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Gallbladder volvulus: A case report of an elderly female presenting with acute cholecystitis

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Abstract
Gallbladder volvulus (GBV) is a rare and acute condition resulting from the twisting of the gallbladder around its mesentery. Often mistaken for acute calculous cholecystitis, GBV presents diagnostic challenges due to nonspecific clinical and imaging findings. Preoperative diagnosis is uncommon, with most cases identified intraoperatively.

We report the case of a 90-year-old female from a memory care facility who presented with progressive abdominal pain and nausea. Physical examination revealed significant right upper quadrant tenderness with a positive Murphy's sign. Laboratory findings included leukocytosis and mild transaminase elevation. Imaging demonstrated a distended gallbladder with cholelithiasis and wall thickening. The patient underwent laparoscopic cholecystectomy, during which GBV with ischemic and necrotic changes of the gallbladder was identified. Surgical management included decompression followed by subtotal cholecystectomy. The patient successfully recovered with minor postoperative complications.

GBV is estimated to occur in approximately 1 in 365 000 cases of gallbladder disease, with certain anatomical variations, such as a freely mobile gallbladder, predisposing to its development. Definitive preoperative diagnosis remains challenging due to overlapping clinical and radiographic features with acute calculous cholecystitis. However, previous literature has suggested certain patient populations are more susceptible to GBV, specifically elderly females with thin body habitus and scoliosis. Although imaging modalities such as MRCP and PET scans may raise suspicion, intraoperative findings remain the gold standard for diagnosis. This case aligns with established diagnostic patterns, including patient demographics and clinical presentation, and underscores the limitations of current diagnostic approaches.

GBV should remain a differential consideration in thin elderly patients with spinal deformities presenting with acute abdominal pain and imaging findings consistent with acute calculous cholecystitis. Early surgical intervention based on clinical suspicion is crucial to reduce associated morbidity and mortality.

Keywords: Gallbladder volvulus, difficult diagnosis, elderly

Introduction

Gallbladder Volvulus (GBV) is an acute and rare condition characterized by the twisting or torsion of the gallbladder around its long axis [1]. GBV was first described in 1898 by Wendel as “floating gallbladder”, and since then only around 500 cases have been presented within the literature [2, 3]. The diagnosis of GBV is often established intraoperatively as the presenting signs on physical exams and laboratory results are often nondiagnostic but should aid in increased suspicion [4]. Age and gender of patients have been correlated to increase presentation of GBV. The peak incidence of this condition is between 60-80 years of age with females being more affected than males at a ratio of 3:1 [5, 6]. However, more recent literature suggests an even higher gender correlation, with a female to male ratio of 4:1 [4]. While the demographics of affected patients are almost exclusively older women, some with scoliosis and spinal or chest deformities, the diagnosis is difficult to make pre-operatively due to the symptoms overlapping with acute cholecystitis [7, 11]. Presenting signs will typically include abdominal pain, nausea, vomiting, and fever; with physical exam findings demonstrating a positive Murphy’s sign and palpable mass in RUQ [8].

Case Presentation

A 90-year-old caucasian female presented to the emergency department from a memory care facility due to concerns of several-day progressive abdominal pain and a one-day history of nausea.

Her past medical history was significant for hypertension, hyperlipidemia, hypothyroidism, chronic pain, glaucoma, depression, dementia, scoliosis, and gastro-esophageal reflux disease (GERD). The patient had previously undergone multiple abdominal surgeries including unspecified hernia repair, unspecified rectal surgery, and hysterectomy. Also within her surgical history were orthopedic surgeries and a right lumpectomy. Upon presentation, initial vitals demonstrated a temperature of 98.4 °F, blood pressure of 159/76, heart rate of 107 BPM, respiratory rate of 20, and an SpO2 of 97%.

Physical examination of the patient revealed an elderly, uncomfortable-appearing female with significant tenderness in the right upper quadrant and a positive Murphy's sign. Laboratory studies ordered in the emergency department revealed leukocytosis with 25.1×103 cell/microliter, total bilirubin of 0.8 mg/dL, mild AST elevation of 38 IU/L and ALT of 28 IU/L within normal limits, and venous lactate level of 1.38 mmol/L within normal limits. Her kidney function tests, and alkaline phosphatase levels were within normal limits. The patient was taken to imaging for a CT abdomen/pelvis with contrast revealing a largely distended gallbladder with cholelithiasis (Fig 1). This imaging finding was confirmed with right upper quadrant ultrasonography, revealing a thickened gallbladder wall of 1.9 cm. The patient was placed N.P.O. and started on IV fluids and piperacillin-tazobactam. She became increasingly more ill-appearing throughout the day. Due to the radiographic findings, patient history, and physical examination, both surgical and non-surgical options were discussed with the patient's children. Surgery was the agreed course of action, and patient was taken to the operating room later that day.

