

## Gallbladder Torsion: A Rare Cause of Acute Abdomen

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### Case Study

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#### ABSTRACT

Gallbladder torsion is one of the important causes of acute abdomen. Early diagnosis and treatment is important because surgical intervention is required. Abdominal ultrasonography (US) and contrast-enhanced computed tomography (CT) are useful diagnostic tools prior to surgery. Here, we present the case of an elderly woman who underwent emergency cholecystectomy due to gallbladder torsion.

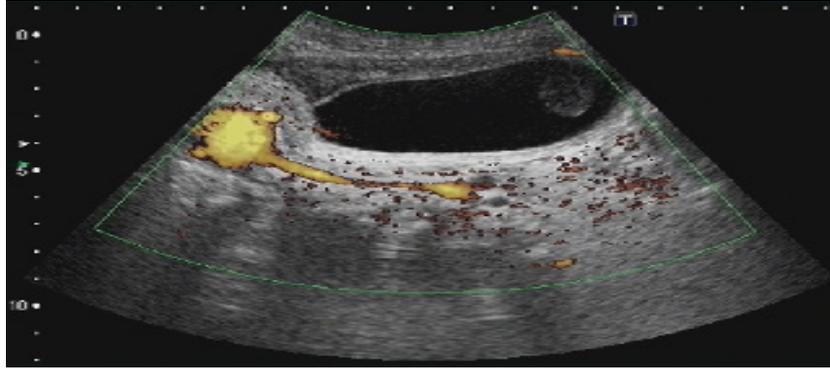
### INTRODUCTION

Patients with right upper quadrant pain are often seen in the emergency department. Most of these are cases of acute cholecystitis. The symptoms of acute cholecystitis are similar to gallbladder torsion, and it is difficult to diagnose the underlying condition before surgery. Although gallbladder torsion is rare, doctors should be familiar with this condition and it should be included in the differential diagnosis of acute abdomen.

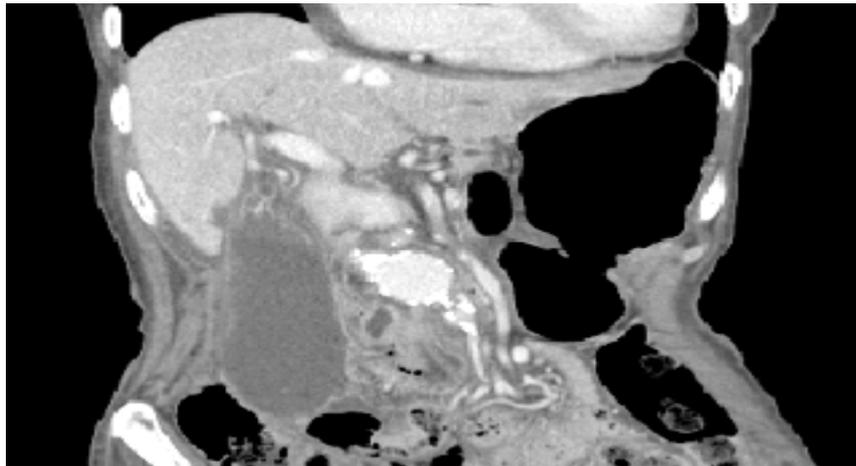
### CASE DESCRIPTION

An 89 year old Japanese woman with hypertension was admitted to our hospital due to the acute onset of severe right upper quadrant pain, without fever. Her vital signs were within normal limits. Physical examination revealed severe right upper quadrant tenderness with a negative Murphy's sign. Her laboratory data revealed the following: Hemoglobin level, 12.2 g/dl; white cell count, 8300/ $\mu$ l; platelets  $10.6 \times 10^4$ / $\mu$ l; C reactive protein, 9.49 mg/dl; aspartate aminotransferase, 30 U/l; alanine aminotransferase, 26 U/l; lactate dehydrogenase, 280 U/l; total bilirubin, 1.18 mg/dl; blood urea nitrogen (BUN) 20.9 mg/dl; serum creatinine level 0.74 mg/dl; alkaline phosphatase, 217 U/l; and gamma-glutamyl transpeptidase, 53 U/l. Abdominal ultrasonography revealed an enlarged gallbladder without blood flow (Figure 1).

