

# Management of a Case of Gangrenous Cholecystitis Detected in the Emergency Department

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## Abstract

**Objective:** Acute cholecystitis is a condition that most clinicians know how to examine and treat, however, evaluation of the radiological findings of gangrenous gallbladder disease and estimation of the urgency of the situation may not be familiar to the emergency physician.

**Case Report:** A 79-year-old female patient was admitted to our Emergency Department with abdominal pain. Findings of cholecystitis were found in her examination and tests. No clear information could be obtained on computed tomography. Abdominal ultrasound was requested because a high probability of gallbladder pathology was considered in the diagnosis. Floating membranes (considered as a sign of gangrenous cholecystitis) were seen in the gallbladder and free fluid at the pelvic level were detected. Due to the comorbidities of our patient, percutaneous drainage catheter was initially planned by the General Surgeon, but due to the deterioration of her general condition, she was taken to emergency operation. Perforation was detected in the gallbladder neck during the operation. She was treated at the hospital for 30 days and was discharged with recovery.

**Results and Conclusion:** Acute gangrenous cholecystitis is a rare cause of gallbladder diseases. It is difficult to diagnose for emergency physicians when clinical signs are unclear. In this article; we aimed to remind emergency physicians that the picture of cholecystitis can worsen rapidly, what should be considered in the examinations and complications.

**Key words:** Gangrenous cholecystitis, Floating membranes, Acute cholecystitis, Emergency Department

## Introduction

Acute gangrenous cholecystitis (AGC) is a rare cause of acute abdominal pain. It is seen in the advanced stage of acute cholecystitis. AGC risk factors include diabetes mellitus, male gender, advanced age, and coronary heart disease. Gangrenous cholecystitis can be seen in 2-29% of all cases of acute cholecystitis<sup>1</sup>. It is thought that gangrenous cholecystitis develops as a result of abnormal gallbladder distension and subsequent ischemic mural necrosis due to vascular insufficiency<sup>2</sup>. Especially in patients who develop stony cholecystitis; If the stone blocks the bladder neck, epithelial damage due to vascular injury, localized ischemia and necrosis of the gallbladder wall develops.

As in all patients with cholecystitis the first imaging method in AGC patients should be abdominal ultrasound (USG). Sonographic findings suggestive of gangrenous changes; Intraluminal floating membranes (indicating exfoliated mucosa), echogenic shadows compatible with gas in the gallbladder wall or lumen, significant loss of wall integrity, and pericholecystic abscess formation<sup>3</sup>. Specific computed tomography (CT) findings suggestive of gangrenous cholecystitis; gas foci in the gallbladder wall, lack of

contrast enhancement (focal or diffuse), intraluminal membranes and pericholecystic abscess formation. AGC should also be considered in cases where the wall shows a layered structure and there is more than normal enhancement in the liver parenchyma<sup>4,5</sup>.

## Case

A 79-year-old female patient applied to our Emergency Service with complaints of abdominal pain and fainting. She was previously diagnosed with hypertension, diabetes, and chronic bronchitis. In her examination, her vital signs were stable, and no neurological deficit was found. Abdominal examination revealed tenderness in the epigastrium and right upper quadrant. Murphy's sign was suspiciously positive. Electrocardiography (ECG) showed normal sinus rhythm. In the blood tests taken; leukocyte 12 10<sup>9</sup>/lt, C-Reactive Protein 0.7 mg/dl, amylase 1191 U/lt, direct bilirubin 1.53 mg/dl, Gamma-glutamyl transferase 101 U/lt, lipase 2974 IU/lt, alanine aminotransferase 120 U/lt, and blood sugar 180 mg/dl, other blood values were found to be normal. According to these results, contrast-enhanced abdominal CT was re-

