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Case Report

Hemoperitoneum secondary to mesenteric laceration after abdominal trauma - Case report

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ABSTRACT

Mesenteric laceration is an uncommon cause of hemoperitoneum, with nonspecific signs and symptoms and frequently is camouflaged by the signs of other traumatic lesions. There is a high risk to go unnoticed increasing morbidity and mortality.

We report a case of a 43-year-old man, who was involved in a motorcycle accident, with thoraco-abdomino-pelvic trauma, but without evidence of intra-abdominal lesions on exams, with exception of hemoperitoneum. Due to *hemodynamic instability*, it was performed an exploratory laparotomy. Intraoperative findings were mesenteric lacerations affecting a small bowel segment.

This case demonstrates that a high index of suspicion is necessary to diagnose and treat lesions like mesenteric laceration, not visible early on imaging but potentially fatal, with high risk of complications.

Introduction

Blunt abdominal trauma is a frequent emergency, causing intra-abdominal injury in 12 to 15% of cases [1], manifesting in a large number of cases, with hemoperitoneum. The most frequent causes of hemoperitoneum are solid organ (liver, spleen and kidney) and large vessels trauma. Mesenteric injuries are an uncommon cause of hemoperitoneum, with a difficult diagnosis due to the lack of specific features, leading to delayed diagnosis and higher morbidity and mortality. This diagnosis delay is also caused by the decreasing number of exploratory laparotomy, due to the development of imaging methods capable of identifying lesions that are amenable to conservative treatment. However, they may miss certain lesions such as mesenteric laceration [2].

The authors present the case of a 43-year-old man with hemoperitoneum, presenting with hemodynamic rebound, secondary to mesenteric laceration.

Case report

A 43-year-old man was brought to the emergency department of our hospital after a motorcycle accident.

On admission, the patient had oxygen saturation of 98% on room air, blood pressure (BP) of 92/58 mm Hg, heart rate (HR) of 118 bpm, Glasgow scale of 15 and presented sudoresis. eFAST showed the presence of mild peritoneal fluid. The radiographic study showed

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bilateral wrists fractures (Fig. 1A), intra-articular fracture of the right acetabulum and a fracture of wing of the left iliac (Fig. 1B). The CT scan showed fracture of two right ribs (6th and 7th) (Fig. 1C) and moderate peritoneal effusion (perisplenic, in the *left paracolic gutter* and in the pelvic cavity) compatible with hemoperitoneum, without any apparent intra-abdominal lesion (Fig. 1C). Injury Severity Score (ISS) was 41.

At the primary survey, we performed fluid resuscitation with 1000 cc of Ringer's lactate, and hemodynamic stability was achieved.

Due to *hemodynamic stability and nonspecific abdominal findings*, the surgical team opted for surveillance and conservative treatment. However, about 6 h after admission, the patient developed signs of hemodynamic instability, with decreasing BP (76/44 mm Hg) and increasing HR (112 bpm).

eFAST was repeated, showing an increase in the intraperitoneal fluid volume leading the surgical team to perform an exploratory laparotomy. There was about 1500 mL of blood in abdominal cavity. An abdominal packing was done, review of all abdominal quadrants and exploration of the entire intestine. It was detected the presence of multiple mesentery lacerations (Fig. 2A) and one segment of small bowel of 15 cm with doubtful viability (practically without mesentery in its dependence). A ligation of one mesenteric vessel, segmental enterectomy and raffia of the mesentery defects were performed (Fig. 2B). Perioperatively, it was administered three units of red blood cells and two units of fresh frozen plasma.

The postoperative period was uneventful. The patient was subsequently submitted to orthopedic surgery for wrist fractures (on the 14th day after the accident) and maintained conservative treatment to the pelvic fracture. He was discharged from hospital 30 days after the accident and was admitted in a rehabilitation unit. In the four months follow-up, the patient's recovery was almost complete, showing excellent general condition and resumption of work activity.

Discussion

Trauma is responsible for a large part of the morbidity and mortality rate in developed countries, particularly in young individuals.

The abdomen is the third region most frequently involved in traumatic events, 85% of which caused by blunt trauma [3]. It may involve injury to one or more intra-abdominal or retroperitoneal organs [4], but a significant percentage can be difficult to diagnose due to mild or nonspecific symptoms [5–7]. The most frequently affected organs are solid organs such as the liver, spleen and kidneys, manifesting more frequently as hemoperitoneum. The mesenteric laceration is rare [6].

The cause of mesenteric laceration is related to shear and tangential forces, of traction and counter traction, causing stretch and consequent rupture of the mesentery [8]. As consequence, it may involve the rupture of vessels responsible for irrigation of the small bowel, leading to deficit of vascular supply and subsequent segmental ischemia, requiring resection, as it was necessary in this case.

Clinically, mesenteric laceration manifests itself with nonspecific signs and symptoms, often camouflaged by other lesions associated with blunt trauma. Examples of that are the severe traumatic brain injuries, with altered state of consciousness, making it difficult to collect information from the patient, or other thoraco-abdomino-pelvic injuries, like pelvic fracture that would justify the hemodynamic changes found in our patient.

