



Case report

The deceitful diagnosis of gallbladder volvulus: A case report

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ABSTRACT

Introduction and importance: The gallbladder volvulus is a rare but life-threatening condition characterized by an axial torsion of the gallbladder along the cystic pedicle, causing gallbladder ischemia and necrosis. This paper aims to present and discuss a rare case of gallbladder volvulus. This case report has been reported in line with the SCARE criteria 2020 [1].

Case presentation: We report the case of a 90-year-old female patient who presented to the emergency room with sharp right upper abdominal quadrant pain of acute onset associated with vomiting, evolving for the last 12 h. She had no fever nor jaundice. Her body mass index (BMI) was 22. She had kyphosis, and scoliosis. Physical examination found tenderness with a palpable mass in the right upper abdominal quadrant. Laboratory test results showed leukocytosis at 11600 /mL and a high C-reactive protein rate at 40 mg/L revealed acute calculous cholecystitis features. However, emergency laparotomy was performed and discovered a gallbladder volvulus. A detorsion and cholecystectomy were performed with a good outcome.

Clinical discussion: The preoperative diagnosis of gallbladder volvulus is difficult due to its misleading clinical presentation mimicking acute cholecystitis. The presence of the three highly suggestive triad clinical signs should encourage the radiologist to search for a gallbladder with a horizontal orientation and located outside its anatomical fossa connected to the liver by a conical structure corresponding to the twisted pedicle in ultrasonography. Unlike ordinary acute cholecystitis, which may sometimes tolerate an initial conservative medical treatment, gallbladder volvulus management is always an emergency cholecystectomy.

Conclusion: Despite the clinical similarities with the classical acute calculous cholecystitis, gallbladder volvulus is more likely to result in fatal outcome. Therefore, a high level of clinical suspicion is necessary to save lives.

1. Introduction

Gallbladder volvulus is an extremely rare biliary emergency [1,2]. It is marked by an axial twisting of the gallbladder around its mesenteric axis, causing an interruption of the vascular and biliary flow [1,3]. Among a total number of published cases not exceeding 500 worldwide, the preoperative diagnosis was made in only 10% of the collected cases [4,5]. Unlike acute calculous cholecystitis, where the pathophysiological mechanism is based on ductal obstruction with normal blood flow, gallbladder volvulus involves strangulation of the cystic pedicle. This rapidly leads to gallbladder necrosis and perforation with fatal outcome [5]. Therefore, particular awareness and perfect knowledge of the various suggestive clinical and radiological signs help avoid an urgent cholecystectomy delay, responsible for a poor prognosis and a high

mortality rate. The diagnostic dilemma encouraged us to present this new case of gallbladder volvulus successfully managed in our center.

2. Presentation of case

A 90-year-old female patient presented to the emergency department with a 12 h-history of an acute sharp pain of sudden onset located in the right upper quadrant of the abdomen, associated with bilious vomiting without inability to pass gas or stools. She had a past medical history of dyslipidemia treated with statins and hypertension treated with calcium channel blocker, with no previous surgical history. She had no significant past family history. The clinical examination showed a thin patient with dorsal kyphosis and scoliosis. She had no jaundice or fever. She was hemodynamically stable. Her pulse rate was 104 per min and regular.

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Blood pressure was 110/60 mmHg. Otherwise, cardiovascular and respiratory system examination was normal. Abdominal examination revealed tenderness in the right upper abdominal quadrant with a palpable mass. The blood tests showed leukocytosis at 11600 /ml and a high C-reactive protein rate at 40 mg/L. The liver function tests and pancreatic enzymes were within normal limits. The electrolyte test showed a hypokaliemia at 3.3 mmol/L and the renal function test was normal. An emergency abdominal ultrasound showed a distended gallbladder measuring 12 × 6.5 cm in diameter with a 5 mm thickened laminated wall with multiple gallstones. The gallbladder was displaced, plunging into the right iliac fossa. Given these findings, the diagnosis of calculous acute cholecystitis was initially considered. The patient was then admitted to the surgical department of the tertiary care hospital of Jendouba, underwent a brief resuscitation with correction of electrolyte disorder, pain management, and empirical intravenous antibiotic therapy based on Cefotaxime 1 g every 8 h, metronidazole 500 mg every 12 h and gentamicin 240 mg once per day. Two hours later, she was transferred to the operating room to undergo an emergency cholecystectomy. A senior surgeon with ten years surgical specialty experience conducted the surgery. A right subcostal approach was performed due to the patient's anatomical spinal deformities, which inhibited an easy and risk-free laparoscopic procedure. Intra-operative findings showed a distended gallbladder descending into the right iliac fossa and distorted around its mesenteric pedicle, making 3 counterclockwise twists (Fig. 1). It was suspended freely from the liver bed to which it was only attached by a very small and almost non-existent mesentery (Fig. 2). The surgical procedure consisted of detorsion, cautious cholecystectomy, and a suction Redon drain was placed in the right subhepatic space. The postoperative course was uneventful. The drain was changed on postoperative day one containing 50 ml of serohematic liquid. It was removed on postoperative day two empty. Her surgical wound was clean. She was discharged on postoperative day 3. She was put on analgesics and venous thromboembolism prophylaxis. Medical follow-up visit on postoperative day ten showed a fully-recovered patient. She



