Acute torsion of the gallbladder

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Acute torsion of the gallbladder is an uncommon disorder. If unrecognized early, it has an associated mortality approaching 100%. We report two cases from our institution, which presented over a 12-month period. This is only the second report in the literature to present more than one case. A summary of the etiology, diagnosis, and treatment is presented.

Just over 300 cases of torsion (volvulus) of the gallbladder have been recorded¹⁻³ since Wendel⁴ first described the entity in 1898. Two distinct clinical types of gallbladder volvulus have been described⁵: incomplete torsion, usually <180 degrees, which often has gradual onset with or without a palpable mass that may disappear after spontaneous detorsion; and complete torsion, usually >180 degrees, which more frequently has an acute onset with severe upper abdominal pain.

In the complete type, twisting of the cystic duct and vascular pedicle results in closed-loop obstruction and hemorrhagic infarction of the gallbladder. In this paper, two cases of acute torsion of the gallbladder, which were seen in our institution within an eight-month time period are presented.

Report of cases

Case 1

A 93-year-old woman presented with midabdominal pain of five hours' duration. The patient's appetite had been good, but she had had episode of emesis enroute to the hospital.

In the emergency room, the patient was in mild to moderate distress because of her abdominal pain. Her vital signs were stable. Physical examination revealed normal bowel sounds in all four quadrants of the abdomen, tenderness in the right upper and lower quadrants, and lower fullness on the right. Examining the patient in different positions found the lower quadrant fullness to be quite mobile within the abdomen; it seemed to shift in position between the right lower and right upper quadrants. No rigidity or signs of peritoneal irritation were found, and the abdomen was nondistended. A right inguinal hernia with easily reducible contents as

well as a left femoral hernia with incarceration of contents were noted. A stool sample tested negative for occult blood.

Laboratory evaluation revealed a hemoglobin level of 13.8 mg/dL, a leukocyte count of 6,700/cu mm, and a differential count of 78% segmented forms, 15% lymphocytes, 3% monocytes, 2% eosinophils, and 2% basophils. The serum inorganic phosphate level was 2.3 mg/dL (normal range, 2.5 to 4.5 mg/dL), and the serum amylase value was 215 units (normal range, 15 to 175 units). All other chemistry and clotting parameters were within normal limits.

Abdominal roentgenographic supine and upright views suggested an ileus without other remarkable findings.

The patient was resuscitated with intravenous fluids and admitted. On the first hospital day, she developed leukocytosis (21,000 cells per cu mm), increased pain, tenderness, and signs of peritonitis. She was taken to the operating suite, and abdominal exploration was performed.

On gross examination, the gallbladder was frankly gangrenous; however, no perforation was noted. There were areas of hemorrhagic infarction within the gallbladder on visual inspection as well. The gallbladder also was found to be twisted 900 degrees on its mesentery. Extreme ptosis of the gallbladder with a long, pendulous mesentery was found to have predisposed the patient to torsion.

Cholecystectomy was performed. Numerous multifaceted gallstones were found within the body of the gallbladder. Operative cholangiography had unremarkable findings. The properitoneal approach was used to repair the right inguinal hernia, and, after manual reduction of the left femoral hernia contents, the left hernia also was repaired in a properitoneal fashion.

On microscopic examination, the specimen was found to exhibit hemorrhagic infarction with loss of cellular detail and integrity. Vascular congestion particularly was noted. The patient had an uneventful postoperative course and was discharged on the sixth postsurgical day in good condition.

Case 2

A 78-year-old woman was brought by ambulance from a local nursing home to the emergency room

with a chief complaint of abdominal pain and associated nausea with vomiting. Historic information obtained from the patient as well as transfer records indicated that she had had six to eight bouts of emesis over the past 12 hours. The patient was given an enema without results prior to transfer.

Physical examination showed the patient to be alert, oriented only to place, and lying in a fetal-type position on her right side. She described this positioning as the most comfortable for her. The abdomen was found to be distended on visual examination; the bowel sounds were auscultated to be of normal pitch and character in all four quadrants. Palpation revealed tenderness throughout the abdomen, but more so in the right upper quadrant. No mass, organomegaly, or guarding was found, and the abdomen was soft without rigidity. A stool specimen tested negative for occult blood. Vital signs were stable, and the remainder of the examination was unremarkable.

