

Delayed rupture of occult splenic injury: a case report

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We report on a case of splenic rupture that presented eleven days after a trivial injury. Possible explanations of the delay in presentation and ways for early detection are discussed. Emergency physicians should always bear this entity in mind before discharging patients with left thoracoabdominal injury. (*Hong Kong j. emerg.med.* 2003;10:188-190)

Keywords: Abdominal injuries, haemoperitoneum, nonpenetrating, splenic rupture, wounds

Introduction

The spleen is the most commonly injured organ after blunt abdominal injury (40-55%).¹ Most patients presented acutely with symptoms of haemodynamic instability or acute abdominal signs attributed to haemoperitoneum. Delayed splenic rupture is defined as late occurrence of symptoms and signs, in patients who experience no initial haemodynamic instability or clinical symptoms, 48 hours or more after injury.² The importance of delayed splenic rupture lies in the relatively high mortality rates (5-15%)^{3,4} as compared with those with acute splenic rupture (1%).^{1,5}

Case report

A 37-year-old Caucasian male presented to the emergency department after being assaulted by an unknown person. He was hit at the head, right thigh and left posterior chest wall with a torch. There was no history of loss of consciousness. He denied any abdominal pain or injury. On examination, the blood

pressure was 119/67 mmHg and pulse rate was 86 beats per minute. The oxygen saturation in room air was 98% and respiratory rate was 18 per minute. He was alert and orientated, with Glasgow coma scale score of 15/15. Chest examination revealed symmetrical chest expansion and equal air entry. Cardiovascular examination was unremarkable. The abdomen was soft and non-tender. There was slight tenderness over the left posterior chest wall with some bruising. There were two one-centimetre lacerations on the left parietal region. Skull radiography was normal. Both the posteroanterior and left oblique chest radiographs showed no rib fracture, with normal lung fields and clear costophrenic angles. After suturing of the scalp lacerations, the patient was discharged home with oral analgesics and advice sheet on head injury.

Eleven days later, the patient re-attended the emergency department because of sudden onset of severe epigastric pain radiating to the left shoulder, associated with sweating. On examination, the blood pressure was 140/82 mmHg and pulse rate was 100 beats per minute. Oxygen saturation in room air was 96% and the respiratory rate was 22 per minute. The abdomen was slightly distended. There was tenderness and guarding over the epigastrium. Murphy's sign was negative. The chest was clear. The electrocardiogram taken at that time showed normal sinus rhythm and no ischaemic changes. Chest radiograph showed normal lung fields and mediastinal width, with no free gas under the diaphragm. Left lateral decubitus

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abdominal radiograph confirmed no free peritoneal gas, but revealed medial displacement of the gastric bubble. (Figure 1) Bedside abdominal ultrasonography performed by emergency physician raised the suspicion of free peritoneal fluid, while the hepatobiliary system was unremarkable. He was admitted to the surgical unit with a provisional diagnosis of peritonitis.

Computed tomography of the abdomen revealed a splenic laceration with perisplenic haematoma. (Figure 2) There was generalized haemoperitoneum over both upper abdomen and the pelvis. After two days of close observation, emergency laparotomy was performed. Pre-operatively, pneumococcal vaccine prophylaxis was given. Intra-operatively one liter of blood was found in the peritoneal cavity, and a five-centimetre long laceration was detected over the lower pole of the spleen. The splenic pedicle was torn. Splenectomy was done. Histological examination of the spleen showed no underlying abnormality. Post-operatively, the patient had thrombocytosis (platelet count $1,166 \times 10^9/L$ on Day 5) which returned to normal after a period of close monitoring. No anticoagulant was given. The patient recovered uneventfully and was discharged home nine days later.

