Paediatric case of a large gastric rupture after a blunt abdominal trauma: Report of a case in a District General Hospital

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INTRODUCTION: Isolated gastric rupture after blunt abdominal trauma is rare. In current literature gastric rupture from blunt abdominal trauma ranges between 0.02% and 1.7%. This document reports the first non-motor-vehicle case of an isolated gastric rupture after blunt abdominal injury, which repaired after early diagnosis and aggressive surgical treatment.

PRESENTATION OF CASE: A 14-year-old boy attended our emergency surgical department after sustained a blunt abdominal trauma following a fall from his bicycle. He presented with pain and left para-umbilical abdominal ecchymoses. Examination revealed subcutaneous emphysema and a palpable abdominal wall dimple.

DISCUSSION: Radiological examination with CT scan determined the need for exploratory laparotomy. Operation revealed, extensive rupture of the left lateral border of the rectus abdominus muscle, free intra-peritoneal position of the nasogastric tube with gross spillage of gastric contents and pneumoperitoneum observed with 7–8 cm full thickness rupture of anterior stomach wall, from the lesser to the greater curvature. Primary, two-layer closure was performed. On the 5th post-operative day he developed gastorrhagia. He was discharged on the 15th postoperative day.

CONCLUSION: We present this case report focusing on the paediatric patient to illustrate isolated gastric injury in terms of mechanism of injury, clinical presentation, and immediate surgical management.

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1. Introduction

In children between the ages of 1 and 14 years, trauma is considered to be the major cause of morbidity and mortality. Around 10% of paediatric hospital admissions occur due to abdominal trauma and 80% of these as a result of blunt trauma. Penetrating injuries in children are reported in the literature with prevalence of 8–12% of the abdominal trauma. Blunt mechanism of trauma to the abdomen commonly occurs due to motor vehicle accidents; however other causes could be seat-belt injuries, vigorous resuscitation and fall from height. Trauma of the gastrointestinal tract in children following blunt abdominal trauma varies from 4 to 15% and is calculated around 3% of abdominal trauma injuries. In current literature gastric rupture from blunt abdominal trauma is even rarer; ranges between 0.02% and 1.7%. Isolated gastric rupture without being associated with intra and extra-abdominal injuries is uncommon after blunt abdominal trauma. We report a rare case of a non-motor-vehicle isolated gastric rupture after blunt abdominal injury, which repaired after early diagnosis and aggressive surgical treatment.

2. Presentation of case

A 14-year-old boy sustained a non-motor vehicle collision with his bicycle 1 h after eating a large meal. The emergency medical nurse reported that he has been vomiting in transit and he was clammy and dehydrated. On arrival the boy was haemodynamically stable with a mild tachycardia. He reported abdominal pain severe in nature. On examination he had a palpable looseness of the left side of his abdomen with intestinal loops protruding through a visible gap associated with left para-umbilical ecchymoses. The most pertinent clinical examination finding was continuous abdominal pain associated with surgical emphysema and a palpable abdominal wall dimple.

A chest X-ray showed no evidence of any chest acute injuries and free air under the diaphragm. After resuscitation, a computed tomography (CT) scan of the abdomen and pelvis was performed (Fig. 1). The CT scan with intravenous contrast of the abdomen and pelvis determined the need of exploratory laparotomy due to intra-peritoneal gas due to a hollow viscous organ injury. Upon return from CT scan, a nasogastric tube revealed a bilious fluid with food mixture and no evidence of blood.

The operation revealed a large rupture of the left lateral border of the rectus abdominus muscle. The intra-peritoneal position of the nasogastric tube along with pneumoperitoneum was the immediate signs. The defect was approximately 7–8 cm full

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3. Discussion

We report a rare case of gastric rupture in a paediatric patient to specify the significant importance of accurate diagnosis and early treatment. Approximately 75% of gastric rupture cases in blunt abdominal trauma occur due to motor vehicle collisions. Other causes are, assaults, falls, motor versus man injuries, and rarely cardiopulmonary resuscitation. In our case there was a history of heavy meal consumption, which is reported in current literature in other similar cases of blunt abdominal trauma. Fizzy drinks consumption is considered to be another risk factor that increases gastric distension during injury.5,7 Fizzy drinks consumption is not recorded in this case.

Patients with gastric rupture occasionally present with haemodynamic instability and sings of acute abdomen. In this case, the patient presented with signs of acute abdomen and abdominal distension, which indicated that the injury was not contained within the lesser sac. Clinical examination signs to establish diagnosis is difficult in gastric rupture. Patients with suspected abdominal injuries after blunt injury require radiological investigation with CT scan. The relevance of CT scan in such cases is debatable as in rare cases CT reports do not reach preoperative diagnosis. Furthermore, CT scan is time consuming and might cost crucial time for the patient post-operative outcome. On the other hand, scanning with CT is the optimal approach with high sensitivity to identify accurately association of hollow viscous or solid organ and vascular injury in haemodynamically stable patients. The decision for surgical treatment is mandatory in cases with acute abdomen after trauma and haemodynamic instability which do not fit time for radiological investigations.

Computerised tomography in patients with blunt trauma with free intra-peritoneal air or fluid collection, stomach dilatation and intra-peritoneal positioning of the nasogastric tube indicates gastric rupture. Another radiological sign could be the presence of extra luminal contrast when the CT scan is performed with oral contrast. In this case, CT scan reported free intra-peritoneal air in minimum quantity, a large anterior gastric wall disruption with extra-luminal contents and subcutaneous emphysema of the left anterior abdominal wall.

The importance of the erected chest X-ray is debatable. Its value is substantial to identify intra-peritoneal free air under the diaphragm although fails to identify pnuemo-peritoneum due to the positioning of the patient in supine position. Diagnostic peritoneal lavage could reach diagnosis when food, bile particles or blood is detected. In this case, the patient entered the operation theatre immediate after the CT scan report was received.

The abdominal contents are very susceptible to injuries in children because the abdominal wall is thin, the diaphragm is more horizontal and the ribs are very elastic.8 Although some authors find that the incidence is higher in childhood, other reported series failed to demonstrate such a correlation with age.9 In our case, we observed bowel protrusion through the abdominal wall gap and association of surgical emphysema. These features were
disproportional to the mechanism of injury, and thus re-enforce the above theory. Moreover the presence of surgical emphysema and the continuous abdominal pain associated with pallor made the differential diagnosis broader and unclear. The necessity to enter the theatre for exploratory laparotomy and immediate management was mandatory.

Blunt abdominal trauma in children carries high mortality, normally due to associated injuries.\(^9\) The repair of the gastric rupture with two-layer suture and the air test ensure any missing perforations.\(^7\) Adequate peritoneal lavage could minimise complications from intra-peritoneal contaminations and abscesses peri-operatively. Septic shock and intra-peritoneal abscess are the most common complications but in our case gastorrhagia and stress-ulcer developed.

4. Conclusion

This case report mentions the importance of increase awareness from emergency surgeons to identify single human momentum free collisions with such a large intra-abdominal injury. We report this case to alert surgeons within emergency and trauma centres about the clinical presentation, severity of injuries from simple mechanisms. CT scan helps for prompt diagnosis. Early and aggressive management is vital to improve patient’s survival.

Conflict of interest statement

All authors including Georgios Pafitanis, Spiros Koulas, Stavros Bikos and Evangelos Tsimoyiannis have no conflicts of interests.

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Georgios Pafitanis, Spiros Koulas, and Stavros Bikos had done the study design. Stavros Bikos had done data collection. Georgios Pafitanis, Spiros Koulas, and Evangelos Tsimoyiannis had prepared the text material.

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