled loop. Robbs et al., in 1980, reported five such lesions in Zulu tribesmen, which were mostly caused by a blow to the abdomen with a heavy, round-headed weapon. These perforations were not surrounded by damaged tissue and did not appear to result from a crushing type injury. Intra-abdominal injury can be difficult to identify during competition, and timely diagnosis of jejunal perforation is difficult because of initially subtle clinical findings that gradually progress over time. Identifying intra-abdominal injuries early can improve the outcome of the patient.

In-game evaluation did not identify this injury. The athlete completed the game, and the injury was ultimately identified with peritoneal signs and a negative Carnett sign, making abdominal wall injury less likely. The athlete underwent surgical repair of the perforation without complication and has since returned to full activity. It is important to maintain a high index of suspicion and to be observant with serial examinations, advanced abdominal examination maneuvers, and to have a broad differential diagnosis in the case of significant impact to the abdomen during athletics. The mechanisms of small bowel injuries with blunt trauma include shearing forces, compression between the abdominal wall and the vertebral column and bursting injury due to a sudden increase in the intraluminal pressure. The isolated "blowout type" of rupture of the jejunum following constriction by a dhoti or fall from the stairs is extremely uncommon. This leads to a sudden increase in the in. Most of the patients will be having punctate or slit like perforations on the anti mesenteric border and so, ideally they require laparotomy and the primary closure of the perforation, with peritoneal lavage tra-abdominal pressure, which in association with a full stomach, can lead to this kind of perforation. A similar mechanism of small bowel injury was caused by physical assault while playing football. They are referred to as "blowout"

perforations. These perforations may be missed initially and may become apparent around three days after the injury. or bowel ischemia which is secondary to contusion, leading to stricture and delayed perforation occurs after 4 weeks. The two cases were reported almost 2 months following blunt abdominal trauma. Blunt abdominal trauma leading to small bowel injuries are usually due to high energy impact from motor vehicular accidents¹¹. Here we report a case of a jejunal perforation after a kick to his abdomen during a football game.

CASE REPORT

A 15 year old boy presented in the Accident & Emergency department, with lower abdominal and right testicular pain, having been struck by a knee of an opponent player during a football match. Physical examination revealed a mild tenderness in epigastrium and lower abdomen. His right testis was swollen and tender. Blood pressure and pulse was normal. Blood tests done were within normal range. He then had an ultrasound of the abdomen and both testes, which showed no free fluid in the pelvis, both testes were normal with good blood supply. The boy was then admitted for observation. On team review of the patient the following morning, he was noticed to have generalized abdominal tenderness. Further examination revealed direct and rebound tenderness, bowel sounds were absent. On repeat blood examination, white cell count jumped up from 9.74 to 16.59.

Further examination with a CT abdomen showed that there was free intra-abdominal fluid and air up to the diaphragm. We have confirmed our suspicion and he was rushed for an operation. He underwent exploratory laparotomy, and it revealed 2 litres of bile stained fluid in the peritoneal cavity. Further exploration showed that there was a 6 cms perforation in the antimesenteric border of the proximal jejunum, 1 foot from the duodenojejunal junction. Postgame (2 hours after the injury), he was reevaluated by the team physician. He noted diffuse abdominal pain (9 out of 10) with nausea. He had urinated without hematuria. He had not had a bowel movement or passed flatus. He denied lightheadedness, chest pain, shortness of breath, coughing, vomiting, back pain, or shoulder pain. The athlete's heart rate was 96 with otherwise normal vital signs.

He appeared in mild distress. Abdominal examination revealed diffuse tenderness to light palpation with rebound and guarding, equivocal distention, and mid-abdominal ecchymosis, which was in the shape of the pylon. Carnett and Grey-Turner signs were negative. Femoral pulses were equal. Because of his worsening clinical status and concern for peritonitis, especially given the negative Carnett sign,³ despite the ecchymosis, he was urgently referred to the emergency room for possible peritonitis. Evaluation revealed a white blood cell count of 11,000 with 85% neutrophils and otherwise normal laboratory test results. A computed tomography scan of the abdomen and pelvis showed

pneumoperitoneum with small volume hemoperitoneum (Figure 1). The athlete underwent urgent exploratory laparotomy, where a 2- to 3-mm full-thickness proximal jejunal injury about 10 cm from the ligament of Treitz was identified and repaired. A small amount of straw-colored fluid was noted in the right upper quadrant, and there was no gross fecal contamination. The colon, spleen, and liver were normal, and there was no retroperitoneal hematoma. He had an unremarkable postoperative course. He began progression of activity at 6 weeks postoperatively, and he has since returned to football without restriction. The involved segment of jejunum was resected and ends were anastomosed. The rest of the patient's hospital stay was uneventful, and he was discharged on his 10th post-operative day.

