

Gallbladder Volvulus: Case Report and Review of the Literature

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ABSTRACT

Introduction: Gallbladder volvulus is rare, but delay in diagnosis and surgical intervention can lead to significant morbidity and mortality.

Case Description: An older woman presented with abdominal pain and was diagnosed with acute cholecystitis. During surgery, she was found to have 360-degree counterclockwise torsion of the gallbladder with ischemia. Laparoscopic cholecystectomy was performed without complications.

Conclusions: In the proper clinical setting, there is no need to explore extra studies for a preoperative confirmatory diagnosis, which may delay surgical intervention. Good prognosis is expected after prompt cholecystectomy.

Key Words: Gallbladder volvulus, Abdominal pain, Acute cholecystitis, Laparoscopic cholecystectomy.

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INTRODUCTION

Gallbladder volvulus (GV), or gallbladder torsion, is a rare clinical condition. Delay in management may lead to gallbladder rupture and biliary peritonitis with significant morbidity and mortality.¹ We present a case that was confirmed intraoperatively and successfully treated with laparoscopic cholecystectomy.

CASE PRESENTATION

The patient was an 85-year-old woman with a history of congestive heart failure, atrial fibrillation, hypertension, and chronic obstructive lung disease; a history of large bowel obstruction status post cecostomy tube placement and removal; and recent back pain that was found to be caused by a T6 compression fracture. She presented to the emergency department with sudden-onset right upper

quadrant abdominal pain and nausea after breakfast. She had normal vital signs and a body mass index of 18 kg/m². She was found to have tenderness in the right upper abdomen with positive Murphy sign. The white blood cell count was elevated to 16,800 cells/mm³, with a neutrophil count of 16,100 cells/mm³. A computed tomography (CT) scan revealed a distended gallbladder to about 9 cm in length and a thickened gallbladder wall at 4.2 mm (**Figure 1**).

The patient was diagnosed with acute cholecystitis and taken to the operating room for laparoscopic cholecystectomy in the same afternoon. During surgery, she was found to have dark bloody fluid around the liver. The gallbladder was distended. Its wall appeared ischemic and hemorrhagic (**Figure 2**). When the gallbladder neck structure was exposed, it was noticed to have a 360-degree counterclockwise torsion at the neck–cystic



Figure 1. CT scan shows distended gallbladder and wall thickening.

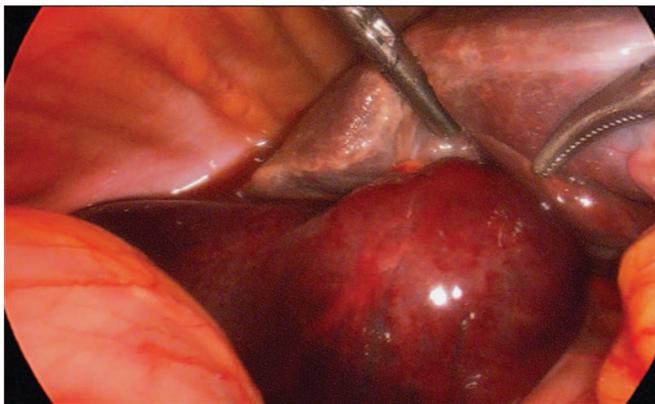


Figure 2. Bloody ascitic fluid around the liver was noted; an ischemic and hemorrhagic gallbladder was exposed under laparoscopy.

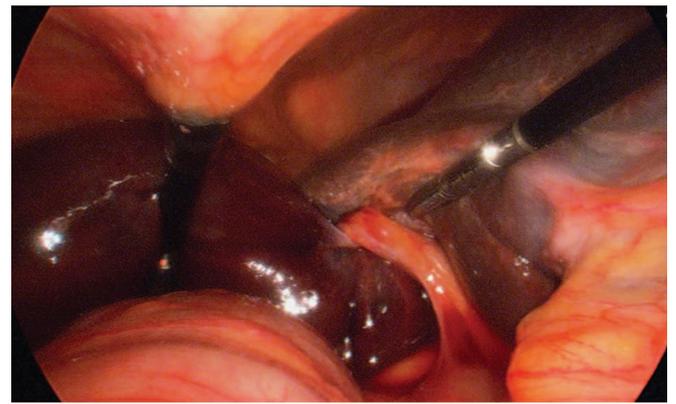


Figure 3. A 360-degree counterclockwise torsion was confirmed at the gallbladder neck–cystic duct junction.