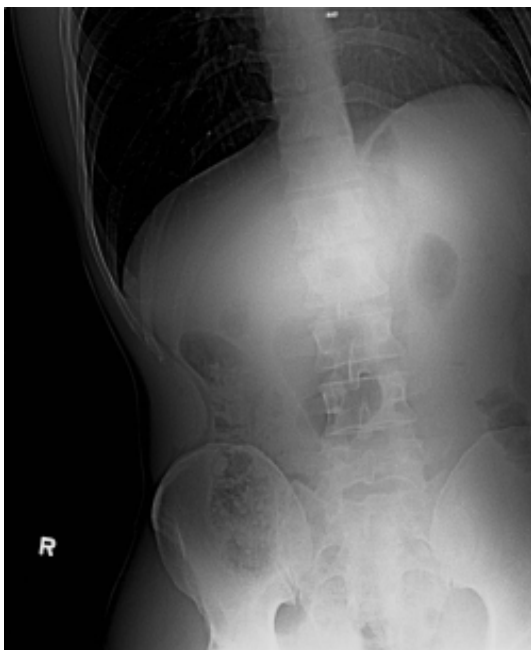


Figure 1. Left lateral decubitus abdominal X-ray showing medial displacement of the gastric bubble.

Discussion

The mechanism of delayed splenic rupture is not known. There are two predominant theories in the literature. The first theory describes a perisplenic haematoma that has been temporarily sealed off by surrounding organs and structures like omentum, only to rupture freely into the peritoneal cavity at a later time.⁶ The second, more widely accepted theory proposes increasing subcapsular tension, most probably from clot lysis and increasing oncotic pressure, as a cause of delayed rupture.⁷ Traditionally, it is believed that in most cases, the delay is mainly in diagnosis or recognition, rather than the time of rupture.^{1,2,4,6} However the case series published by Kluger et al did point to the existence of genuine splenic injury in evolution and delayed splenic rupture.² Simpson and Ajuwon reported a case of occult splenic injury presenting with jaundice as a result of haemolysis.⁸ In the literature, there are reported delayed ruptures ranging from less than a month to several years (Schultz: 23 days,⁹ Deva: 5.5 years¹⁰).

Our patient presented with classical Kehr's sign, which is pain and paraesthesia radiating to the left shoulder. It is due to sub-diaphragmatic irritation, mediated through afferent fibres of the phrenic nerve. As the peritoneal signs developed eleven days after the injury



Figure 2. Computed tomograph of the abdomen showing splenic laceration with generalized haemoperitoneum.

and the symptoms and signs were abrupt in onset, we believed that this case was more likely to be a true case of delayed rupture of the spleen.

Plain abdominal radiographic signs of splenic rupture include elevated left hemidiaphragm, left pleural effusion, left basal atelectasis and fractured left lower ribs. Left upper quadrant mass may be found with medial displacement of the gastric bubble or inferomedial displacement of the splenic flexure of the colon. There may be increased soft tissue density between descending colon and properitoneal line (fat superficial to peritoneum).

Bedside ultrasonography (FAST or Focused Abdominal Sonography in Trauma) has emerged as a quick and efficient method for detection of haemoperitoneum in blunt abdominal injury patients. It has a comparable sensitivity and specificity (83-87%; 97-100%)¹¹ to computed tomography (74-97%; 98-99%)¹² and diagnostic peritoneal lavage (87-99%; 97-98%)¹³ respectively. It can be performed with ongoing resuscitation simultaneously. It is safe, non-invasive, and inexpensive. Sonographic signs of splenic injury include splenomegaly, irregular splenic border, intrasplenic fluid that represents a splenic haematoma, splenic heterogeneity representing pericapsular or subcapsular haematoma, contusion or free peritoneal fluid.¹⁴ However, ultrasonography performs poorly for low-grade splenic injury (American Association for the Surgery of Trauma scale I or II). It is most sensitive to detect grade III or above splenic injuries based on the presence of haemoperitoneum.¹⁵ In case of doubt, computed tomography remains the gold standard for diagnosing and precisely assessing the severity of splenic injury, provided that the patient is stable.

In conclusion, we presented a case of delayed splenic rupture with no clinical abdominal signs or haemodynamic instability after the initial apparently trivial injury. Retrospectively, we believed that the splenic injury was probably related to the blow over the left posterior chest wall. However, it was probably a genuine case of splenic injury in evolution, as the lesion only presented itself suddenly eleven days after injury. Careful clinical assessment, with high index of suspicion, liberal use of imaging, and even

diagnostic peritoneal lavage have been suggested to minimize the risk of 'delayed recognition' of splenic injury.^{1,3} Bedside ultrasonography emerges as an easily available, highly sensitive and specific, fast and non-invasive method for emergency physicians to detect major intra-abdominal organ injuries, and is especially recommended. Emergency physicians should bear in mind and patients informed about the remote possibility of delayed splenic rupture before the latter are discharged.

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