CASE REPORT

Traumatic gallbladder rupture: a patient with multiple risk factors

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SUMMARY

Isolated gallbladder rupture following blunt thoracoabdominal trauma is rare; gall bladder rupture is seen in <1% of blunt abdominal trauma. This case report describes a significant mechanism of blunt force injury resulting in an isolated gallbladder rupture. Risk factors for traumatic gallbladder rupture are reviewed and the authors propose that a stiff, cirrhotic liver may exacerbate shear forces in the gallbladder fossa and represents an important risk factor for blunt gallbladder injury. Cholecystectomy remains the definitive management for gallbladder trauma. Almost all gallbladder injuries following blunt trauma are associated with other significant intra-abdominal injuries and in the setting of acute trauma, the authors recommend an open procedure to facilitate a detailed exploration of the peritoneal cavity to exclude associated injuries.

BACKGROUND

The gallbladder is a pear-shaped, fibromuscular sac.^{1 2} It is located within the gallbladder fossa on the visceral surface of the right lobe of the liver, sheltered by the right costal margin, the liver and adjacent alimentary tract. Its protective anatomical location likely accounts for the considerably low incidence of traumatic gallbladder injuries following blunt abdominal trauma (BAT). However, if this protective position is breached due to blunt force and produces a gallbladder injury, other serious intra-abdominal injuries are almost always present (>98% incidence of concomitant intra-abdominal pathology is described in the literature, commonly a liver or major intra-abdominal blood vessel injury).^{3 4} It is these associated injuries that most frequently determine patient management and prognosis. Subsequently, the mortality associated with gallbladder injuries is reflective of the mortality resulting from concomitant injuries.⁵

Gallbladder rupture is most commonly due to penetrating trauma and there are seldom published reports that attribute an isolated gallbladder rupture to BAT.⁶ A delay in diagnosis of isolated gallbladder ruptures is not uncommon as initial symptoms are often vague, before a period of clinical deterioration resulting from bile peritonitis.⁷ Delayed detection of trauma to the extrahepatic biliary system is associated with high morbidity.⁴ This report serves to increase clinician awareness of probable risk factors for traumatic gallbladder perforation in order to focus diagnostic suspicion and enhance early detection.

CASE PRESENTATION

A young male was admitted to our level 1 trauma centre after consuming 750 mL of bourbon and jumping off an overpass onto a road, from a height of 10 m, attempting suicide. The incident was witnessed by bystanders. He had an extensive history of chronic alcohol consumption and hepatitis C from intravenous drug use but no known cirrhosis. He was intubated at the scene without sedation due to a respiratory arrest secondary to a closed head injury and acute alcohol intoxication. Transport time from injury scene to hospital was about 30 min and the patient was haemodynamically stable throughout the transfer (heart rate 88/min, blood pressure 115/61 mm Hg). He had received 1000 mL of normal saline during transport. In the resuscitation room, he presented haemodynamically stable and normothermic, with warm and perfused extremities, and without the need for cardiovascular support. Standard ATLS protocol was followed. On admission, he was noted to have a metabolic acidosis (pH 7.30, base excess -7.9 mmol/L, lactate 3.3 mmol/L), in excess of that expected from his inebriation.⁸ The primary and secondary surveys were normal apart from the signs of the closed head injury and closed fractures of the ankle, elbow and patella. Other admission blood tests, including routine biochemistry, coagulation profile and full blood count, were all within normal limits. No haematuria was present on urinalysis. Images from the focused assessment with sonography for trauma scan incidentally demonstrated echogenic material in the gallbladder (figure 1). CT imaging was obtained within 30 min of patient arrival.

An abdominal CT demonstrated low-density (~40 Hounsfield Units) fluid between the

Figure 1 Ultrasonographic findings at focused assessment with sonography for trauma scan.

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gallbladder wall and liver, tracking into the hepatoduodenal ligament, but without extension into the free peritoneal space. A progressive contrast blush was demonstrated within the gallbladder, on the arterial (figure 2) and portal venous (figure 3) phase. An area of discontinuity of the normally enhancing gallbladder wall indicated a likely rupture (figure 3). The CT head and spine were normal.

The patient was brought to the operating theatre on an emergent basis (within 1 hour of patient admission), and a

Figure 2 Arterial phase CT abdomen.

Figure 3 Portal venous phase CT abdomen.

Figure 4 Operative findings.

Figure 5 Pathological specimen.

laparotomy performed. Free peritoneal bile was encountered particularly in the right upper quadrant, about a grossly distended and tense gallbladder. There was no intraperitoneal blood (figure 4). Macronodular cirrhosis of the liver and other findings suggestive of portal hypertension, such as a moderately enlarged spleen and enlarged upper abdominal vessels, were also present. A cholecystectomy was performed. No other abdominal injuries were identified. The gallbladder specimen demonstrated a longitudinal tear in its hepatic surface, and a clot occupied the gall bladder lumen (figure 5). The orthopaedic injuries were attended at the end of the laparotomy. The patient was extubated the following day, and made an uneventful recovery.

OUTCOME AND FOLLOW-UP

The patient made an unremarkable recovery and was followed by his primary healthcare provider.

DISCUSSION

A review of the literature demonstrates a number of case reports of gallbladder trauma, as well as several small case-series.^{3–6} BAT is associated with a spectrum of injury, ranging from contusion to lacerations and frank avulsions of the gallbladder, and a high index of suspicion is required to diagnose this relatively uncommon injury.

This case patient had a unique combination of multiple risk factors for gallbladder rupture. First, the acute alcohol consumption increases the tonicity of the sphincter of Oddi, reducing the capacity for acute decompression into the alimentary tract.⁹ Second, the patient has a normal, thin-walled gallbladder, free of chronic inflammatory changes that may resist greater shear forces.¹⁰ Finally, we propose that the stiff, cirrhotic liver (as observed during laparotomy) may exacerbate shear forces in the gallbladder fossa. This probable risk factor has not been previously described in the literature (PubMed, Embase, Ovid, MEDLINE).

A cholecystectomy is the definitive management for gallbladder trauma.¹¹ While laparoscopic approaches have been described,¹² we favour an open procedure in the setting of acute trauma, as this facilitates an exploration of the peritoneal cavity to exclude associated injuries; laparoscopic approaches have largely been described in situations of a delayed diagnosis, where solitary organ pathology is more certain.

Learning points

- ▶ The authors' propose that a stiff, cirrhotic liver may exacerbate shear forces in the gallbladder fossa and represents an important risk factor for blunt gallbladder injury.
- ▶ Active intraluminal bleeding within the gallbladder lumen is a rare finding on contrast-enhanced CT imaging.
- ▶ In the setting of acute trauma and suspected gallbladder injury, the authors suggest that a laparotomy and open cholecystectomy is the preferred surgical approach compared with laparoscopy.

Competing interests None declared.

Patient consent Obtained.

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