CASE REPORT

Turbulent tackle: a novel surgical approach to a rugby-related jejunal perforation

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SUMMARY

Viscus perforation in the context of blunt-force abdominal trauma is a rarity. Within a sporting context, it is especially rare. However, the increasing physicality observed in rugby union, both in the amateur and professional setting, has resulted in a higher rate of serious injury. We report a novel laparoscopic surgical approach to the management of a traumatic jejunal perforation sustained on the playing field in a previously fit and healthy 28-year-old.

BACKGROUND

Isolated hollow viscus injury following blunt force abdominal trauma is a rare finding. The majority of cases described in the literature can be seen to have occurred in the context of high velocity events such as road traffic accidents and pedestrian injuries. Even within this context, small bowel injury is far less likely than solid abdominal organ injury, for example, splenic, hepatic and pancreatic injuries. The EAST Hollow Viscus Injury in Blunt Trauma Study, a prospective multi-institutional review found that of 227 972 blunt trauma abdominal injuries admitted over a 2-year period, perforating small bowel injury accounted for less than 0.3%.¹ We present a case of jejunal perforation in a 28-year-old patient secondary to a rugby tackle. To our knowledge, this has not been reported in the amateur arena. It highlights the increasing physicality of modern sport. Furthermore, it emphasises the importance of early diagnosis and offers a novel surgical approach to this rare injury.

CASE PRESENTATION

A 28-year-old man with no significant medical history presented to emergency department (ED) with severe left-sided abdominal pain and vomiting following abdominal trauma during a rugby match.

The patient reported receiving a shoulder charge of significant force to the upper abdomen during the game. He experienced instant debilitating upper abdominal pain and was substituted. Ensuing deterioration in pain and persistent vomiting prompted transfer to the ED.

On arrival, the patient was afebrile and the vital signs were within normal ranges. Abdominal examination exhibited evidence of involuntary guarding and rebound tenderness limited to the left side. Bowel sounds were absent on auscultation. Venous lactate was 1.8 while erect chest X-ray revealed no evidence of free intraperitoneal air.

INVESTIGATIONS

Following initial fluid resuscitation and the commencement of broad-spectrum antibiotics, CT of the abdomen and pelvis was performed. Imaging demonstrated free intraperitoneal fluid, a focal segmental thickening of jejunum distal to the ligament of Treitz and engorgement of small bowel mesentery. Tiny foci of free air were identified adjacent to this area of small bowel (figure 1).

TREATMENT

Given the evidence of a jejunal perforation, a proton pump inhibitor was commenced and a wide bore nasogastric (NG) tube was placed to decompress proximally. Prior to transfer to the operating theatre for intervention, the patient provided informed consent for a diagnostic laparoscopy with potential progression to a laparotomy and small bowel resection. At the time of consent, careful emphasis was placed on the relatively novel nature of laparoscopy in this setting with the possibility of laparotomy remaining high both in the first instance, that is, intraoperatively, and second, in the postoperative period.

Laparoscopy was performed through a standard subumbilical balloon port revealing a small volume of free bilious fluid in the left paracolic gutter and pelvis. There was evidence of an early adhesional mass forming in the left upper quadrant. A further 5 mm port was placed in the left iliac fossa allowing for gentle probing of the inflammatory area. This identified no further bowel content, suggesting the underlying defect had sealed within the inflammatory mass. Further inspection of the peritoneal cavity revealed minimal contamination elsewhere with no other visceral injury. An extensive washout was undertaken and a wide bore-free drainage system was placed along the left paracolic gutter extending into the pelvis via the 5 mm port site.

OUTCOME AND FOLLOW-UP

On return to the ward, a low threshold for return to the operating theatre was maintained and would be governed by a combination of vital parameters, clinical status and biochemical markers. Hourly observations were performed including regular pain score assessments. Thrice daily abdominal examinations were performed by the attending surgical team. Daily laboratory investigations comprising full blood count, C reactive protein and renal profile were sent; with a focus on inflammatory markers to ensure a downward trend of same.

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Figure 1 Axial view of CT imaging of abdomen demonstrating tiny foci of free air.

An immediate symptomatic response was noted in the postoperative period with near-complete resolution of pain and full mobility the next day. Continued management consisted of broad spectrum antibiotics, free nasogastric drainage and nil per os. Clear fluids were commenced on day 3 with removal of the spigotted NG on day 5 when full soft diet was tolerated without further pain. The abdominal drain was removed on resumption of diet following 5 days of minimal serous output. The patient was discharged well 8 days postoperatively and returned to work within 2 weeks.

DISCUSSION

Small bowel injury in a sporting context is a rare occurrence with a paucity of reported cases. Bergqvist *et al*² report the outcomes of 136 sports-related abdominal injuries over a 30-year period in a Swedish population. The authors report only three small intestinal perforations; two of which were secondary to football injuries, one unspecified.

To date, only seven cases report jejunal perforation resulting from sporting activities. Specific sports identified were hockey (one), American football (three), football (two) and rugby union (one).³ It should be noted that this case occurred during an amateur competition, whereas the existing case occurred during a professional one. Both cases may be seen to represent the ever-increasing physicality and athleticism of the modern game of rugby union.

