Introduction: The Meckel’s diverticulum is a common congenital anomaly of the gastrointestinal tract that rarely causes symptoms. Symptomatic patients usually present with haemorrhage, obstruction or inflammation of the diverticulum, however, perforation, specially following a blunt abdominal trauma is very rare. We present a rare case of an isolated diverticular rupture due to a crushing abdominal trauma.

Case Report: A 36-year-old male presented with abdominal pain after a rollover accident, in which his abdomen got stuck underneath the structure of an industrial tractor. Initial physical examination showed bruises on the hypogastric region without signs of peritonitis or haemodynamic instability. Image examination didn’t show clear signs of intraperitoneal trauma. Due to the worsening of the patient, an exploratory laparotomy was performed and revealed blood and faecal content in the peritoneal cavity, consequence of a Meckel’s diverticulum rupture. Conclusion: The rupture of the Meckel’s diverticulum is a rare cause of peritonitis following blunt abdominal trauma. A prompt surgical decision with the excision of the diverticulum is essential to control the damage in this patient.

Keywords: Abdominal trauma, Blunt trauma, Meckel’s diverticulum, Traumatic rupture

INTRODUCTION

The first time an ileal diverticulum was described, was in 1595 by Hildanus, and its embryological and pathological features were later brought to our knowledge by J. Meckel in 1809 [1]. The Meckel diverticulum (MD) occurs in 2% of the population, usually 60cm from the ileocecal valve with 5cm in length. It is more common in males and the risk of lifetime complications is 4%.

Symptomatic patients usually present with haemorrhage, obstruction, perforation or inflammation of the diverticulum [1]. MD may rupture in rare circumstances, secondary to blunt trauma [2]. The first report was made by Park and Lucas in 1970 [3]. Since then, traumatic rupture of MD has been reported only in a few published articles [1].
CASE REPORT

A 36-year-old male presented in the emergency department, after incurring in a rollover accident, getting his abdomen stuck underneath the structure of an industrial tractor. The patient was haemodynamically stable on arrival and presented bruises on the hypogastric region. Analytically, the patient had a haemoglobin within the normal range, leucocytes of 19\(^9\)/L, C reactive protein 7mg / dL, with no other biochemical changes. Blood gas at the time of admission revealed pH 7.58, pCO\(_2\) 23 mmHg, pO\(_2\) 101mmHg, lactic acid 2.1 mmol / L and HCO\(_2\) 21.8mEq / L, similar for the standard. The computed tomography scan (CT) suggested a small amount of free fluid in the abdominal cavity, without injury of massive organs or pneumoperitoneum (Figure 1A). The patient was admitted to a clinical observation unit with continuous surveillance. Two peripheral venous accesses, oxygen at 2L/min and a foley catheter were placed, so that fluid in perfusion and effective analgesia could be initiated. Vital signs and clinical reassessment were performed hourly or whenever necessary.

Within 8 hours after admission, the clinical condition of the patient deteriorated, with increase in pulse rate, fever and increased lactic acid (2.1 mmol/L to 4 mmol/L). CT was repeated and showed a small increase of the fluid in the abdominal cavity (Figure 1B). An exploratory laparotomy revealed blood and faecal content in the peritoneal cavity. We observed a Meckel’s diverticulum rupture (Figure 2), with a transverse lesion of the distal ileum mesentery and an active haemorrhage by a distal branch of the superior mesenteric artery. A raffia of the vascular lesion was performed with 6-0 prolene suture, the closure of the mesentery was performed with continuous suture with the same thread and the excision of the diverticulum was done with stapler, blue load, (by Covidien®). On observation, the remaining loops presented no evidence of traumatic lesions, the small bowel and colon with no apparent vascular compromise.

The postoperative evolution was uneventful. The histopathological examination revealed a MD with 5cm in length lined with gastric mucosa.

DISCUSSION

MD results from incomplete closure and obliteration of the proximal portion of the omphalomesenteric duct [1]. Usually, it is small and arises from the anti-mesenteric border of the ileum. The wall of the diverticulum contains all layers of the ilium and ectopic mucosa (usually gastric or pancreatic) may be present in 55% of cases [4].

Various nonspecific symptoms have been associated to MD, however only 16% are symptomatic [5]. In a patient with an acute abdomen following blunt abdominal trauma, the most probable injuries are of the liver and spleen. When perforation of a hollow viscus is suspected, attention should turn to the small bowel. They usually occur in the angle of Treitz and ileocecal region, which are relatively fixed regions. They may also be associated with abrupt and localized compression [1].

Due the low incidence of both, MD and small bowel injuries, the perforation of a MD from blunt trauma, as described in this report, is incredibly rare. To the best of our knowledge, to date, only five published cases report traumatic rupture of MD, all following road car accidents [1–3, 6]. We believe that our report is the first to describe a perforation of the MD following a crushing abdominal trauma. Risk factors include male gender, age below 50 years, presence of heterotopic mucosa and length of the diverticulum greater than 2cm [7]. The literature also refers that the presence of linear abdominal bruising (usually referred as seat belt sign) in trauma patients, is also associated with small bowel Injury [2]. In our case all these risk factors were present.

Our case is unique by the simple fact that all the image examinations were pointless in the search for the cause of the patient’s deterioration. The decision to perform surgery was made to achieve a diagnosis and to prevent further damage. This marks the importance of a proper continuous clinical evaluation, and not to only
rely in image techniques, more and more available with modern technology. In our opinion, the crush injury led to increased intra-visceral pressure which caused a rupture in a susceptible area, such as, the terminal ileum, particularly the MD.

CONCLUSION

The perforation of a Meckel diverticulum is a rare cause of peritonitis following blunt abdominal trauma. This report shows the importance of awareness in this kind of injuries to limit the morbidity associated with the delay of the surgical therapy.

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Author Contributions

Manuel Alexandre Viana Ferreira – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
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Francisco Fazeres – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
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Guarantor of Submission
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Written informed consent was obtained from the patient for publication of this case report.

Conflict of Interest
Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.

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