CASE REPORT

Gallbladder volvulus treated by laparoscopic cholecystectomy

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Summary An 83-year-old woman was admitted to our hospital because of right upper abdominal pain with acute onset. Computed tomography demonstrated a free-floating distended gallbladder with a tortuous cystic duct. Gallbladder volvulus was diagnosed preoperatively and laparoscopic cholecystectomy was performed successfully. Delayed diagnosis of gallbladder volvulus may have resulted in mortality in this case. A proper image study can lead to early surgical intervention and result in good prognosis.

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1. Introduction

Gallbladder volvulus is a relatively rare disease that is difficult to diagnose preoperatively. Early diagnosis with prompt surgical intervention has been shown to reduce the mortality to less than 5%.1 After Wendel published the first report of gallbladder volvulus in 1898,2 about 300 cases have been reported.3 Since Nguyen et al. reported the first case of gallbladder volvulus treated by laparoscopic cholecystectomy in 1995,4 seventeen cases diagnosed preoperatively and treated by the laparoscopic approach have been reported. We present an 83-year-old woman who was diagnosed to have gallbladder volvulus by preoperative computed tomography and was treated successfully by laparoscopic cholecystectomy.

2. Case report

An 83-year-old female presented to our emergency department with a 1-day history of abdominal pain with sudden onset. She had a history of scoliosis and right inguinal herniorrhaphy. The pain was located in the right upper quadrant, persistent and sharp in nature, and was...
accompanied by nausea and mild chills. There was no vomiting, fever, diarrhea, or constipation.

Physical examination revealed that the patient was thin and had a temperature of 36.1°C, a blood pressure of 141/63 mmHg, a pulse of 68 beats/minute, and a respiratory rate of 20 times/minute. Palpation demonstrated localized muscle guarding in the right hypochondriac region, but no abdominal mass was palpable. Initial blood tests showed an elevated white cell count (11900/mm³) with 90.2% neutrophils and an elevated lactate level (21.5 mg/dL; reference value: 3–12 mg/dL). Hemoglobin, liver function tests, serum bilirubin, electrolytes, creatinine, amylase, and lipase were unremarkable.

An abdominal plain film revealed scoliosis without ileus, and ultrasonography a distended cystic lesion in the right upper abdomen without attachment to the liver surface. Because it was difficult to determine the nature of the cystic lesion by ultrasonography alone, computed tomography (CT) of the abdomen was performed. A distended gallbladder with atypical anterior location was identified by the coronal view (Fig. 1). After focalized reconstruction, a tortuous cystic duct was demonstrated (Fig. 2). In spite of the patient’s history and physical examination, compatible with acute cholecystitis, gallbladder volvulus was diagnosed by the CT image.

Therefore, under the tentative diagnosis of gallbladder volvulus, we performed laparoscopic cholecystectomy. On laparoscopic examination, the gallbladder was found to be free-floating, twisted at its junction with the cystic duct and artery at 270 degrees, and gangrenous (Fig. 3). After detorsion and decompression by needle suction, a watershed line along the volvulus was noted at the junction of the cystic artery and duct. There was no intraoperative or postoperative complication. The patient’s postoperative course was uneventful and she was discharged on postoperative day 2. Pathological examination revealed gallbladder strangulation with congestion, mucosal necrosis and fibrin thrombi in vessels. A follow-up at the outpatient department one week after surgery showed that the patient was in good condition.

3. Discussion

Free-floating gallbladders can be classified into two types,1 as follows: type A, the mesentery supports the gallbladder and cystic duct, and type B, the mesentery supports the cystic duct only. Such abnormalities may explain the pathogenesis of torsion of the gallbladder. There are also two types of torsion: incomplete rotation of less than 180 degrees and complete rotation of 180 degrees or greater than 180 degrees.3 Our patient showed type B with complete rotation that resulted in a vascular supply compromise and gangrene.

Gallbladder volvulus was first described by Wendel in 1898.2 In two published reviews, one article mentioned 245 cases and the other 300 cases.1, 3 In almost all of the cases, open cholecystectomy was done by means of the Kocher incision or by mid-line exploratory laparotomy. Since May
Gallbladder volvulus treated by laparoscopic cholecystectomy

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
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<th>Gender</th>
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US = ultrasonography; CT = computed tomography; MRI = magnetic resonance imaging; MRCP = magnetic resonance choledochopancreatography; NM = nuclear medicine scan; AC = acute cholecystitis; GBV = gallbladder volvulus.

1995, when Nguyen et al. reported the first case of gallbladder volvulus treated by laparoscopic cholecystectomy,4 a few articles have mentioned the laparoscopic approach for gallbladder volvulus.

Gallbladder volvulus is difficult to differentiate from acute cholecystitis. Acute cholecystitis can be treated by antibiotics initially but volvulus should be treated by immediate cholecystectomy to avoid mortality. Triple triads are commonly used to make the preoperative diagnosis: specific symptoms (short history, abdominal pain, and early vomiting), physical signs (abdominal mass, absence of toxemia, and pulse rate–temperature discrepancy), and physical characteristics (thin, elderly, and deformed spine).3

Ultrasoundography findings are mainly nonspecific. A high index of suspicion is needed for the diagnosis of gallbladder volvulus, especially when the ultrasound reveals that the gallbladder is out of its position in the fossa, or if the gallbladder has a septated or conical connection to the region of porta hepatitis, which represents a twisted pedicle.6 CT and magnetic resonance choledochopancreatography (MRCP) can be useful in identifying a twisted cystic duct, but sensitivity may be low. The typical whirl sign of a cystic duct is very difficult to detect. A large, anteriorly floating gallbladder without gallstones (free-floating gallbladder sign) is observed most commonly in patients with torsion of the gallbladder by CT or ultrasonography.7

Correct preoperative diagnosis is made in only 9.8% of gallbladder volvulus cases, and most diagnoses are made intraoperatively. The peak incidence occurs in persons aged 60 to 89 years, and most of them are female. The overall female to male ratio is 3:1. Percutaneous transhepatic choledocystic drainage is difficult and should not be performed in patients with anatomic abnormalities related to minimal fixation of the gallbladder to the liver bed.1 This may result in delayed surgery and high mortality.

In our review, we have found 18 case reports in which patients were treated by laparoscopic cholecystectomy between 1995 and 2012 (including our case) (Table 1).3,8,10–23 Of these 18 cases, 4 were young (7 to 18 years old) and 14 were aged (73 to 95 years old). The young patients included 2 females and 2 males. The fourteen aged patients were all females. In addition to the peak incidence in aged persons, high incidence was noted in children. Female dominance noted in general. Gallbladder volvulus was diagnosed preoperatively in 5 patients and all of them underwent CT or MRI/MRCP. Preoperative CT or MRI/MRCP images, but not ultrasonography, identifying torsion of the gallbladder or cystic duct, can lead to preoperative diagnosis of gallbladder volvulus. Nuclear medicine studies can support the diagnosis of acute cholecystitis but not of volvulus.

Early diagnosis with prompt surgical intervention has been shown to reduce the mortality to less than 5%.1 Delayed diagnosis and failure of initial laparoscopic intervention have been reported in many cases. Proper image studies, especially CT and MRI, can lead to correct preoperative diagnosis. Correct preoperative diagnosis and prompt laparoscopic intervention are mandatory to bring about better postoperative outcome and life quality.8

References