The exact mechanism of small bowel injury secondary to blunt force trauma remains a topic of debate. Various hypotheses have been proffered with generally accepted mechanisms including sudden increases in intraluminal pressure leading to perforation; shearing forces produced from sudden deceleration leading to injuries near points of fixation (eg, the ligament of Treitz, adhesions from previous surgeries) and direct compression of the affected viscus against the vertebral column.⁴

Furthermore, this case demonstrates a novel use of laparoscopy for both diagnostic and therapeutic purposes in the sports trauma setting. Laparoscopy has previously been shown to be a useful diagnostic tool in the setting of abdominal trauma successfully reducing negative laparotomy rates.⁵ However, to our knowledge, the washout and drainage technique has yet to be described in the context of a sporting injury.

The key parameter leading to our decision to proceed with laparoscopy over laparotomy, and the main determinant seen in most of the available literature, was the patient's persistent

haemodynamic stability. The clinical status of the patient also permitted timely CT imaging which in turn provided a preoperative road map. This limited the risk of missed injury which has been reported as occurring in 41%–77% of cases in this context, which often limits the use of laparoscopy.⁶ Other factors influencing our choice were the adoption of a patient-centred approach and the experience of the surgeon. After laparoscopic identification of the area corresponding to CT findings, we were satisfied that the defect had likely sealed and that peritoneal washout with placement of a drain would be sufficient.

We acknowledge the novelty of the laparoscopic approach in this setting and cannot overemphasise the importance of the postoperative period with respect to maintaining a very low threshold for proceeding with laparotomy if indicated. Rigorous monitoring of vital parameters was insisted, with any deviations in the patient's haemodynamic status or spikes in temperature to be reported to the attending surgical team. These were performed first on an hourly and later 2-hourly basis. Subjective pain assessments were also included. The attending surgical team performed thrice-daily abdominal examinations. Inflammatory markers comprising white cell count and C reactive protein were measured daily, assessing for a downward trajectory. Any combination of aberrations in the aforementioned parameters would be considered as indicators of evolving abdominal sepsis and hence guides for potential laparotomy.

The widespread use of laparoscopy as a therapeutic approach continues to gather momentum in the trauma setting. Recent, large studies have demonstrated therapeutic laparoscopy in traumatic abdominal injuries to be an acceptable and efficacious alternative to laparotomy. Furthermore, these studies have shown the added benefit shorter recovery times, reduced hospital stays and lower complication rates from therapeutic laparoscopy.^{7,8}

The benefit of CT in this case cannot be overemphasised. As per the EAST guidelines for the evaluation of abdominal trauma, CT scan is advised in patients in which abdominal injury is suspected on the proviso that haemodynamic stability is present. Since the publication of these guidelines (in 2002), CT imaging has become even more relevant, given the increased accessibility in more remote areas; the increasing resolution of images, with accompanying decrease in radiation exposure. One large prospective study found the missed injury rate of CT abdomen following blunt abdominal trauma to be as low as 0.3%.⁹

The preceding case demonstrates that, in the setting of an isolated small bowel injury secondary to blunt abdominal trauma, a laparoscopic approach may offer a safe and effective approach echoing the paradigm of minimally invasive being maximally effective.

Learning points

- Rugby union appears to be increasing in physicality both in the professional and amateur arena; this in turn can predispose to a spectrum of injuries. These patients represent a diagnostic challenge as they can remain systemically well while harbouring potentially fatal pathologies.
- Delayed diagnosis of hollow viscus perforation can significantly increase mortality risk.
- Laparoscopy, in the appropriate setting, can offer a safe and effective treatment option for small bowel perforation.
- CT is an extremely useful tool in suspected abdominal trauma provided there is haemodynamic stability.

Contributors All authors were involved in the management and care of the patient. DOS was responsible for the describing the presentation and clinical course of the patient. ROS performed the literature review used to write the discussion and obtained informed consent from the patient. TA was responsible for conception and overseeing the production of this case report. All authors were involved in the editing and critical revision. The patient was under the care of KS, who was also responsible for final draft approval of this case report.

Competing interests None declared.

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REFERENCES

- 1 Watts DD, Fakhry SM; EAST Multi-Institutional Hollow Viscus Injury Research Group. Incidence of hollow viscus injury in blunt trauma: an analysis from 275,557 trauma admissions from the East multi-institutional trial. *J Trauma* 2003;54:289–94.
- 2 Bergqvist D, Hedelin H, Karlsson G, *et al.* Abdominal injury from sporting activities. *Br J Sports Med* 1982;16:76–9.
- 3 Perry W, Fischer J, Wakeman C. Jejunal tackle: a case report of complete jejunal transection in rugby union. *Clin J Sport Med* 2014;24:e54–e55.
- 4 Chiang WK. Isolated jejunal perforation from nonpenetrating abdominal trauma. *Am J Emerg Med* 1993;11:473–5.
- 5 Addeo P, Calabrese DP. Diagnostic and therapeutic value of laparoscopy for small bowel blunt injuries: a case report. *Int J Surg Case Rep* 2011;2:316–8.
- 6 Villavicencio RT, Aucar JA. Analysis of laparoscopy in trauma. *J Am Coll Surg* 1999;189:11–20.
- 7 Khubutiya MSh, Yartsev PA, Guliaev AA, *et al.* Laparoscopy in blunt and penetrating abdominal trauma. *Surg Laparosc Endosc Percutan Tech* 2013;23:507–12.
- 8 Chestovich PJ, Browder TD, Morrissey SL, *et al.* Minimally invasive is maximally effective: diagnostic and therapeutic laparoscopy for penetrating abdominal injuries. *J Trauma Acute Care Surg* 2015;78:1076–83.
- 9 Hoff WS, Holevar M, Nagy KK, *et al.* Practice management guidelines for the evaluation of blunt abdominal trauma: the East practice management guidelines work group. *J Trauma* 2002;53:602–15.

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