Laboratory examination revealed a hemoglobin level of 14.2 mg/dL, a leukocyte count of 12,400/cu mm, and a differential count of 78% segmented forms, 9% banded forms, 8% lymphocytes, and 5% monocytes. All other chemistry and clotting parameters were within normal limits.

Abdominal roentgenograms were unremarkable. Radionuclide biliary function scanning failed to show any activity in the area of the gallbladder, showed a patent common bile duct emptying into the duodenum, and showed an area of very faint activity laterally and inferiorly to the duodenum. This was interpreted as possible minimal activity of the right kidney or duodenal loop diverticulum. (Retrospectively, this activity indeed may have represented the gallbladder.) Ultrasonographic examination confirmed a dilated gallbladder with sludge within its confines.

In the operating suite, gross examination showed infarction of the gallbladder with gangrenous changes (Fig 1). No perforation was noted. The gallbladder was found to be twisted 720 degrees on its mesentery. Cholecystectomy was performed without difficulty.

Microscopic examination demonstrated hemorrhagic infarction of the gallbladder with loss of cytologic and histologic detail (Fig 2). The patient recovered uneventfully and was released on the sixth postoperative day to her previous extended care facility in good condition.

Discussion

Etiology

Torsion of the gallbladder has been found in patients of all ages. Most, however, have been elderly women (seventh decade and beyond). The ex-

act mechanism of torsion is unclear. Brewer⁶ found an abnormal mobility of the gallbladder on a long mesentery in 5% of cadaver dissections. Gross⁷ suggested that the onset of torsion and anatomic variance is delayed in presentation until "supporting fat has largely disappeared from the surrounding structures and when atrophy of the tissues allows for greater ptosis of the viscera," and that this was cause for increased risk of torsion of the thin, "free-floating" gallbladder.

Many precipitating factors have been implicated; these include peristalsis in the stomach, duodenum, or colon,⁸⁻¹¹ tortuous arteriosclerotic cystic artery,^{2,8} venous stasis in the vessels of the gallbladder,⁹ skeletal deformity and kyphoscoliosis,^{5,12-14} violent movement,¹⁵⁻¹⁷ and a tense, heavy mobile gallbladder with its own peristaltic activity.¹⁸

The presence of gallstones also may be a contributory factor. It is postulated that stones might precipitate torsion by giving the colon more purchase on the gallbladder¹⁰ or by increasing peristalsis in the gallbladder.¹⁸ Levene¹⁸ found that 50% of women with reported gallbladder torsion had gallstones, whereas there was only 5% incidence of gallstones in postmortem examination of women of the same age. Certainly, the one constant factor is the free-floating gallbladder. Two cases^{19,20} of torsion of the fundus of the gallbladder have been reported, however.

Diagnosis

The diagnosis of torsion of the gallbladder is difficult because of the lack of a specific syndrome or pathognomonic sign. Only a high index of suspicion would lead one to a rapid diagnosis prior to laparotomy. Torsion of the gallbladder has been diagnosed correctly prior to surgery only twice^{21,22} in the literature.

With incomplete torsion, symptoms are very similar to recurrent biliary colic. With complete torsion, the patient experiences a sudden onset of excruciating pain, usually in the right upper quadrant. Short and Paul¹⁰ stated that "acute pain and vomiting without jaundice in an elderly female and the appearance within a few hours of onset of the greatly enlarged and palpable gallbladder are highly suggestive of the diagnosis of acute torsion of the gallbladder."

The clinical presentation may vary greatly. Reported cases of gallbladder torsion have had presurgical diagnoses of malignancy, incarcerated inguinal or internal hernia, twisted ovarian cyst, intestinal obstruction, perforated gastric ulcer, acute appendicitis, acute cholecystitis, and perforated gallbladder.^{12,23} Invariably, the patient has acute disease and undergoes laparotomy, during which the

Fig 1. Gross specimen after resection (case 2). Notice the gangrenous changes superimposed on the generalized organ infarction.

correct diagnosis is made. Leukocytosis usually is present, and there may be left shifting. Plain roentgenographs usually are not helpful, but radionuclide biliary function scanning and ultrasonography should aid in diagnosis.