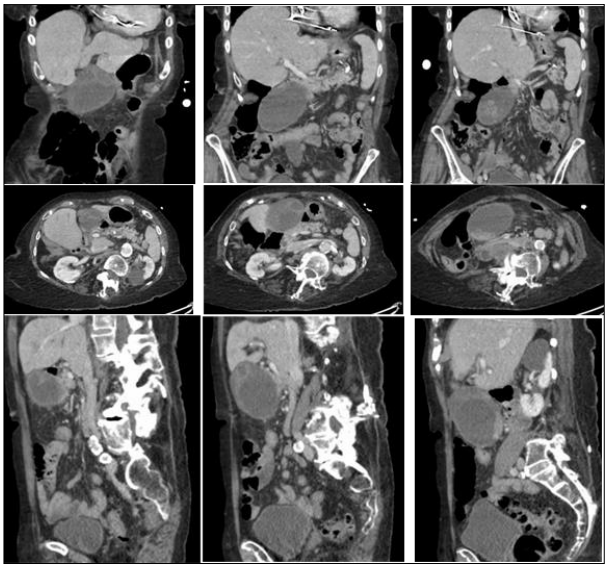

Fig 1: CT abdomen/pelvis demonstrating distended gallbladder and cholelithiasis. *A-C:* Coronal slices from anterior (A) to posterior (C). *D-F:* Axial images from superior (D) to inferior (F). *G-I:* Sagittal images from approximate midline (G) to right lateral (I).

In the operating room, pneumoperitoneum was obtained with the Veress needle at the umbilicus. Upon inspection, the gallbladder appeared necrotic and ischemic. Its position within the abdomen was abnormal, being draped across the center of the abdomen. Gallbladder adhesions were taken down and, given its distention, the gallbladder was decompressed aspirating approximately 60 cc of hemorrhagic fluid (Fig 2). A top-down approach was taken due to the abnormal anatomy of the patient. The gallbladder was opened with attempted removal of stones. This proved tedious and difficult given the number of small stones that crushed with minimal compression. The cholecystotomy was then carried circumferentially and distally toward the infundibulum. Eventually, the gallbladder was able to be completely removed with only an infundibular stump remaining (Fig 3). This revealed that the stump was volvulized around itself with no impacted stones. The cystic artery was cauterized with LigaSure during the dissection. The stump was then ligated with PDS Endoloops. Endoscopic ultrasound confirmed the absence of cystic or common bile duct stones. The gallbladder and stones were removed via the umbilical port site, a surgical drain was placed, and port sites were closed.

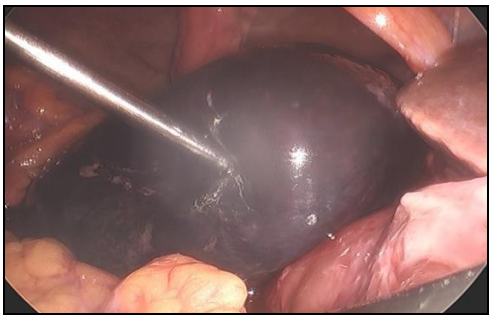

Fig 2: Initial view intra-operative view of the gallbladder with ischemic and necrotic appearance in an abnormal position toward the midline. Decompression performed given its severe distension.

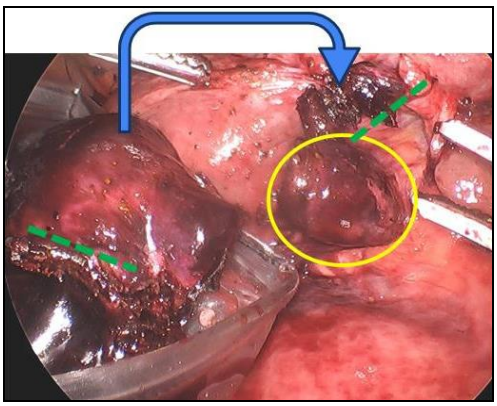

Fig 3: Circumferential dissection at the infundibulum demonstration a volvulized stump (indicated by blue arrow and green dashed lines). Endoloops placed around remnant stump (indicated by yellow circle).

The final pathologic diagnosis was acute necrotizing cholecystitis with cholelithiasis and hemorrhagic mucosa. Postoperatively, the patient's pain improved. She was continued on four days of antibiotics with resolution of her leukocytosis. The patient was discharged back to her facility on postoperative day five. The patient represented to the emergency department on postoperative day six after she self-removed and transected her surgical drain tubing just superficial to the skin. The surgical team removed the remaining Jackson-Pratt drain without issue, and she was discharged back to her facility.