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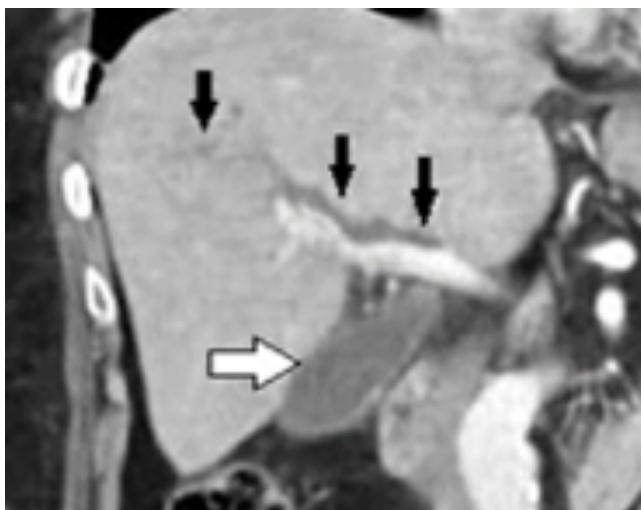
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**Figure-1:** Mild-dilated intrahepatic bile ducts (*black arrows*) in CT scan with IV contrast material. The gallbladder wall appears regular and intact (*white arrow*).

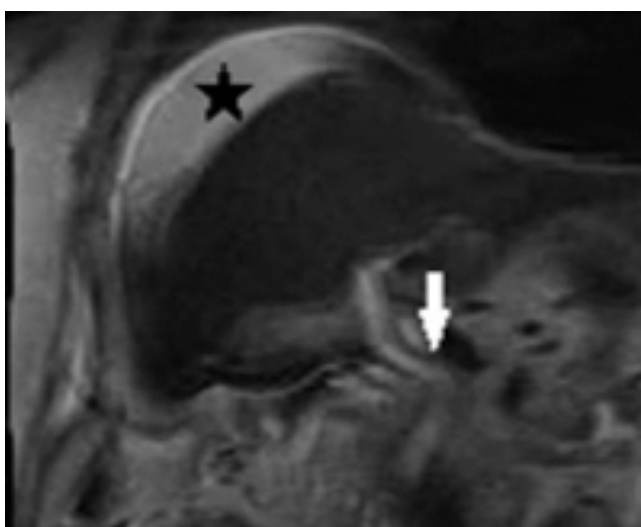


**Figure-2:** Thickened gallbladder wall (*uncolored arrow*), intraluminal membranes representing sloughed mucosa (*white arrows*) in Ultrasonogram. Free fluid is observed around the liver (*stars*).

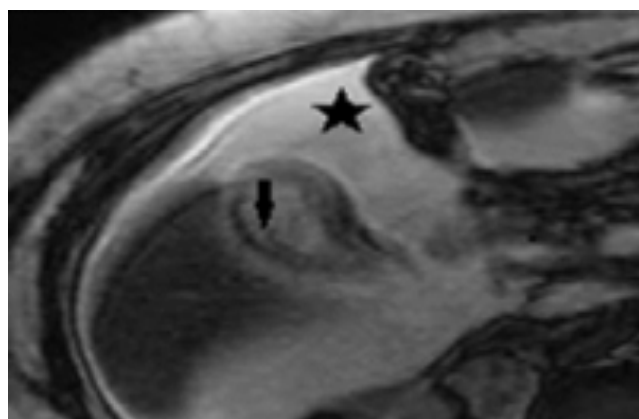
quested with the preliminary diagnosis of acute pancreatitis. It was reported as ‘moderate dilatation was observed in the intrahepatic bile ducts, the diameter of the common bile duct was 8 mm, there is no wall thickness in the gallbladder, there is no pathology in the pancreatic tissue’ (Figure-1). The result of the abdominal USG performed for the gallbladder pathology immediately after CT: ‘Moderate dilatation of the intrahepatic bile ducts, an increase in the thickness of the gallbladder wall (5 mm), and intraluminal membranes in the gallbladder lumen were detected. There was no pericho-

lecystic abscess. Free fluid was observed in the abdomen’ as seen in Figure-2.

Because our patient had additional diseases, the infection parameters were not very high, and her vital signs were stable; she was admitted for medical treatment, percutaneous catheter (PC) drainage with a preliminary diagnosis of cholecystitis was planned by the general surgeon. Intravenous aerobic and anaerobic antibiotic therapy was started. Magnetic resonance cholangiopancreatography (MRCP) was requested as further investigation (Figure-3,4) and



**Figure-3:** MRCP image of the same patient. No stones are observed in the choledochal lumen (*white arrow*). Free fluid is observed around the liver (*star*).