Treatment

Treatment is cholecystectomy after detorsion to ensure that there is no tenting of structures in the porta hepatis or subsequent damage to the common duct. The procedure is easily performed due to the long mesentery of the gallbladder. The operative mortality rate should be less than 3% to 5% with early surgery; without surgical intervention, mortality from infarction, gangrene, perforation, and subsequent bile peritonitis is 100%.^{9,24}

Summary

Two cases of acute torsion of the gallbladder are described. Etiology, precipitating factors, presentation, diagnosis, treatment, and prognosis are discussed. With the devastating effect of delayed treatment, it is recommended that this entity be a part of the differential diagnosis when contemplating nonsurgical management of what is thought to be acute cholecystitis, especially in the elderly woman.

Fig 2. Hemorrhagic infarction with extensive loss of cytologic and histologic detail is seen in this photomicrograph of the gross specimen in Fig 1 (hematoxylin and eosin stain, 40x magnification).

1. Whipple RD, Sabo RR: Acute torsion of the gallbladder. *Am J Surg* 1979;137:798-799.
2. Stieber AC, Bauer JJ: Volvulus of the gallbladder. *Am J Gastroenterol* 1983;78:96-98.
3. Lin HC, Piro JF: Acute torsion of the gallbladder. *Conn Med* 1976;40:372-373.
4. Wendel AV: A case of floating gallbladder and kidney complicated by cholelithiasis with perforation of the gallbladder. *Ann Surg* 1898;27:199-202.

5. Carter R, Thompson RJ, Brennan LP, et al: Volvulus of the gallbladder. *Surg Gynecol Obstet* 1963;116:105-108.
6. Brewer GE: Differential diagnosis in diseases of the gallbladder and ducts. *Ann Surg* 1899;29:721.
7. Gross RE: Congenital anomalies of the gallbladder. *Arch Surg* 1936;32:131-162.
8. Caldwell KPS: Torsion of the gallbladder. *Br Med J* 1950;2:1425.
9. Lal RB, Pepper M, Puestow CB: Torsion of the gallbladder. *Arch Surg* 1968;97:750-752.
10. Short AR, Paul RG: Torsion of the gallbladder. *Br J Surg* 1934;22:301-309.
11. Barber AH: Acute torsion of the gallbladder. *Br Med J* 1939;2:1272-1273.
12. Rais O, Thulin CA: Torsion of the gallbladder. *Acta Chir Scand* 1957;113:289-293.
13. Mouzas GL: Torsion of the gallbladder in a kypho-scoliotic patient. *Postgrad Med J* 1960;36:686-687.
14. Ashby BS: Acute and recurrent torsion of the gallbladder. *Br J Surg* 1965;52:182-184.
15. Shah N: Torsion of the gallbladder in a child. *Br J Clin Pract* 1966;20:535-537.
16. Leger L, Debeyre J, Mazingarbe A: Volvulus de la vesicule biliaire. *J Chir* 1945;61:21-36.
17. Berry WH: torsion of the gallbladder. *JAMA* 1939;112:1580-1581.
18. Levene A: Acute Torsion of the gallbladder: Postmortem findings in two cases. *Br J Surg* 1958;45:338-340.
19. Rossouw J: Torsion of the gallbladder: A case where the gallbladder was firmly attached to the liver, letter. *S Afr Med J* 1970;44:47-48.
20. Schlinkert RT, Mucha P JR, Farnell MB: Torsion of the gallbladder. *Mayo Clin Proc* 1984;59:490-492.
21. Krabbel M: Die Stieltorsion der Gallenblase. *Dtsch Ztschr Chir* 1920;154:76-86.
22. Kettner G: A case of complete torsion of gallbladder. *Zentralbl Chir* 1930;57:589-590.
23. May RE: An unusual case of torsion of the gallbladder. *Br J Clin Pract* 1967;21:191-193.
24. Maingot R: Ptosis and volvulus or torsion of the gallbladder, in *Abdominal Operations*, ed 8. New York, Appleton-Century-Crofts, 1985, pp 1855-1868.

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