Contrast-enhanced CT in the coronal view showed a swollen gallbladder without enhancement (Figure 2). According to the physical examination and diagnostic imaging, a diagnosis of gallbladder torsion was obtained, and acute laparoscopic cholecystectomy was subsequently performed. The cholecystectomy specimen exhibited thickened walls and necrosis (Figure 3.A and 3.B). After surgery, the patient was discharged from the hospital on the eighth post-operative day, without complications.



**Figure 1.** Abdominal US showing a swollen gallbladder without blood flow.



**Figure 2.** Coronal view of a contrast-enhanced CT showing an enlarged gallbladder without contrast enhancement.



**Figure 3.A.** Surgical specimen of the gallbladder and histopathologic examination showing a wide area of necrosis in the gallbladder wall.



**Figure 3.B.** Surgical specimen of the gallbladder and histopathologic examination showing a wide area of necrosis in the gallbladder wall.

## DISCUSSION

The present case provides two important clinical messages.

First, gallbladder torsion is rare yet one of the important differential diagnoses of acute abdomen because it requires emergent surgery [1]. Without treatment, life-threatening complications, such as gallbladder gangrene, gallbladder perforation, and bilious peritonitis, occur [2]. However, it is difficult to diagnose preoperatively. According to a previous report, less than 10% of patients are diagnosed as having gallbladder torsion preoperatively [3]. The symptoms of gallbladder torsion are similar to those of acute cholecystitis [4]; additionally, gallbladder torsion is frequently misdiagnosed as acute cholecystitis, because no single clinical, serologic, or radiographic finding is lesion specific [5]. There are several risk factors for gallbladder torsion: age more than 70 years, female sex, weight loss, liver atrophy, kyphoscoliosis, atherosclerosis, an elongated mesentery, and loss of visceral fat [6]. When physicians examine a patient with right upper quadrant pain and these characteristics, they should be aware of this rare disorder. An early diagnosis and adequate intervention of gallbladder torsion prevent poor outcomes.

Second, various imaging techniques are useful tools for making a diagnosis [7], such as abdominal ultrasonography (US) and abdominal CT. An abdominal ultrasonogram of gallbladder torsion is similar to that of acute cholecystitis [8]. To distinguish these two diseases, several findings are helpful. When the gallbladder is located outside of the fossa and inferior to the liver (an abnormal location), this can help diagnose gallbladder torsion [9]. Color Doppler US is useful for visualizing blood flow, and gallbladder torsion is characterized by ischemic change [10]. Cholelithiasis visualized using US may support the diagnosis of acute calculous cholecystitis [11]. According to Nakao et al.'s review, in patients with gallbladder torsion, only 24.4% had coexisting cholelithiasis [12]. Physicians should perform abdominal US multiple times to make an early diagnosis. Additionally, contrast-enhanced CT is also beneficial for diagnosing gallbladder torsion. Contrast-enhanced CT can help physicians visualize an abnormal location of the gallbladder without blood flow and swirl sign of the cystic duct [13], and the gallbladder is more distended in torsion than in acute cholecystitis [14]. Sharon et al. reported that three-dimensional reconstructed CT assisted in establishing a preoperative diagnosis and proceeding to surgery immediately [15]. In our case, a combination of abdominal US and contrast-enhanced CT findings helped us diagnose this rare condition. Information from clinical and imaging studies can facilitate the preoperative diagnosis..

## CONCLUSION

Gallbladder torsion is a rare disease that requires operative treatment. Diagnostic imaging aids in its early diagnosis and treatment.

## CONSENT

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

## AUTHOR'S CONTRIBUTIONS

Yoshiaki Hirohata performed surgery. Both authors read and approved the final manuscript.

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