CASE REPORT

Laparoscopic treatment of an isolated gallbladder rupture following blunt abdominal trauma in a schoolboy rugby player

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Laparoscopic treatment of an isolated gallbladder rupture in a schoolboy rugby player resulting from blunt abdominal trauma has not previously been reported. A case report of this rare occurrence is presented together with a brief review of the literature.

CASE REPORT

A healthy 18 year old schoolboy rugby player was admitted to the emergency department with acute abdominal pain after having been involved in a midair collision during a rugby practice. The player sustained a direct blow to his upper abdomen from an opponent's knee.

On admission, examination of his abdomen disclosed epigastric and right iliac fossa tenderness. Signs of right upper quadrant (RUQ) peritonitis were not obvious, and bowel sounds were normal. Blood analysis showed a haemoglobin concentration of 17.4 g/100 ml, a white cell count of $8.4 \times 10^9/l$, and an amylase concentration of 50 mg/100 ml. Urine analysis was normal. Electrocardiography showed a sinus rhythm of 62 beats/min, and there were no features of cardiac contusion. Chest and abdominal roentgenograms were unremarkable. Ultrasonography showed a mobile filling defect in the lumen of the gall bladder (fig 1). No liver or pancreatic injury was noted.

Figure 1 Ultrasound scan showing a mobile filling defect in the gall bladder indicating a possible gallbladder injury.

A diagnosis of possible gallbladder injury was considered and a conservative treatment approach was adopted. The patient was admitted to hospital, observed for 36 hours, and later discharged asymptomatic with a soft, non-tender abdomen.

The patient was readmitted to the emergency department 72 hours later with jaundice, RUQ peritonitis, and bilirubinuria. Blood analysis showed a white cell count of $8.2 \times 10^9/l$, total bilirubin concentration of 54 $\mu\text{mol/l}$, unconjugated bilirubin concentration of 39 $\mu\text{mol/l}$, conjugated bilirubin concentration of 15 $\mu\text{mol/l}$, and a lactate dehydrogenase activity of 686 U/l.

A contrast enhanced computed tomographic scan showed leakage of contrast from the region of the porta hepatis into the right iliac fossa. Biliary isotope (hepatic iminodiacetic acid) scintigraphy confirmed free intra-abdominal leakage of bile from the fundal end of the gall bladder.

Abdominal laparoscopy showed RUQ biliary peritonitis. The omentum was oedematous, hyperaemic, and adherent to the gall bladder and liver. The gall bladder was oedematous, and an irregular tear in the fundus was evident. There were no associated organ injuries. Suturing the gall bladder was not considered a reliable option in this case, and laparoscopic cholecystectomy was performed. The patient's recovery was uneventful.

The histology specimen showed the presence of granulation tissue and reactive fibroblastic proliferation. This suggests that the rupture occurred at least 48 hours previously and was partially sealed by the omentum and intestine.

DISCUSSION

Injuries to the gall bladder resulting from blunt abdominal trauma occur rarely¹ and are usually associated with damage to other abdominal organs.²⁻³ Isolated perforation of the gall bladder is rare because of the protected anatomical position of this hollow viscus.²⁻⁴ Only two cases of isolated gallbladder rupture following sport related blunt injury have been described in the English literature.⁵⁻⁶ The injuries occurred in soccer and wrestling.

This is the third case of isolated gallbladder rupture following sport related blunt abdominal injury to be reported in the literature and the first to be reported in rugby football. The case is also unique as the injury was treated laparoscopically.

Laparoscopic and pathology findings suggest that a rupture in the fundus of the gall bladder occurred at the time of injury. This tear was partially sealed by omentum and intestine. A continued bile leak into the right hypochondrium produced jaundice, RUQ peritonitis, bilirubinuria, and raised levels of conjugated bilirubin. Soderstrom *et al*² reports that it is not unusual for a patient with gallbladder injury to be discharged from hospital, only to return days to weeks later with signs or symptoms of peritonitis and jaundice.

Gallbladder injury is usually first apparent at the time of surgery for associated abdominal injuries.²⁻⁷ The diagnosis of

Take home message

Blunt abdominal trauma is often overlooked as there may be no visible signs on the abdomen wall. It is important to follow up patients closely and look for early signs of organ damage, as signs may become apparent later. A combination of special investigations may be required to confirm the diagnosis.

gallbladder rupture in this case was made before surgery by the use of contrast enhanced computed tomography and biliary isotope scintigraphy.

Blunt abdominal trauma often leaves no external sign of injury, therefore its seriousness may be underestimated or an injury completely overlooked. Early diagnosis of gallbladder rupture is important, as a delay in the diagnosis is associated with morbidity and mortality. However, less costly and less invasive investigations do not provide a definitive. Roentgenographic studies are of little value in diagnosing gallbladder injury,² although a right hypochondrial mass indenting the colon may alert one to this injury.⁸ Contrast enhanced computed tomography is a sensitive tool for the diagnosis of abdominal injury⁹ and is therefore an important adjunct for diagnosing gallbladder rupture. Biliary isotope scintigraphy on its own may not show enough detail,¹⁰ and in our case this investigation was combined with computed tomography. Magnetic resonance imaging and endoscopic retrograde cholangiopancreatography are other possible diagnostic modalities that can be used to investigate blunt abdominal trauma. The former can distinguish blood from bile; however, blood would not be expected to be found after an isolated gallbladder injury.¹⁰ Endoscopic retrograde cholangiopancreatography can give more information about the injury, especially when the liver parenchyma is injured.¹⁰ Unfortunately, some findings can be deceptive and not show the full extent of the injury.¹⁰

Abdominal laparoscopy will provide a definitive diagnosis, but is costly, invasive, and difficult to justify when symptoms and signs are vague.

Traditionally gallbladder injuries are treated by cholecystectomy, unless the tear is small and can be easily sutured or there is a partial avulsion of the gall bladder from the liver bed that can be reattached.¹⁰ In our case, the delay in the diagnosis had resulted in the tear not being amenable to suturing.

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COMMENTARY

This interesting case report of an isolated rupture of the gall bladder caused by a blunt sports injury highlights the insidious onset of bile peritonitis and the role of both diagnostic and therapeutic laparoscopy in this setting. The paper also raises the important question of an appropriate diagnostic imaging algorithm in patients with suspected blunt abdominal injury who are otherwise haemodynamically stable. Most would agree that an ultrasound scan should be carried out as the initial investigation and, if the nature or extent of the injury cannot be clearly defined, the next investigation would be a computed tomography scan. It is doubtful, however, whether the yield of investigations such as biliary isotope scintigraphy, magnetic resonance imaging (MRCP), and endoscopic retrograde cholangiopancreatography (ERCP) would be cost effective once there is a suspicion of injury to the gall bladder per se. Certainly ERCP should be avoided, as the risk of inducing pancreatitis would outweigh its benefit. In this respect MRCP should now be regarded as the preferred imaging when there is suspicion of injury to the biliary system.

The role of laparoscopy in trauma has received much attention in recent times with the advent of video laparoscopy. Unfortunately there is still a paucity of prospective randomised trials to clearly define its role in both penetrating and blunt abdominal injuries. However, in cases such as rupture of the gall bladder, where laparoscopy could fulfil both a diagnostic and therapeutic role, there would be little doubt of this being a cost effective approach.

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