

Gallbladder Volvulus: A Rare Entity

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Background	First described as a case of “floating gallbladder” in 1898, gallbladder volvulus is a rare condition with an incidence of only 1 in 365,520 hospital admissions. ^{1,2} This phenomenon occurs when the gallbladder rotates on its axis, with subsequent interruption of its blood supply and flow of bile. ³ Emergent cholecystectomy is necessary due to the risk of perforation, bilious peritonitis, and hemodynamic instability. The mortality rate associated with gallbladder volvulus approaches six percent; however, with surgical intervention, the prognosis is excellent. ^{2,4}
Summary	An 89-year-old woman presented with complaints of right-sided abdominal pain for four days accompanied by subjective fevers and anorexia. Clinical evaluation revealed an afebrile, clinically stable woman with moderate to severe tenderness in the right upper and lower quadrants with mild rebound and no guarding. Imaging revealed a distended, inflamed gallbladder without gallstones in an abnormal position suspicious for torsion. Emergent laparoscopic cholecystectomy was performed. A gangrenous and twisted gallbladder with minimal attachments to the liver was observed intraoperatively. Histopathologic evaluation of the gallbladder showed hemorrhagic infarction and gangrenous necrosis of the gallbladder with acute serositis. The patient’s postoperative course was uncomplicated, and she was discharged on the third postoperative day.
Conclusion	Gallbladder volvulus is rare, but poses a significant risk of mortality if left undiagnosed. Suspicion should be high in elderly patients if radiologic signs of acute cholecystitis are present in the absence of gallstones and with the gallbladder in an unusual location beneath the liver. Emergent cholecystectomy is the treatment of choice.
Keywords	Gallbladder volvulus; gallbladder torsion; acute cholecystitis; gallstones; laparoscopic cholecystectomy; floating gallbladder

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The authors have no conflicts of interest to disclose.

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Case Description

The patient, an 89-year-old woman with a history of hypertension, dementia, and status-post distant hysterectomy, presented with complaints of right-sided abdominal pain for four days. She reported subjective fevers at home with anorexia, but denied nausea, vomiting, or changes to her bowel habits. Clinical evaluation revealed an afebrile, clinically stable woman with moderate to severe tenderness in the right upper and lower quadrants with mild rebound and no guarding. Laboratory investigation was significant for a hemoglobin of 11.5 g/dL, a leukocytosis of $18.5 \times 10^9/L$, a sodium of 132 mEq/L, a chloride of 94 mEq/L, and a blood urea nitrogen of 27 mg/dL. Liver tests and bilirubin were within normal limits.

With the differential diagnosis of acute cholecystitis in mind, the patient underwent an ultrasound of the right upper quadrant, which demonstrated a distended gallbladder with diffusely thickened walls up to 9.2 mm. Pericholecystic fluid and a sonographic Murphy sign were both present. The common bile duct was within normal limits for the patient's age, and gallstones were not visualized. A CT scan of the abdomen and pelvis with IV contrast visualized a distended, inflamed gallbladder without stones. It was noted to be in an abnormal position and suspicious for torsion (Figures 1 and 2).

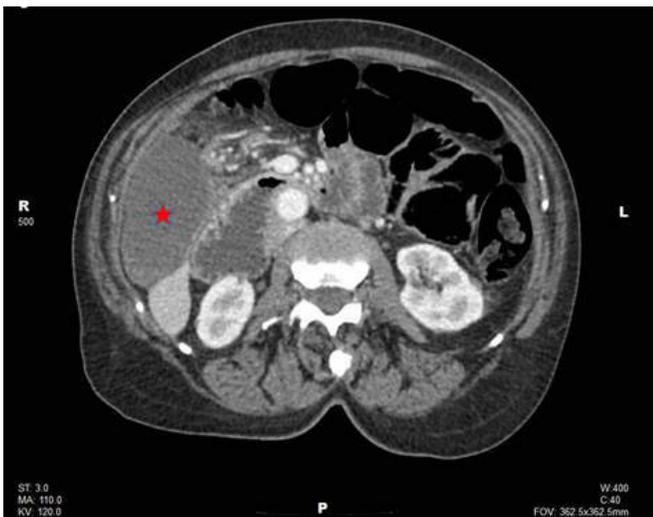


Figure 1. CT scan showing inflamed gallbladder without gallstones.