duct junction (**Figure 3**). After detorsion, a long and partially incomplete mesentery with a long cystic duct was noted (**Figure 4**). The gallbladder was removed laparoscopically without complication. She otherwise recovered well after surgery, but low oxygen saturation required oxygen supplement. Then she was discharged home the next day. Pathologic examination of the gallbladder revealed ischemic and hemorrhagic cholecystitis without gallstones.

DISCUSSION

Epidemiology

GV was first described as a “floating gallbladder” by Wendel in 1898.² It is a rare condition, and only about 500 cases have

been report in the literature.³ Its incidence increases with age and peaks at age 60–80.⁴ A review from Reilly et al.¹ found GV to occur in patients aged 5 days to 100 years, with a median age of 77 years. A commonly cited ratio of adult women to men is 3:1, but the ratio is reversed in children, with a ratio of 1:4 of girls to boys.⁵

Etiology and Classification

The exact etiology of GV is unknown; however, some anatomical variants are more frequently observed with this condition.⁶ These include a complete but long mesentery and an incomplete mesentery covering only the cystic duct and artery. In both of these variants, the gallbladder is “free-floating.” In older patients, GV may be caused by relaxation and atrophy of a previously normal mesentery.^{3,7} Cholelithiasis is not believed to be a strong

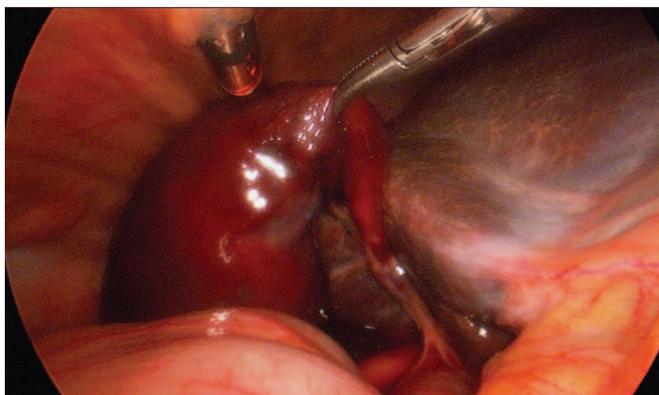


Figure 4. After detorsion, a long and partially incomplete gallbladder mesentery with a long cystic duct was noted.

factor because only about 24% to 32% of patients have gallstones.^{1,8}

GV can be classified based on degrees of the torsion and its direction of rotation. Rotation of greater than 180 degrees is classified as complete, while less than 180 degrees indicates a partial torsion. The rotation of the torsion can be clockwise or counterclockwise. Gastric peristalsis may be attributed to clockwise torsion, whereas colonic peristalsis may be attributed to counterclockwise torsion.⁹

Presentation

Incomplete torsion mimics biliary colic. Complete torsion may present as acute cholecystitis, but more often than acute cholecystitis, this may ultimately result in infarction followed by perforation.¹⁰ The clinical features have been grouped into three triads: an older, thin patient with chronic lung disease or spine deformity; a patient with typical abdominal pain, early vomiting, and short duration; and a patient with abdominal mass, absence of toxemia or jaundice, and pulse and temperature discrepancy.¹¹

Diagnostic Studies

GV is often diagnosed intraoperatively. Preoperative laboratory and imaging studies may help but are usually nonspecific. Liver function tests are commonly within normal limits in early cases. White blood cell count, C-reactive protein, and creatine phosphokinase may become elevated with disease progression.¹²

As a result of the improvement in medical imaging techniques, since 1991 about one-fourth of cases have been diagnosed preoperatively.¹ When used with ultrasound, the gallbladder may appear lower than its normal location,

with wall thickening and pericholecystic fluid. There may or may not be gallstones. Near the gallbladder neck, a “knot”-like hyperechoic nodular structure is occasionally identified.^{13,14} High-resolution CT scanning may demonstrate distortion of extrahepatic ducts and twisted pedicle. Postcontrast images, if obtained, may display twisting of the cystic artery and poor enhancement of the gallbladder wall.¹² High signals within the gallbladder wall on T1-weighted magnetic resonance images suggest necrosis and hemorrhage. Reconstruction images may reveal distortion of the extrahepatic ducts.^{12,15}

With a certain level of suspicion, exploration of more image modalities for the purpose of preoperative confirmatory diagnosis is not necessary.

