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Traumatic Gallbladder Perforation Following Stab Wound: A Rare Cause of Massive Hemoperitoneum – Case Report

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ABSTRACT: Traumatic gallbladder injury is a rare condition particularly following penetrating trauma. This report discusses a 30-year-old male with no prior medical history who presented to the emergency department one day after a stab wound to the abdomen. Initial examination indicated hemodynamic stability and a superficial abdominal wound. However, CT imaging revealed massive hemoperitoneum and an intravesicular hematoma within the gallbladder.
Following diagnostic imaging, exploratory laparoscopy was performed and converted to a midline laparotomy due to significant findings. A 2-cm gallbladder perforation, a linear liver laceration, and active abdominal wall bleeding were identified. Surgical management included debridement, retrograde cholecystectomy, and drainage of the peritoneal cavity. This case highlights the diagnostic challenges associated with gallbladder injuries from stab wounds and the need for prompt surgical intervention.

INTRODUCTION

Traumatic injury to the gallbladder is a rare condition due to its protected anatomical position beneath the liver and rib cage. It is most frequently associated with blunt abdominal trauma, while gallbladder injury following penetrating trauma remains exceptional. Clinical diagnosis is challenging and often delayed. We report a rare case of traumatic gallbladder perforation secondary to a stab wound, revealed by massive hemoperitoneum.

CASE PRESENTATION

A 30-year-old male with no prior medical history was admitted to the emergency department an assault by a sharp weapon causing a penetrating abdominal wound.
There was no exteriorization of omentum, digestive fluid, or active external bleeding. The patient was afebrile.

CLINICAL EXAMINATION

On admission, the patient was conscious presenting a tachycardia with a heart rate of 113 beats per minute, a normal blood pressure of 100/60 mmHg, and a polypnea with respiratory rate of 22 cycles per minute,. Slight conjunctival pallor was noted.
Abdominal examination revealed a linear penetrating wound measuring approximately 2 cm, located in the right supra-umbilical region, with clean edges and no evidence of evisceration or digestive fluid leakage. There was associated epigastric tenderness without any palpable mass.(Image 1)
Digital rectal examination was normal, Musculoskeletal examination showed a dorsal wound on the right hand opposite the fifth metacarpal, associated with a complete extension deficit. The remainder of the physical examination was unremarkable.

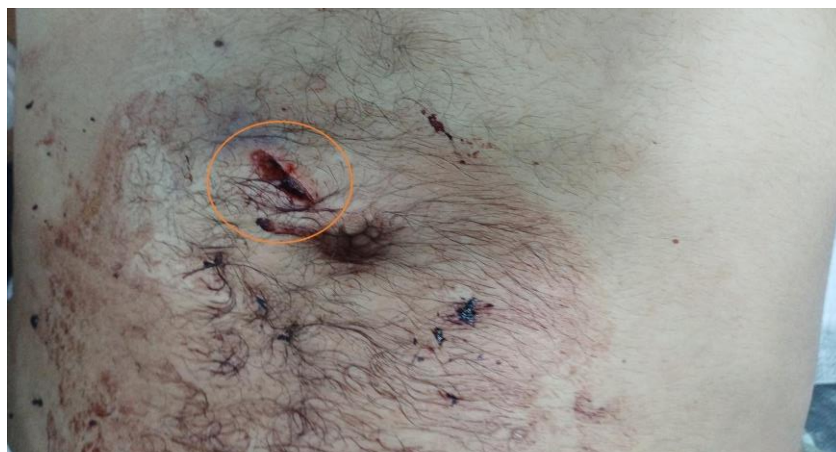


Image 1: Abdomen with the orange circle marking the wound

The patient was initially admitted to the resuscitation unit. Initial resuscitation included high-flow oxygen delivered via a non-rebreather mask, insertion of two large-bore peripheral intravenous lines, comprehensive laboratory workup with blood typing and crossmatching, urinary catheterization for hourly urine output monitoring, followed by a whole-body CT scan.

LABORATORY FINDINGS

Laboratory tests revealed mild anemia with a hemoglobin level of 11.8 g/dL. The white blood cell count was elevated at 24,050/mm³, and the platelet count was 214,000/mm³. Prothrombin time was 80%, and activated partial thromboplastin time was 26.6 seconds. Liver enzymes were within normal limits (AST: 36 IU/L, ALT: 22 IU/L). C-reactive protein was 0.5 mg/L, and lipase was 19 IU/L.

CT SCAN FINDINGS

A thoraco-abdominopelvic CT scan showed no abnormalities in the thoracic compartment. However, the abdominopelvic CT demonstrated a massive hemoperitoneum involving the perihepatic and perisplenic spaces, interloop areas, paracolic gutters, right iliac fossa, and pelvic cavity.

The gallbladder contained a well-defined, spontaneously hyperdense oval lesion measuring 33 × 31 mm with a density of 64 Hounsfield units, consistent with an intravesicular hematoma, surrounded by pericholecystic fluid (Image 2).