RESULTS

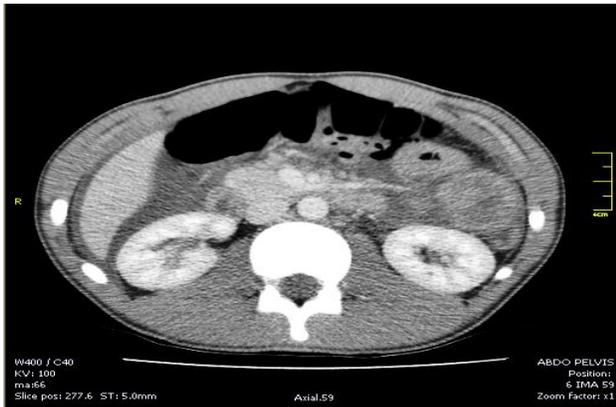


Figure 1 Free Air and fluid



Figure 2 Surgical procedure



Figure 3 Surgical procedure



Figure 4 Blow-out of jejunal intestine

DISCUSSION

Blow-out or perforation of the small bowel in blunt abdominal trauma are rare, and are more commonly found in motor vehicle accidents^{12,13,14}. Although small bowel ruptures has incidence of 7% after the blunt abdominal trauma that is rare. Overall incidence is between 1% to 7% in most of the case series¹⁵⁻²⁰. The diagnosis can be delayed regardless of ultrasound and CT scan until the peritonitis occurs^{14,16,19}. Five cases of duodenal rupture describe during sports in literature. Blunt abdominal trauma is common in the sports like Cycling, Skating, Hockey and Football. Frequently there is difficulty in diagnosis and often there is a delay in treatment and management of this potentially life-threatening condition.

The mechanism of injury is still debatable, but most authors believe that compression between abdominal wall and spine is the most important cause²¹. The mechanism also causes injury to bowel mesentery. When the tangential force is applied to relatively fix point such as duodenojejunal junction or ileocaecal junction, this leads to complete avulsion of mesentery that can cause devitalisation of small bowel and can lead to delayed perforation. Physical examination and history are very important in making the diagnosis of small bowel injury. Repeated physical examinations are very helpful. The presence of distracting injuries such as cerebral trauma and haemodynamic instability are challenge for surgeon to make diagnosis²².

Diagnosis imaging plays an important role in early diagnosis. Gas under diaphragm in plain abdominal film suggests perforation of hollow viscera but having low yield. Contrast enhanced CT is very beneficial in diagnosing bowel and mesenteric injuries by showing free fluid, thickening of bowel wall, mesenteric or bowel haematoma or presence of extraluminal air. Jejunal perforation is very rare in sport, with only 3 published cases in football.^{1,4,7} Football has the highest injury rate of collegiate sports, with a game injury rate of 35.9 per 1000 athlete-exposures. However, abdominal injuries account for only 6.3% of injuries.¹² Blunt abdominal trauma in sport usually affects nonhollow organs such as the liver and spleen and rarely affects hollow organs like the small bowel. The most common injury mechanism in football is player-player contact at 74.5%, while 8.1% and 0.6% of injuries occur from contact with the playing surface and contact with equipment, respectively.² Fixed areas of the bowel, including the duodenum, terminal ileum, and proximal jejunum, are susceptible. The usual mechanism is a shearing force of bowel fixed to the spine.⁶ In this case, it is likely that a direct compression of the jejunum between the pylon and spine caused the perforation. Pylons are composed of a firm and compliant foam core that deforms when contacted with a plastic exterior. Fixation to the playing surface is maintained with a weighted base.

This case highlights the importance of serial abdominal examinations and maintaining of vigilant clinical suspicion in diagnosing abdominal perforation. Timely diagnosis of jejunal

perforation is difficult because of initially subtle clinical findings that gradually progress over time. The progression of pain within hours is consistent with development of chemical peritonitis. In-game evaluation did not identify the injury. The initial reassuring examination was likely because of the size of the perforation. The athlete had no peritoneal signs on initial evaluation, though he did have midline epigastric pain, which may be an early sign of small bowel injury.⁴ He tolerated exertional testing without increased pain. He returned to play for the remainder of the game and continued to excel in his position. The Carnett sign can assist in differentiating abdominal wall injury from intra-abdominal injury. The Carnett sign is positive when abdominal tenderness to palpation increases or remains the same when the abdominal muscles are activated through an abdominal crunch, indicating injury to the abdominal muscles.¹³ In a study of 24 patients with acute abdomen, 23 with a positive Carnett sign had a normal laparotomy.^{14,15} A negative Carnett sign raised our clinical suspicion for intraabdominal injury, leading to further evaluation. Small bowel perforation has low mortality and complication rates if it is treated before 24 hours after the injury¹⁶. Delayed jejunal perforation is often associated with high mortality and morbidity^{17,18,19}. It is important to be vigilant with serial examinations and advanced abdominal examination maneuvers and to maintain a high index of suspicion in the case of significant impact to the abdomen during athletics. Evaluation of the safety of equipment is also important.

CONCLUSIONS

Traumatic jejunal rupture is rare in soccer game, but always considered in player with mid-epigastric abdominal pain, peritonitis and x-ray finding of free air in the abdomen. CT is powerful tool in making the diagnosis. Early management reduces the mortality and morbidity.

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