

## CASE REPORT

# Rare Coincidence of Gallbladder Perforation in Blunt Traumatic Injury: A Case Report

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### ABSTRACT

Traumatic gallbladder perforation is an unusual but potentially life-threatening injury that can occur following blunt or penetrating abdominal trauma. A 46-year-old male presented to the emergency department following a motor vehicle accident (MVA). He complained of severe abdominal pain and sustained ecchymosis with localized tenderness over the right upper quadrant. Despite a positive focused assessment with sonography in trauma scan, initial computed tomography of the abdomen revealed grade 1 liver and splenic injury but was unable to identify gallbladder perforation. He was initially managed conservatively until he developed secondary signs of sepsis after 24 hours. An exploratory laparotomy revealed a perforated gallbladder. A subtotal cholecystectomy was done. A retrospective review revealed a missed gallbladder perforation from an earlier CT scan assessment. We report a case of missed gallbladder perforation following MVA which was only diagnosed intraoperatively after failing non-operative management, following which the patient underwent laparotomy and subtotal cholecystectomy.

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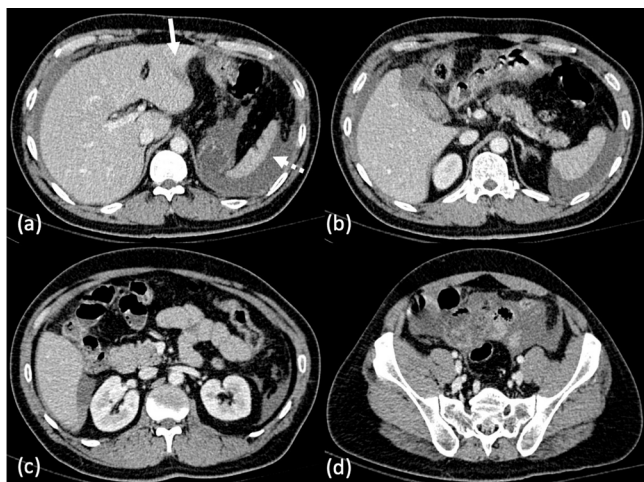
### INTRODUCTION

Trauma is a major cause of morbidity and mortality worldwide including in Malaysia, in which motor vehicle accident (MVA) remains the commonest cause (1). Traumatic gallbladder perforation is an unusual but potentially life-threatening injury that can occur following blunt or penetrating abdominal trauma. The diagnosis of gallbladder perforation can be challenging. Imaging studies may be inconclusive and also associated with other intra-abdominal injuries (2). Preoperative diagnosis of gallbladder perforation is rare in traumatic blunt injury but upon reassessment, this diagnosis should be considered. Exploratory laparotomy often revealed the diagnosis and delayed diagnosis may lead to a poorer prognosis, with high morbidity and mortality rate. We report a case of a 46-year-old male who had a missed gallbladder perforation following MVA which was only diagnosed intraoperatively after failing non-operative management, following which he underwent laparotomy and subtotal cholecystectomy.

### CASE REPORT

A 46-year-old male presented to the emergency department following an MVA. He appeared intoxicated but vital signs were stable. He complained of severe abdominal pain on admission. On examination, there was localized tenderness over the right upper quadrant with ecchymoses on the upper chest. These features were suspicious towards solid organ injury. Initial laboratory tests revealed a leukocytosis, high lactate with normal renal profile and liver function test. Focused assessment with sonography in trauma scan revealed an intraperitoneal free fluid. Computed tomography (CT) scan of the abdomen and pelvis revealed a liver contusion (grade 1) and a spleen laceration (grade 1) with the presence of free fluid in the pelvis and paracolic gutters [Fig. 1].

The patient was initially managed non-operatively in view of hemodynamic stability. However, 24 hours later, he developed signs of sepsis with fever, tachycardia, and leukocytosis. The patient then consented to the operation suspecting solid organ injury. We proceeded with exploratory laparotomy. Intraoperative findings revealed blood mixed with bile oozing from the perforated gallbladder [Fig. 2]. We performed subtotal



**Figure 1:** Axial images of the contrast-enhanced CT of the abdomen from (a) to (d) showing free fluid at perihepatic and perisplenic regions with (a) liver contusion (solid arrow) and splenic lacerations at its superior pole (dashed arrow), (b) gallbladder with pericholecystic fluid and (c, d) hyperdense layering in the Morrison's pouch suggestive of hemoperitoneum.



**Figure 2:** Cholecystectomy specimen showing perforation at the body of gallbladder.

cholecystectomy, a reconstituting type as we could not locate the Calot's triangle intraoperatively and the perforation occurred at the level of the infundibulum of the gallbladder. Therefore, approximately 75% of the gallbladder was removed and the remaining tissues were sutured via reconstituting type. Other solid organs appeared to be normal. A subtotal cholecystectomy was performed. The patient was admitted to the intensive care unit postoperatively. The patient's recovery was uneventful and was discharged well on post-operation day 15. Upon review in our surgical outpatient clinic at 1 month, he was well.

## DISCUSSION

Traumatic gallbladder perforation is rare but potentially life-threatening. The majority of gallbladder injuries are caused by blunt trauma, with penetrating trauma

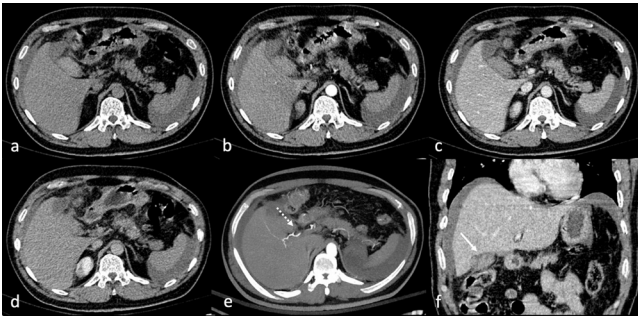
accounting for only a small percentage. There is only about 2% of patients diagnosed with gallbladder injuries via laparotomy after blunt trauma (3). Diagnosis can be very challenging and often results in delayed subsequent management as in our case.