In the context of the patient's evaluation in the emergency room, eFAST was performed, confirming the presence of fluid in the abdominal cavity. With the hemodynamic recovery after fluid resuscitation in the primary survey, thoraco-abdominal-pelvic CT scan was performed to identify any other injuries.

There are definite and suggestive signs of mesenteric injury. The definite signs are the active contrast leakage - sign of active bleeding and significant mesenteric injury [9], intermesenteric free fluid, often forming triangles [10], irregular appearance of the mesenteric vessels - beading and abrupt termination of mesenteric vessels [10] and accumulation ("pooling") of contrast on multiphase images. The suggestive signs are the mesenteric infiltration (haziness and fat stranding), mesenteric hematoma and bowel wall thickening [10]. However, these definitive and suggestive signs of mesenteric injury are not always present and may go undetected in imaging exams.

In the past, mesenteric lacerations were more often diagnosed due to the greater number of exploratory laparotomies performed. However, nowadays, these injuries may go unnoticed, with consequent increased morbidity and mortality.

In our case, although the complementary exams performed did not showed major lesions with immediate need of intervention, the



Fig. 1. Initial complementary diagnostic tests. A - wrists X-rays. B – pelvic CT. C - TAP CT scan: Rib fractures (arrow 1) and moderate peritoneal effusion (perisplenic, in the *left paracolic gutter* and in the pelvic cavity) compatible with hemoperitoneum (arrow 2).

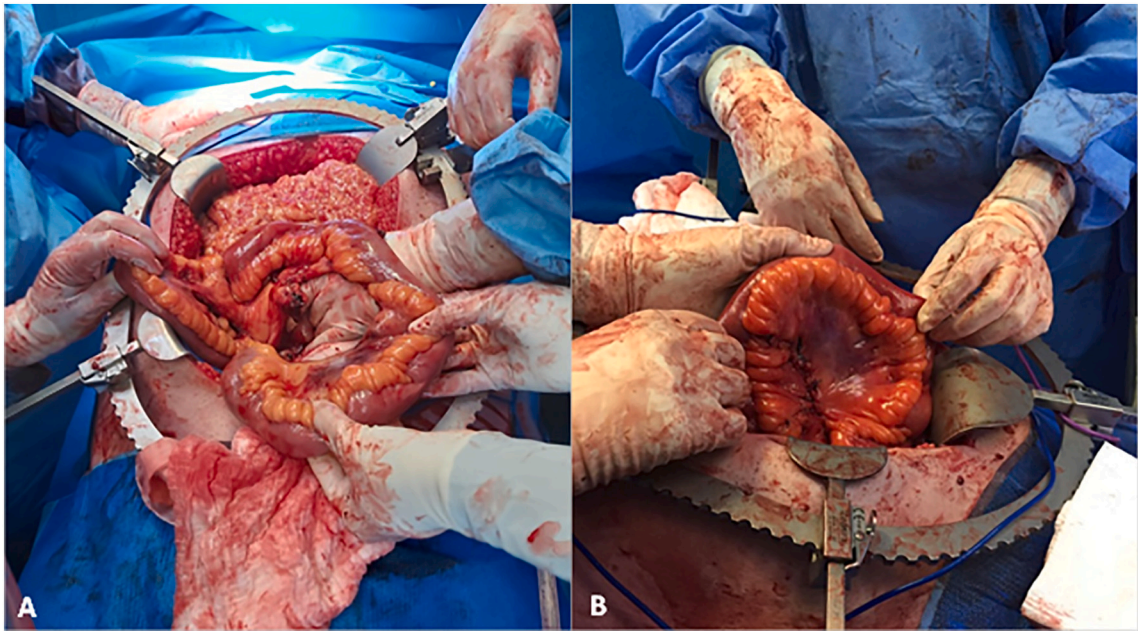


Fig. 2. A – Mesenteric laceration, B - mesentery gap closed.

clinical worsening of the patient led to the decision to perform an exploratory laparotomy. During the procedures, it was verified a laceration of the mesentery and the presence of a non-viable small bowel segment, with need of segmental enterectomy and refixation of mesenteric lacerations, avoiding future complications.

Conclusion

Mesenteric laceration is a rare traumatic injury, which diagnosis can easily go unnoticed, either due to the concomitance of other injuries, or due to the low diagnostic accuracy of the imaging exams. Taking into account the injury mechanism, a high index of suspicion is needed to detect mesenteric laceration and to not delay the correct treatment.

CRediT authorship contribution statement

All the authors have read the manuscript and have approved the submission.

Marta M. Ferreira: Corresponding and first author, conceptualization and study design, data acquisition, analysis and interpretation, article drafting and critical revision of the work for important intellectual content, performed the operation.

Narcisa Guimarães: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published.

Inês Bolais Mónica: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published.

Simone Oliveira: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published, assisted with the operation.

Daniela Pais: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published.

Sara Andrade: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published.

Alice Fonseca: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published, assisted with the operation.

Ana Couceiro: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published, assisted with the operation.

Isabel Borges: data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published.

José Valente Cecílio: Project administrator; Conceptualization, data analysis and interpretation, critical revision of the work for important intellectual content, and final approval of the manuscript to be published.

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