No traumatic injury was identified in the liver, spleen, pancreas, kidneys, or adrenal glands. There was no evidence of contrast extravasation, pneumoperitoneum, or biliary dilatation. In addition, a large hematoma of the right rectus abdominis muscle measuring 75 × 53 mm was observed, with infiltration of adjacent soft tissues and the presence of air bubbles.

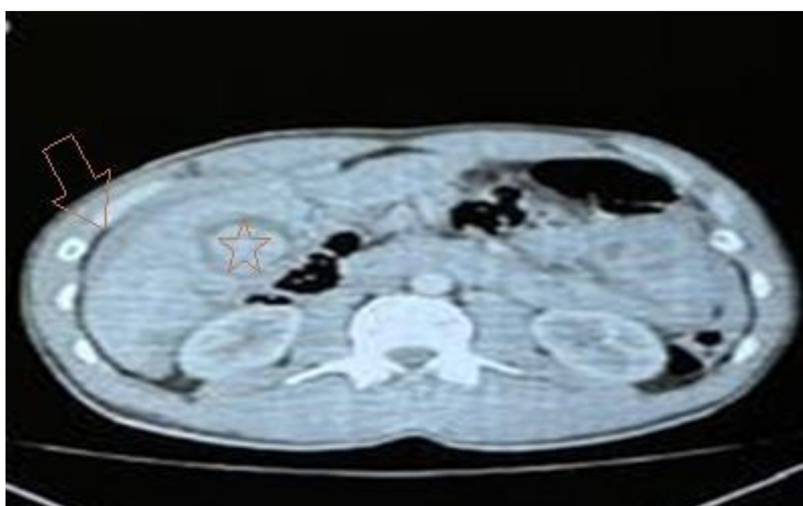


Image 2: CT scan showing the gallbladder (star) and hemoperitoneum (arrow).

MANAGEMENT

An exploratory laparoscopy was performed which exploration revealed a massive hemoperitoneum without signs of generalized peritonitis (Image 3). An actively bleeding parietal wound was noted forcing the operator to convert to laparotomy after the hemostatis of the bleeding was assured by sutures, the exploration was resumed and a 2-cm perforation of the gallbladder was identified, associated with an intraluminal hematoma. A linear, hemostatic liver laceration measuring approximately 8 cm was observed, involving segments IV, V, and VI. This was followed by a retrograde cholecystectomy. Subhepatic and Douglas pouch drainage were performed using two Salem tubes.

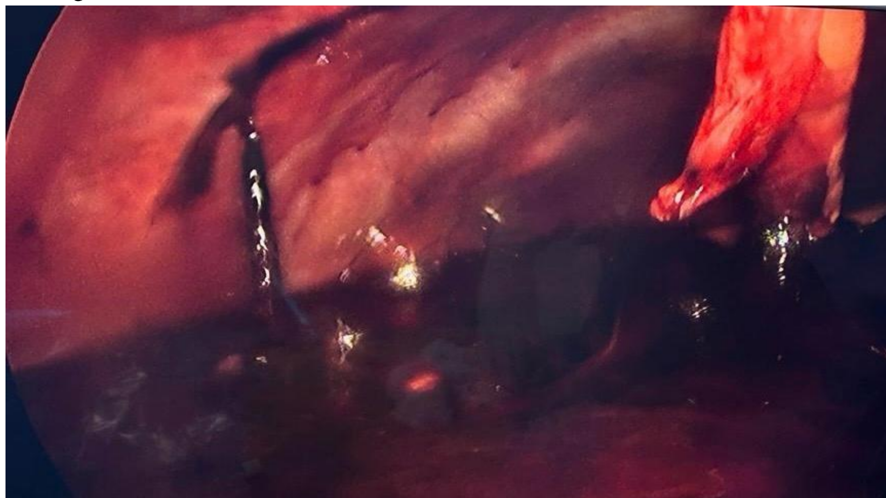
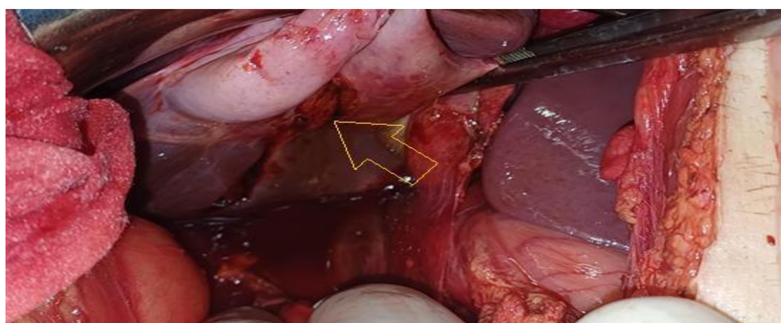