Fig. 1. Intraoperative view showing the volvulated gallbladder with its twisted pedicle (yellow arrow) and the common bile duct (green arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

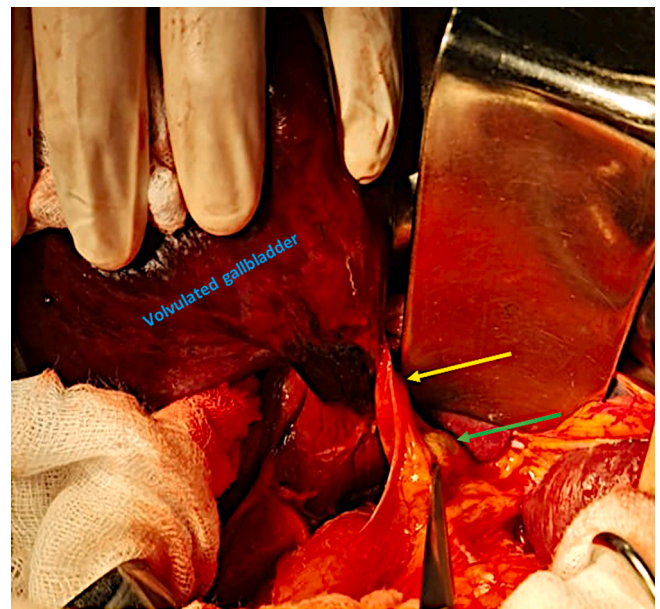


Fig. 2. Intraoperative view of the surgical specimen showing the almost absent mesentery attaching the freely mobile gallbladder to the liver bed.

was highly satisfied with the management and the clinical outcome. Histological examination of the surgical specimen showed lesions of acute ischemic cholecystitis without signs of malignancy. This case report has been reported in line with the SCARE criteria 2020 [1].

3. Discussion

Gallbladder volvulus is an infrequent cause of acute abdomen. Despite its clinical similarities with the classical acute calculous cholecystitis, the outcome is more rapidly fatal. Since its first description in an adult woman at the end of the 19th century, it has remained predominant in female with male to female ratio of 1/4 [2,7]. It occurs in 84% of cases in adults with a peak incidence between 60 and 80 years [2,7].

Its underlying etiopathogenic mechanism is based on the presence of a hypermobile gallbladder, generally described as “floating” [2]. Gross' classification identified the two anatomical variations of the mesentery resulting from embryological anomalies of gallbladder migration leading to a congenitally floating gallbladder. The first type corresponds to a long and wide mesentery, and the second includes an incomplete or absent mesentery where only the cystic duct is attached to the liver as it is described in the current case [3,8].

The other predisposing factors that trigger the final twisting are age-induced liver atrophy, a decrease of visceral fat and elastic tissues necessary for the support of the gallbladder [2], kyphosis and scoliosis putting the gallbladder in a descending position [2,6], and atherosclerosis making the cystic artery rigid and tortuous [6]. The increase in the neighboring gastrointestinal tract organs' peristaltic movements is another contributing factor, essentially the colon, which accounts for clockwise rotation, and the stomach for anticlockwise rotation [2]. The absence of gallstones in more than 50% of cases suggests the absence of a direct relationship with this condition [4].

The deleterious effect of this disease is ascribed to the cystic artery's strangulation causing a complete interruption of the cystic blood flow. In the case of a complete volvulus with a rotation exceeding 180°, spontaneous detorsion is impossible [6], and the progression occurs towards gallbladder necrosis and perforation, which is 100% fatal in the absence of prompt surgical management [7,8].