Discussion

Gallbladder volvulus is a rare condition seen in roughly 1 in 365 000 cases with gallbladder diseases. While more

common in certain patient demographics the diagnosis is often established intraoperatively as there is no definitive diagnostic technique [9]. Both radiographic imaging and physical exam findings often mimic similar disorders such as acute calculous cholecystitis. The pathophysiology of the disease is uncertain; however, anatomical variations of the gallbladder have been investigated for precipitating the event. These include if the gallbladder possesses its own mesentery or if the cystic duct and artery have their own mesentery allowing for the gallbladder free movement within the peritoneal cavity [10]. Regarding this patient, we suspect that her severe scoliosis caused the abnormal intra-abdominal position of her liver and gallbladder. This, in turn, led to its midline position and eventual rotation around its mesenteric axis as it became more distended.

Preoperative diagnostics of GBV have been investigated and utilized in previous cases. Presenting signs of a triad of triads (Table 1) have been discussed to increase suspicion of GBV using appearance, symptoms, and physical exam. Appearance uses patient demographics, commonly elderly, thin individuals with chronic chest conditions or spinal deformities. In the symptom category, presentation typically features sudden onset abdominal pain, early vomiting, and right upper quadrant pain. The final aspect of the triad, physical exam, includes palpable right upper quadrant abdominal mass, absence of jaundice or systemic toxicity, and a noticeable pulse-temperature dissociation [11]. The presentation in this patient closely aligns with these case presentations including demographics, symptom history, spinal deformity with severe scoliosis (Fig 4), and physical signs. Absent from this triad of triads is the pulse-temperature dissociation which was not identified.

Table 1: Triad of triads used to recognize potential gallbladder volvulus [11]

Appearance	Symptom	Physical examination
Elderly (usually female)	Sudden onset	Nontoxic presentation
Thin habitus	Right upper quadrant pain	Palpable right upper quadrant mass
Spinal deformities	Early emesis	Pulse-temperature discrepancy

Fig 4: Coronal slice of our patient's CT scan, demonstrating her significant lumbar scoliosis, aiding to her presence of GBV.

There have been some radiographic findings to suggest GBV. "Whirlpool sign" can occasionally be identified on CT to suggest twisting of the gallbladder. Other indicators of torsion on CT include presence of intramural edema, poor wall enhancement, and abrupt angulation of the gallbladder neck [12]. On PET scan, the presence of a "Bulls-eye" image on seen in near the right lower lobe of the liver could be suggestive [13]. This imaging modality was not utilized in this case due to the acuteness of the episode but noted in the literature to increase suspicion. Abdominal ultrasound was utilized in this case as it is the gold-standard of imaging for acute calculous cholecystitis; however, this technique does not definitively differentiate between acute calculous cholecystitis and GBV due to both presenting with gallbladder wall thickening [14]. Magnetic resonance cholangiopancreatography (MRCP) is yet another imaging modality that could help with preoperative diagnosis of GBV. It has been described that MRCP could identify a dilated gallbladder along with the absence of the gallbladder neck [15]. Again, this modality is not definitive but would further increase suspicion of gallbladder torsion prior to surgical intervention.

Preoperative definitive diagnosis of GBV is still uncertain in the current surgical landscape. There are many imaging modalities, clinical symptoms, and physical exam findings, that will raise suspicion for the rare diagnosis. With surgical intervention being the treatment for the abnormality, intraoperative diagnosis through direct visualization remains standard. Based on current literature, high clinical suspicion remains an important factor in diagnosis. Mortality has been estimated at approximately 5% for patients with GBV [11]. Although unique, GBV should remain part of the differential for select patients, specifically thin elderly females with scoliosis as seen in the case presented.

Conclusion

In conclusion, we report a case of a rare condition of GBV in a 90-year-old woman after presenting to the emergency department from a memory care facility with progressive abdominal pain and nausea. From physical examination and radiographic findings, we were able to suspect acute cholecystitis with cholelithiasis, for which the patient was treated surgically with a laparoscopic cholecystectomy. An intraoperative diagnosis of a GBV was then established. The literature presents no definitive technique for preoperative diagnosis of this condition but aids to increase suspicion of GBV have been investigated. This case highlights the importance of maintaining an early preoperative suspicion of gallbladder volvulus, especially in thin elderly females with spinal deformities, to help reduce the risk of heightened patient morbidity and mortality associated with the condition.

Conflict of Interest

Not available

Financial Support

Not available

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