Gallbladder perforation can be difficult to diagnose, as the symptoms and signs are often non-specific and delayed. The commonest presentation includes severe upper abdominal and fever. However, these symptoms are masked in other abdominal injuries. As in our case, the diagnosis was delayed as the initial patient presentation and CT findings were concordant. However, after 24 hours, the patient develops signs of sepsis. Following reassessment, there was a high index of suspicion of solid organ injury and the patient was subsequently subjected to exploratory laparotomy.

The clinical manifestations of blunt gallbladder injury are nonspecific and range from an acute abdomen to a steady progression of abdominal symptoms (2). The symptoms can also be masked with other concurrent intraabdominal injuries. We initially suspected that the patient's increasing upper abdominal pain was caused by liver injury.

The roles of CT scans can be helpful in the diagnosis of gallbladder perforation, but always insignificant. CT findings suggest gallbladder perforation includes pericholecystic fluid, bile in the peritoneal cavity, and gallbladder wall thickening. A high index of suspicion is necessary to detect this relatively uncommon injury as it is linked with a spectrum of imaging findings, in which the most common are perforation, contusion, or avulsion (2). Other CT findings suggestive of a gallbladder injury include distorted gallbladder wall contour with focal mural defect and contrast leakage from the porta hepatis into Morrison's pouch (5). Moreover, by utilizing maximum intensity projection (MIP) in the arterial phase of the CT, contrast extravasation from a tear of the cystic artery or its branches may be seen either in the lumen or pericholecystic region (5). Complete or total avulsion of the gallbladder leads to the displacement of the gallbladder from its fossa. Delayed imaging can be useful in detecting progressive slow bleed evident by increasing attenuation or volume of the intraluminal dense fluid in the gallbladder or in the Morrison's pouch. Other conditions that can mimic intraluminal gallbladder clotted blood on CT scans include vicarious contrast excretion and milk-of-calcium bile (4).

In our patient, there was a perihepatic free fluid with hyperdense fluid layering in Morrison's pouch, and hence this raises the suspicion of possible grade 1 liver injury although there were no obvious liver lacerations or parenchymal hematoma seen. Reviewing the images retrospectively [Fig. 3], the medial wall of the gallbladder appeared distorted and a focal wall defect is better depicted on coronal reconstructed images. Intraluminal



**Figure 3:** Upon retrospective review, axial images of multiphase CT of the abdomen at the level of the gallbladder in (a) non-contrasted, (b) arterial, (c) portovenous, and (d) delayed phases showing distorted gallbladder contour with intraluminal hyperdensity showing no interval attenuation increase suggestive of blood clots. Maximum intensity projection (MIP) in the arterial phase showing (e) abrupt truncation of the cystic artery (dashed arrow) with no arterial blush to suggest active bleed. Coronal reformatted image showing (e) perforated gallbladder with focal wall defect in the superior aspect of its body

gallbladder hyperdense content was seen in the non-contrasted phase which does not show an interval increase in attenuation in dynamic phases suggestive of intraluminal clotted blood. MIP in the arterial phase shows truncation of the cystic artery with no evidence of active arterial bleeding. This corresponds to the intraoperative findings, whereby upon the evacuation of blood clots, an arterial spurt was noted coming from the cystic artery. Hence, we can conclude that the hyperdense fluid layering in Morrison's pouch is blood clots which tracts from the porta hepatis as a result of initial active arterial bleed from the cystic artery which was subsequently tamponade by both intraluminal and pericholecystic blood clots resulting in its truncated appearance in CT. The splenic lacerations seen on CT were not detected intra-operatively.

The management of gallbladder perforation varies on the severity of the injury and the patient's clinical condition. Cholecystectomy is the gold standard treatment for severe gallbladder injuries, particularly in the case of perforation, which requires immediate surgical intervention. The role of laparoscopy in trauma is debatable and requires a learning curve. We proceeded with exploratory laparotomy and subtotal cholecystectomy. Non-operative management of gallbladder injury is not recommended and is rarely described in the medical literature, but it may be considered for high-risk surgical patients. Under these instances, percutaneous cholecystostomy which is a bedside procedure can be done to drain the blood clots and biloma (5). Besides damaged control gallbladder

surgery, other methods have been described in the literature including the identification and ligation of the cystic duct, and coagulation of small bleeding points, followed by placement of drain. Due to its rarity in the incidence of less than 2%, treatment of gallbladder injury following trauma should be individualized and tailored according to the patient's condition (5).

## CONCLUSION

Traumatic gallbladder perforation is a rare but potentially life-threatening injury that can occur following blunt abdominal trauma. Features such as right hypochondrial pain and ecchymoses are crucial indicators towards liver and/or gallbladder injury. CT scan is the best modality to diagnose but misdiagnosis can result in a serious sentinel event. This however can be overcome by multiphase CT scan and close patient monitoring by the attending surgeon. Surgery is the gold standard in the management of traumatic perforated gallbladder. Laparoscopic subtotal cholecystectomy can be performed in a well-equipped trauma centre with an experienced surgeon on board. Otherwise, exploratory laparotomy can be advocated.

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