The clinical presentation is not specific, and the signs mimic those of acute cholecystitis [2,4]. The patient usually presents severe pain in the right upper abdominal quadrant associated with nausea or vomiting

without fever or jaundice [5,7]. A palpable mass in the right upper quadrant of the abdomen corresponding to the markedly distended gallbladder may also be found [4,7].

Nevertheless, the patient's overall approach as soon as he/she presents to the emergency room allows detecting clinical leads highly suggestive of volvulus. Lau et al. summarized these criteria in three triads. The first triad of the patient's characteristics includes an elderly, thin female with spine deformities. The triad of symptoms is based on the sudden onset, the pain of the right upper abdominal quadrant, and the early vomiting. The last triad of clinical signs is made of a palpable gallbladder, the absence of sepsis or jaundice, and pulse-temperature discrepancy [2,6,9]. Our patient met all these criteria. Perfect knowledge of these valuable clinical clues associated with an overall attentive approach helps inexperienced young surgeons avoid missing such an emergency and save lives.

Abdominal ultrasonography, the most available first-line radiological examination that is usually requested in this case, rarely differentiates it from ordinary acute cholecystitis, especially in the presence of associated gallstones [8,10]. However, if the previously discussed suggestive clinical signs are detected, the informed radiologist may search for a gallbladder with a horizontal orientation and located outside its anatomical, connected to the liver by a conical structure corresponding to the twisted pedicle [2,6]. However, these specific radiological signs are exceptional. The beneficial and effective use of the Doppler, visualizing an interrupted blood flow in the cystic pedicle, is an easy key measure that immediately sorts out the diagnosis and saves lives [2]. In doubt, the abdominal CT scan is requested to search for two specific signs proposed by Layton et al.: the "Beak sign" and the "Whirl sign," both of which translate the change in angulation of the twisted cystic pedicle [2,6,11]. Decreased enhancement of the gallbladder wall usually confirms parietal ischemia [2,6]. The hepatobiliary iminodiacetic acid (HIDA) scan may show a "Bull's eye" appearance indicating accumulation of radioactive tracer within the gallbladder [4]. Careful image analysis and attentive search for these radiological features help to establish the right diagnosis.

Unlike ordinary acute cholecystitis, which may sometimes tolerate an initial conservative medical treatment, gallbladder volvulus treatment is undoubtedly an emergency cholecystectomy in order to avoid gallbladder perforation and fatal biliary peritonitis that follows [6]. Young surgeons need to consider this unusual diagnosis in the presence of the suggestive clinicomorphological features. Once the diagnosis is made, an urgent cholecystectomy should be offered without resorting to a preliminary antibiotic treatment, for which a management-delay by inadvertence could lead to a biliary peritonitis. This cholecystectomy is best performed by laparoscopic procedure and should be carried out with caution, considering the changes in the anatomical configuration caused by the torsion [3,8]. In case of hazardous cystic duct identification, conversion is recommended [7], and the right sub-costal approach may also be chosen since the beginning, particularly in case of spinal deformities frequent in this context. Cholecystectomy must be preceded by detorsion to prevent an iatrogenic common bile duct injury during Calot's triangle's dissection [3]. Bustos et al. described the first case of gallbladder volvulus treated with robotic surgery and proposed an innovative way of real time cystic artery detection using the intravenous injection of fluorescent indocyanine in the aim of facilitating the operative procedure [4]. However, this promising novel technology is not yet available in all centers such as ours.

4. Conclusion

Gallbladder volvulus is both rare and serious. It presents a differential diagnosis of lithiasis cholecystitis. Some clinicoradiological features suggest it. The sonographer must be alerted of the suspected diagnosis in order to carry out a Doppler study to establish the diagnosis. The recognition of this entity could change the management. Indeed, initial antibiotic therapy runs the risk of perforation. In order to avoid a

choleperitoneum, it is necessary to operate urgently. Laparotomy is recommended in case of troubled trunk posture reducing the operative space and dissection of the cystic pedicle must be done with caution.

Abbreviations

| | |
|------|----------------------------------|
| CT | Computed tomography |
| HIDA | Hepatobiliary iminodiacetic acid |

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None.

Ethical approval

An ethical approval was obtained from the Jendouba Regional Hospital Medical Ethics Committee N° JH26Y21. We confirm that all methods were performed in accordance with the ethical guidelines of the 1975 Declaration of Helsinki.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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- Conceptualization: AM
- Data curation: AO
- Supervision: SS
- Writing - original draft: KA
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Declaration of competing interest

The authors declare that they have no conflicts of interest.

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