Image 3: Laparoscopic view showing massive hemoperitoneum



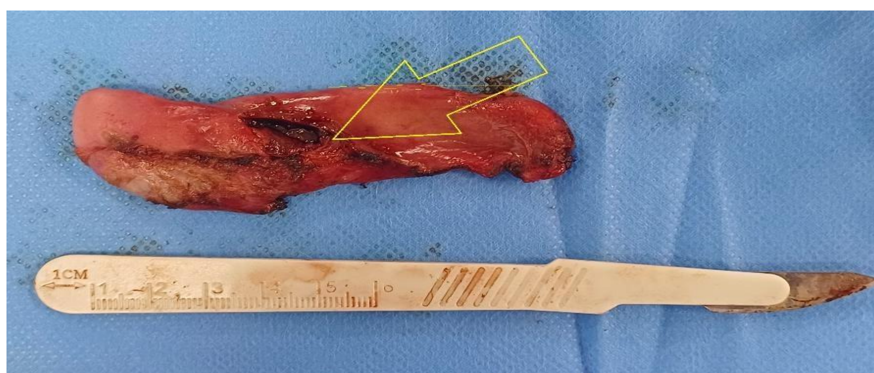


Image 4: Intraoperative image and image of the specimen showing with the arrow the gallbladder's perforation

POSTOPERATIVE OUTCOME

The postoperative course was uneventful. Hemodynamic stability was achieved, and laboratory parameters progressively normalized. The abdominal drains showed decreasing hemorrhagic output and were removed after control imaging. The patient was discharged in good general condition.

DISCUSSION

Traumatic injury to the gallbladder remains a rare entity, representing less than 2% of all abdominal traumas [1–3]. This rarity is explained by the anatomical protection offered by the liver, the rib cage, and surrounding viscera. Gallbladder injuries are usually associated with severe polytrauma and are more commonly observed following blunt abdominal trauma [2,3]. Gallbladder perforation secondary to penetrating trauma, as observed in our patient, is exceptional and rarely reported in the literature [4].

Several risk factors predispose the gallbladder to traumatic rupture, including gallbladder distension, a thin gallbladder wall, alcohol intoxication leading to sphincter of Oddi spasm and bile retention, and pre-existing cholecystitis [1,5]. In our case, the patient had no known biliary disease, which highlights the violent mechanism and direct impact of the stab wound as the primary causal factor.

The clinical presentation of gallbladder trauma is often nonspecific. Early symptoms may be absent or limited to vague abdominal pain, which explains the frequent diagnostic delay [2,3]. Signs of peritonitis usually appear later due to bile leakage or associated visceral injuries. In our patient, the presentation was dominated by massive hemoperitoneum without initial signs of biliary peritonitis, which is consistent with the presence of an acute intracholecystic hematoma and perforation [6].

Computed tomography (CT) remains the gold standard imaging modality for diagnosis in hemodynamically stable patients [7]. Typical CT findings include gallbladder wall discontinuity, pericholecystic fluid, active contrast extravasation, and hyperdense intraluminal content consistent with hematoma [7,8]. In our case, CT revealed a spontaneously hyperdense intravesicular lesion measuring 64 HU, strongly suggestive of an intracholecystic hematoma, associated with massive hemoperitoneum. The absence of contrast extravasation illustrates the diagnostic difficulty and the importance of systematic surgical exploration in penetrating abdominal trauma with hemoperitoneum [7,9].

According to the Losanoff and Kjossev classification, traumatic gallbladder injuries are divided into contusion, laceration, perforation, and avulsion [10]. Our patient presented with a true perforation associated with intraluminal hematoma, corresponding to a severe form that mandates urgent surgical treatment.

Surgical management is the cornerstone of treatment. Cholecystectomy is universally accepted as the standard of care, even in isolated injuries, due to the high risk of bile leakage, biliary peritonitis, sepsis, and delayed complications [3,9]. Laparoscopy may be attempted in hemodynamically stable patients; however, conversion to laparotomy is frequently required because of associated injuries or massive hemoperitoneum, as was the case in our patient [3,11]. The associated liver laceration found intraoperatively confirms that gallbladder injuries are rarely isolated and frequently coexist with hepatic trauma [2,5].

The prognosis of traumatic gallbladder injury mainly depends on the presence of associated abdominal or vascular injuries and the delay in diagnosis [3,9]. When managed early and appropriately, gallbladder perforation carries an excellent prognosis, with low morbidity and mortality [4,6]. In our patient, early surgical intervention resulted in a favourable postoperative course without complications.

This case highlights the diagnostic challenge of gallbladder trauma and emphasizes the importance of maintaining a high index of suspicion in penetrating abdominal injuries, even in the absence of obvious biliary signs on initial imaging [7–9].

CONCLUSION

Traumatic perforation of the gallbladder following stab wounds is a rare but serious injury that may present with massive hemoperitoneum. CT scan is essential for diagnosis, and early surgical management by cholecystectomy ensures favorable outcomes.

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