



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Small bowel perforation and mesentery injury after an unusual blunt abdominal trauma—Case report



J. Pimenta de Castro*, G. Gomes, N. Mateus, R. Escrevente, L. Pereira, P. Jácome

Unidade Local de Saúde do Baixo Alentejo, Beja, Portugal

ARTICLE INFO

Article history:

Received 11 September 2014

Received in revised form

19 November 2014

Accepted 16 December 2014

Available online 24 December 2014

Keywords:

Blunt abdominal trauma

Small bowel perforation

Mesenteric injury

ABSTRACT

INTRODUCTION: In blunt abdominal trauma, lesions of the small bowel and mesentery are often under-diagnosed; although unusual, they represent the third most injured organ, with increasing morbidity and mortality.

PRESENTATION OF CASE: The authors present the case of a 68 years old male, admitted to the emergency department after being hit by a bale of straw, weighing around 300 kg, in the abdomen. After successful resuscitation, a CT scan was performed, suggesting hemoperitoneum because of vascular lesion of the right colon bleeding. An exploratory laparotomy was performed, confirming the presence of blood in the abdominal cavity and identifying jejunal perforation, an apparently innocent hematoma of the small bowel mesentery (beside the bowel wall) distally to the first lesion and a laceration of the sigmoid serosa; a segmental jejunal resection and suture of the colon serosa were performed. In the early post-operative period, an enteric discharge was noticed, mandating surgical reexploration; a previously unnoticed bowel perforation, in the mesenteric border where the hematoma was identified, justified an additional enterectomy, after what the patients recovery progressed uneventfully.

DISCUSSION: In this case, a sudden increase in abdominal pressure could explain that missed rupture of the mesenteric border of the jejunum, also causing the mesenteric hematoma, or, in spite of that, a state of low perfusion could have lead to total wall ischemia of an already irrigation compromised segment.

Only noted after surgical exploration, despite prior evaluation with a computed tomography. Small bowel and mesenteric injuries are potentially missed due to decreased exploratory laparotomies for blunt abdominal trauma.

CONCLUSION: Although uncommon, small bowel and mesenteric injuries are associated with high morbidity and mortality. High clinical suspicion is essential for an early diagnosis

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1. Introduction

In blunt abdominal trauma small bowel and mesentery injury (SBMI) is the third most common organ injury with an estimated incidence of 1–5% [1–3]. Isolated SBMI lesions are uncommon and delayed diagnosis is often frequent, with increased morbidity and mortality [4].

Most of the solid organ injuries caused by abdominal trauma are treated nonoperatively, making small bowel injuries difficult to diagnose due to less frequent laparotomies and lack of specific and reliable clinical or radiological findings [3].

Motor vehicle crashes are the principal cause of SBMI, but other mechanisms of injuries are described [3].

The authors present the case of a 68 years old male with a traumatic jejunal perforation and mesenteric injury wich despite

prompt surgical exploration had post-operative complications dictating re-laparotomy.

2. Presentation of the case

A 68 years old male, previously healthy, was admitted to the emergency department of our district hospital after being struck in the abdomen by a bale of straw (around 300 kg) which fell from a height of 2 m, while working in a trailer loaded with bales of straw.

At admission, blood pressure was 76/55 mmHg, pulse 80 beats/min and respiratory frequency was 20 cycles/min. The abdomen was distended with diffuse tenderness and guarding over the lower quadrants of the abdomen; an abdominal FAST was performed revealing peritoneal fluid in Morrisonis and Douglais pouch (Image 1). No other injuries were observed.

Resuscitation was immediately iniated with a cristalloid solution while blood was not available. Hemodynamic stability was achieved; an abdominal CT was ordered without delaying surgery, that showed non-pure fluid around the liver, spleen and lower

* Corresponding author. Tel.: +351 964819586.

E-mail address: jdpimenta.castro@gmail.com (J. Pimenta de Castro).