**Figure-4:** Hypointense intraluminal membranes in the gallbladder (*black arrow*) and free fluid around the liver (*star*) in axial T2-weighted MR image

MRCP findings were reported as: 'Free fluid was observed around the liver and the spleen. Gallbladder wall thickness has increased, intraluminal membranes were observed in the gallbladder lumen. No stones were detected in the lumen of the common bile duct'.

While the interventional procedure was planning, the patient's blood pressure dropped to 80/50 and she had pre-syncope, the level of CRP (20.7 mg/dl) and leukocyte ( $18.66 \times 10^9/l$ ) increased, therefore emergency laparotomic surgery was performed. During the operation, it was observed that there was a gallbladder neck perforation. The gallbladder was examined by the pathologist and it was reported as 'multifocal necrotic areas were observed on the outer surface'. Our patient was discharged with recovery after being followed up in the post-operation intensive care unit for 30 days.

## Discussion

AGC is a rare, fatal form of cholecystitis that can worsen rapidly if undiagnosed, and may be difficult to differentiate from acute cholecystitis by physical examination and laboratory tests. Typical Murphy sign positivity may not always be seen. In a study by Simeone et al., they found that Murphy's sign was positive in only 33% of cases of AGC, and they explained this with denervation of the gallbladder wall<sup>6</sup>. Although our patient also had a disease such as diabetes that could cause neuropathy, the suspicious positive murphy sign gave us a clue and further examination was performed to rule out upper abdominal pathologies.

In AGC, bilirubin and infection parameters are found to be significantly higher, just like in patients with non-gangrenous acute cholecystitis. To distinguish it, the focus should be on radiological methods. Abdominal USG is the examination that best detects gallbladder pathology and should be requested first. Since very high values were observed in pancreatic examinations in our case, we primarily requested contrast-enhanced abdominal CT to rule out pancreatitis. Even if there was no finding suggestive of gallbladder infection or perforation in the CT report, abdominal USG for the gallbladder was also performed immediately afterward, and findings in favor of cholecystitis were observed. 'The membranes in the gallbladder' on the requested abdominal USG suggested gangrenous cholecystitis.

In AGC patients; Gallbladder perforation develops as a result of transmural necrosis and is seen in 2%-11% of cases of acute cholecystitis. The gallbladder mucosa peels inward. The most common perforation site is the fundus. Small areas of perforation are difficult to detect on imaging. A focal defect in the gallbladder wall can be seen on USG, CT, and MR images. Extraluminal gallstone is a specific imaging finding indicating perforation<sup>7, 8</sup>. In our patient, the perfora-

tion site was found to be the neck of the gallbladder, unlike the literature. In perforations in the fundus, since it is the largest anatomical region of the gallbladder, there is a faster and greater amount of fluid escape. In our patient; The bile flow in the form of leakage from the neck of the gallbladder became evident over time, a late finding occurred in the patient and caused a sudden clinical change.

In patients with gangrenous cholecystitis with or without perforation, emergency surgery is usually preferred. When perforation develops, laparotomic surgery is performed. Intravenous (IV) antibiotics should be added to the treatment. In patients in whom surgical intervention cannot be performed, PC drainage can be applied<sup>9</sup>. In the case of AGC examined by Faraji et al., only a drainage was applied without any operation, although there was a perforation. They preferred this form of treatment because the case was asymptomatic and the general condition had not deteriorated<sup>10</sup>. Due to the advanced age of our patient, her good general condition, and comorbidities, the general surgeon decided to apply PC drainage as the primary treatment method. However, laparotomic surgery was performed after the infection parameters increased despite IV antibiotic treatment, the amount of free fluid in the abdominal cavity increased and the general condition of the patient deteriorated.

## Conclusion

Cases of AGC usually present with clinical findings indistinguishable from non-gangrenous cholecystitis symptoms, and more meticulous evaluation of imaging tests is required to reach an accurate diagnosis in patients. Since patients with AGC usually show symptoms of non-gangrenous acute cholecystitis, it does not seem like a condition that can be overlooked, but further investigation may waste time and increase the risk of perforation. In this case, the physician who will perform the surgical procedure will need to be more meticulous and act quickly when choosing the treatment method, and also be alert to possible problems.

In this article; We aimed to remind the emergency physician who first examines the patient, to recognize the findings in the radiology reports, to emphasize the importance of radiology methods in detecting gallbladder or bile duct pathologies, and to guide the surgeon in the field of emergency interventional procedures.

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