Figure 2. CT scan showing abnormal location of gallbladder.

A diagnosis of gallbladder volvulus was made, and the patient underwent emergent laparoscopic cholecystectomy. Intraoperatively, a gangrenous and twisted gallbladder was observed. It was noted to have minimal attachments to the liver and a skeletonized cystic duct. The cystic artery was completely thrombosed. Histopathologic evaluation of the gallbladder showed hemorrhagic infarction and gangrenous necrosis of the gallbladder with acute serositis. The patient's postoperative course was uncomplicated, and she was discharged on the third postoperative day.

Discussion

Gallbladder volvulus is an extremely rare cause of gallbladder disease, with only about 500 cases documented since its initial description in 1898.^{2,4} Although gallbladder volvulus can occur in any age group, incidence is highest in women between the ages of 60 and 80 years old.⁴

The exact etiology of gallbladder volvulus is unknown. However, two types of gallbladders that seem to be predisposed to torsion have been identified: a gallbladder with a long and wide mesentery, and a gallbladder a mesentery that only covers the cystic duct and artery.⁵ Both of these types allow the gallbladder to float within the peritoneal cavity. Other precipitating factors that appear to be involved include violent peristalsis of neighboring organs, kyphosis, visceroptosis, and atherosclerosis of the cystic artery.⁵ Loss of visceral fat and elasticity of the viscera with aging may be responsible for the higher incidences found in the elderly.⁶

Gallbladder volvulus can be described as either complete or incomplete torsion. Complete torsion signifies a rotation of more than 180 degrees and often causes acute onset of severe right upper quadrant pain and vomiting. Incomplete torsion occurs with rotation of the gallbladder less than 180 degrees and may have intermittent symptoms mimicking biliary colic.⁴

Preoperative diagnosis can be difficult; therefore, gallbladder volvulus is frequently an intraoperative diagnosis.⁵ On physical exam, a palpable right upper quadrant mass may be appreciated. There are generally no signs of jaundice or toxemia, and laboratory analysis typically shows normal or high white cell count with normal liver function tests.^{2,7}

Most common imaging studies include ultrasound and CT scan. Ultrasound can show a large, thickened gallbladder oriented in a transverse plane outside of the anatomical fossa and pericholecystic fluid. On color Doppler, flow is typically absent.^{8,9} Though gallstones may be seen, approximately 70 to 80 percent of patients with gallbladder volvulus had no gallstones.⁵ The “cystic duct knot” sign, an echogenic nodule near the gallbladder neck that likely represents the twisted cystic duct, has been proposed as a new ultrasound identifier for earlier diagnosis. CT scan can appreciate focal thickening around the gallbladder neck, with a non-enhancing wall, and the “whirl sign” representing a twisted cystic artery and medial deviation of the extrahepatic common duct.⁹

Magnetic resonance cholangiopancreatography (MRCP) can be a useful adjunct to ultrasound and CT scan. It will show high signal intensity in the gallbladder wall on T1 imaging due to hemorrhage or necrosis. The gallbladder may appear dilated with failure to visualize the neck.¹⁰ V-shaped distortion of the extrahepatic bile duct and tapering of the cystic duct may also be ominous for gallbladder volvulus.⁶

Although percutaneous cholecystostomy tube placement is a viable option for acute cholecystitis in the high-risk surgical patient, it is not an option in cases where torsion is suspected. Laparoscopic cholecystectomy is both diagnostic and therapeutic, and it is the treatment of choice for gallbladder volvulus. The goals of surgical intervention in cases of torsion are decompression, derotation, and cholecystectomy with or without intraoperative cholangiogram.⁸

Conclusion

Gallbladder volvulus is rare, but poses a significant risk of mortality if left undiagnosed. Suspicion should be high if radiologic signs of acute cholecystitis are present in the absence of gallstones with a gallbladder in an unusual location beneath the liver. Emergent laparoscopic cholecystectomy is warranted in these cases.

Lessons Learned

Gallbladder volvulus is rare, but poses a significant risk of mortality if left undiagnosed. Torsion of the gallbladder should be considered in an elderly patient presenting with right upper quadrant pain and no evidence of gallstones on imaging. Emergent laparoscopic cholecystectomy is the treatment of choice for gallbladder volvulus.

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