Management

Definitive treatment of GV is emergent cholecystectomy. Percutaneous transhepatic aspiration/cholecystostomy had been attempted but failed to avoid a cholecystectomy.¹² Access to the abdominal cavity for cholecystectomy, open or laparoscopic, depends on clinical setting and equipment/technique availability. Because the configuration of the extrahepatic duct has been distorted, detorsion is the most important step before any dissection at the Calot triangle. Decompression of the gallbladder may be necessary for a severely distended gallbladder to facilitate detorsion. After detorsion, a cholecystectomy is performed with attention to avoid bile duct injury.

CONCLUSION

GV is a rare but potentially fatal condition. In a proper clinical setting, and with a high level of suspicion, there is no need to explore extra studies for preoperative confirmatory diagnosis, which may delay surgical intervention. Treatment is emergent cholecystectomy and detorsion first before dissection to avoid injury to the common bile duct. With prompt surgical intervention, the morbidity and mortality associated with this condition can be reduced with excellent prognosis.

References:

1. Reilly DJ, Kalogeropoulos G, Thiruchelvam D. Torsion of the gallbladder: a systematic review. *HPB (Oxford)*. 2012;14:669–672.
2. Wendel AV. A case of floating gall-bladder and kidney complicated by cholelithiasis, with perforation of the gall-bladder. *Ann Surg*. 1898;27:199–202.

3. Boonstra EA, van Etten B, Prins TR, Sieders E, van Leeuwen BL. Torsion of the gallbladder. *J Gastrointest Surg.* 2012;16:882–884.
4. Stieber AC, Bauer JJ. Volvulus of the gallbladder. *Am J Gastroenterol.* 1983;78:96–98.
5. Kitagawa H, Nakada K, Enami T, et al. Two cases of torsion of the gallbladder diagnosed preoperatively. *J Pediatr Surg.* 1997;32:1567–1569.
6. Gross LE. Congenital anomalies of gallbladder. *Arch Surg.* 1936;32:131–162.
7. Lemonick DM, Garvin R, Semins H. Torsion of the gallbladder: a rare cause of acute cholecystitis. *J Emerg Med.* 2006;30:397–401.
8. Nakao A, Matsuda T, Funabiki S, et al. Gallbladder torsion: case report and review of 245 cases reported in the Japanese literature. *J Hepatobiliary Pancreat Surg.* 1999;6:418–421.
9. Short AR, Paul RG. Torsion of the gallbladder. *Br J Surg.* 1934;22:301–309.
10. Shaikh AA, Charles A, Domingo S, Schaub G. Gallbladder volvulus: report of two original cases and review of the literature. *Am Surg.* 2005;71:87–89.
11. Lau WY, Fan ST, Wong SH. Acute torsion of the gallbladder in the aged: a reemphasis on clinical diagnosis. *Aust N Z J Surg.* 1982;52:492–494.
12. Matsuhashi N, Satake S, Yawata K, et al. Volvulus of the gall bladder diagnosed by ultrasonography, computed tomography, coronal magnetic resonance imaging and magnetic resonance cholangiopancreatography. *World J Gastroenterol.* 2006;12:4599–4601.
13. Yeh HC, Weiss MF, Gerson CD. Torsion of the gallbladder: the ultrasonographic features. *J Clin Ultrasound.* 1989;17:123–125.
14. Dasyam AK, Koo J, Stahlfeld Miller M, Sell HW Jr, Tublin ME. The cystic duct knot sign: case report with description of a new ultrasound sign of gallbladder torsion. *Emerg Radiol.* 2015;22:445–447.
15. Chung JC, Song OP, Kim HC. Gallbladder torsion diagnosed by MDCT and MRCP. *Abdom Imaging.* 2010;35:462–464.