

# Traumatic Gangrenous Gallbladder Following Blunt Abdominal Trauma: A Rare Case Scenario

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## ABSTRACT

**Background:** Gallbladder injury following blunt abdominal trauma is uncommon because of the organ's protected anatomical position beneath the liver and rib cage. Isolated traumatic gallbladder injury is even rarer and is frequently associated with delayed diagnosis due to nonspecific clinical manifestations.

**Case Presentation:** We report the case of a 42-year-old chronic alcohol consumer who presented with abdominal pain, respiratory distress, and abdominal distension following a fall from stairs under alcohol intoxication. Imaging demonstrated free intraperitoneal fluid and suspected gallbladder perforation. Exploratory laparotomy revealed hemoperitoneum and a grossly distended gangrenous gallbladder without any associated visceral injury. Cholecystectomy was successfully performed, and the patient had an uneventful postoperative recovery.

**Conclusion:** Traumatic gangrenous gallbladder is a rare but potentially life-threatening consequence of blunt abdominal trauma. A high index of suspicion is necessary in patients with right upper quadrant pain following trauma, particularly in chronic alcoholics. Early diagnosis and prompt surgical intervention are crucial for favorable outcomes.

**Keywords:** Gallbladder trauma, Gangrenous gallbladder, Blunt abdominal trauma, Cholecystectomy, Gallbladder perforation

## INTRODUCTION

Gallbladder injury following blunt thoracoabdominal trauma is a rare surgical emergency because of the organ's protected anatomical location. The gallbladder lies within the gallbladder fossa on the visceral surface of the right lobe of the liver and is additionally protected by the right costal margin, liver, and adjacent bowel loops. This anatomical protection accounts for the considerably low incidence of traumatic

gallbladder injuries after blunt abdominal trauma.

Gallbladder injury occurs in approximately 1.9%–2.1% of abdominal trauma cases, while isolated gallbladder injury is nearly ten times rarer. <sup>[1,2]</sup> Delayed diagnosis is common due to the absence of specific early symptoms and the frequent presence of associated injuries. Reported patterns of injury include contusion, perforation,

avulsion, and traumatic cholecystitis or gangrene.

Chronic alcohol consumption has been considered a predisposing factor because alcohol-induced sphincter of Oddi spasm and gallbladder distension may increase intraluminal pressure, making the gallbladder more susceptible to trauma. [2] Early surgical intervention, particularly cholecystectomy, remains the definitive treatment. [1,4]

We present a rare case of isolated traumatic gangrenous gallbladder following blunt abdominal trauma.

### CASE SUMMARY

A 42-year-old man from Delhi, labourer by occupation, and a known chronic alcohol consumer and smoker for the past 25 years presented to the emergency department on 19/04/2025 with alleged history of fall from stairs on 15/04/2025 while under alcohol intoxication. He complained of dizziness, shortness of breath, right upper quadrant abdominal pain, and non-passage of stool and flatus for four days.

On presentation, the patient was hemodynamically unstable with blood pressure of 109/70 mmHg, pulse rate of 130/min, respiratory rate of 30 cycles/minute, and oxygen saturation of 82% on room air. Immediate resuscitation was initiated.

Respiratory examination revealed bilateral basal crepitations with decreased air entry in the right basal region. Abdominal examination showed abdominal distension with generalized tenderness and guarding.

Focused Assessment with Sonography for Trauma (FAST) demonstrated free fluid with internal echoes in the peritoneal cavity, with a maximum separation of 2.5 cm in the right iliac fossa. Initial laboratory investigations revealed severe anemia with hemoglobin of 5.4 g/dL and deranged coagulation profile with INR of 1.85.

Computed tomography (CT) angiography of the abdomen demonstrated hyperdense fluid in the hepatorenal pouch, a distended gallbladder with imperceptible wall, and ill-

defined hypodensities in the adjacent liver parenchyma along with mild ascites, suggestive of gallbladder perforation.

After optimization and transfusion support, the patient was shifted to the operating theatre for exploratory laparotomy. Intraoperatively, approximately 500 mL of clotted blood was found within the peritoneal cavity, predominantly in the right upper quadrant. A grossly distended gangrenous gallbladder was identified (Figure1). The cystic artery could not be visualized, likely due to traumatic avulsion and retraction following blunt injury. The liver was hypertrophied. No associated bowel, hepatic, or other intra-abdominal visceral injury was identified.



Figure. 1 Gangrenous gall bladder

Cholecystectomy was performed with placement of right subhepatic and left pelvic drains. The patient was extubated successfully in the postoperative period. Recovery was uneventful with minimal serosanguinous drain output. Drains were removed on postoperative day 4, and the patient was discharged on postoperative day 5 after satisfactory oral intake and pain control.

During follow-up, sutures were removed on postoperative day 10, and the patient was clinically stable with complete recovery.

## DISCUSSION

Traumatic injury to the gallbladder is an uncommon consequence of blunt abdominal trauma due to the organ's relatively protected anatomical location. [1,5] Most cases occur in association with injuries to adjacent organs such as the liver, duodenum, or pancreas. Isolated gallbladder injury is therefore exceedingly rare. [2,3]

The mechanism of injury typically involves a sudden compressive or shearing force applied to a distended gallbladder. [2] Chronic alcohol consumption is considered an important risk factor because alcohol can increase sphincter of Oddi tone, resulting in gallbladder distension and increased intraluminal pressure. A distended gallbladder is more susceptible to rupture, ischemia, and gangrene after blunt trauma.

Gallbladder injuries are classified into contusions, perforations, avulsions, and traumatic hemorrhagic cholecystitis. [2,5]

Gangrenous transformation secondary to vascular compromise is particularly rare. In the present case, non-visualization of the cystic artery intraoperatively suggests traumatic vascular injury leading to ischemia and gangrene.

Clinical presentation is often nonspecific and may include abdominal pain, nausea, vomiting, abdominal distension, or signs of peritonitis. [2,4] Delayed presentation is common because symptoms may initially be mild. Radiological evaluation plays a critical role in diagnosis. FAST scan may identify intraperitoneal fluid but lacks specificity. CT imaging is the investigation of choice and may demonstrate gallbladder wall discontinuity, pericholecystic fluid, intraluminal hemorrhage, or surrounding hemoperitoneum. [2,3]

Definitive management depends on the type and extent of injury. Cholecystectomy remains the gold standard treatment for traumatic gallbladder perforation or gangrene. [1,4] Early surgical intervention prevents complications such as biliary peritonitis, sepsis, and multiorgan dysfunction. [1,6]

The present case highlights the importance of maintaining a high degree of suspicion for gallbladder injury in patients presenting with right upper quadrant pain after blunt abdominal trauma, especially in the setting of chronic alcohol use.

## CONCLUSION

Isolated traumatic gangrenous gallbladder following blunt abdominal trauma is an extremely rare clinical entity. Diagnosis may be delayed due to nonspecific presentation and associated hemodynamic instability. CT imaging is valuable for early suspicion, while exploratory surgery confirms the diagnosis and allows definitive treatment.

Prompt cholecystectomy provides excellent outcomes and should be considered early in suspected cases. Awareness of this rare injury pattern is important for trauma surgeons and emergency physicians, particularly in patients with a history of chronic alcohol consumption.

## Declaration by Authors

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