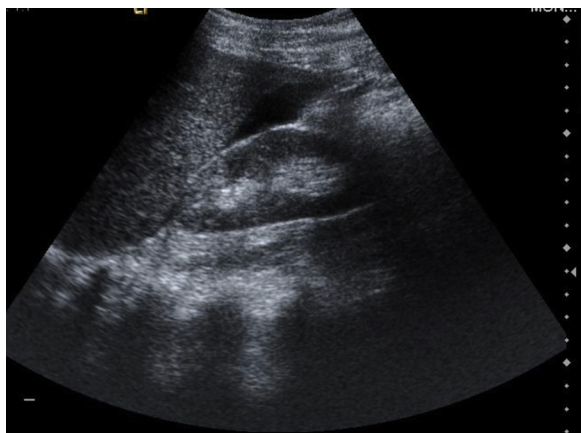


Image 1. Ultrasound of Morrison's pouch revealing intraperitoneal fluid.

abdomen with a suspected active hemorrhage of the mesentery and apparently with no other injuries (**Image 2**).

A median laparotomy was performed and an estimated 700 cc hemoperitoneum was evacuated. Intra-operatively, multiple perforations were observed on the antimesenteric border of a jejunal segment 80 cm from the ligament of Treitz, an hematoma in the mesentery of the distal ileum without active hemorrhage, intestinal ischaemia or perforation. A segmental resection of the jejunum involved was performed and abdominal drainage was established. The patient was admitted in the intensive care unit and, in the second post-operative day an enteric discharge was noted from the abdominal drain despite hemodynamic stability with no signs of sepsis. A second laparotomy was performed revealing a perforation of the mesenteric border of the ileum in the area of the initial mesentery injury; another segmental resection was performed and the postoperative course was uneventful.

3. Discussion

Small bowel perforation after blunt abdominal trauma is a rare condition (0.3% of blunt trauma admissions) [3]; the vast majority is caused by motor vehicle accidents, handle bar injury and falls [2]. To the best of our knowledge, this is the only reported case of SBMI after straw bale injury.



Image 2. Abdominal computed tomography showing active mesenteric hemorrhage.

The exact pathophysiologic mechanism for traumatic blunt small bowel injuries is not well understood, but some mechanisms have been described [5].

A sudden increase in pressure within a closed segment of intestine would explain antimesenteric perforation as the ones seen in our patient. Shearing and tangential forces may be responsible for mesenteric injuries, as the one sustained by this patient near the ileocecal junction (a fixed point prone to this kind of lesion); in the first laparotomy no signs of ischemia or perforation were noted, despite rigorous examination of the small bowel. The decision of not performing another segmentar resection was made. Once there was not signs of perforation or ischemia, such decision could raise complication rate. It is to our believe that most probably a perforation was missed or evolving ischemia developed and, a new operative procedure was necessary.

Although laparotomy indication was made as soon as an abdominal trauma with a grade III hemorrhagic shock was noted, since the patient was stable and without compromising the timing of the surgery, a CT was performed to collect more information before an intervention.

Resuscitation was initiated in the first survey with crystalloid fluids according to trauma guidelines. Despite achieving hemodynamic stability after 1 L of fluid, a pack of red blood cells was initiated and another one was performed during surgery.

Before the widespread use of abdominal CT in the evaluation of blunt abdominal trauma, exploratory laparotomies were much more common (mainly due to the high sensitivity and low specificity of diagnostic peritoneal lavage) and few abdominal injuries were missed. Nowadays, with the information provided by CT as much as 50% of patients with blunt solid organ injury are eligible for nonoperative management [3].

SBMI is associated with high morbidity and mortality, which increase with delayed diagnosis: clinical and radiographic signs of perforation are often absent, making diagnosis difficult. CT with a sensitivity and specificity of 97,7% and 98,5%, respectively, is considered the gold-standard for the detection of SBMI [6].

In our case although immediate clinical and imagiologic diagnosis and prompt immediate surgical approach, the patient developed secondary perforation and subsequeute localized peritonitis. Thorough surveillance and high clinical suspicion was essential for timely reintervention.

4. Conclusion

SBMI is a rare but deadly injury. The understanding of the mechanisms responsible for this kind of traumatic lesion are valuable in the first evaluation of blunt abdominal trauma.

An imaging supported clinical approach is essential for an early diagnosis, but also for a careful vigilance for related injuries and complications.

Conflict of interest

There are no conflicts of interest.

Funding

There are no sources of funding.

Ethical approval

No ethical approval has been given.

Author contributions

João Castro – participated in surgery and care of the patient, study concept and written the article.

Gabriel Gomes – responsible surgeon, review article.

Nuno Mateus – participated in surgery, review article.

Ricardo Escrevente, Luis Sequeira, Paulo Jácome – review article.

Consent

The patient signed an informed written consent.

Guarantor

João Castro.

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