Case Report

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# Acute Emphysematous Cholecystitis Rarely Accompanied by Necrotized Cystic Duct: A Case Report

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## Abstract

Emphysematous cholecystitis is an acute abdominal disease characterized by gas in the gallbladder lumen and wall. Emphysematous cholecystitis and related cystic duct necrosis are rare, but if not noticed, they can cause a mortal picture up to perforation and sepsis. In this article, we present a case of emphysematous cholecystitis involving gangrenous gallbladder and necrotizing cystic duct, which developed suddenly in an immunosuppressive patient who presented to the emergency department with abdominal pain and was treated with rapid emergency successful surgery.

**Keywords:** Abdominal pain, emergency surgery, emphysematous cholecystitis, gangrenous cholecystitis, necrotizing cystic duct

## Introduction

Acute emphysematous cholecystitis (EC) is a rare cause of acute abdomen characterized by the presence of gas in the gallbladder lumen, wall, and sometimes in the bile duct (1). It is usually caused by gas-forming bacteria. Gallbladder ischemia, which develops as a result of vascular insufficiency due to endarteritis, can be seen among the causes (2). EC immunosuppression may be associated with uncontrolled diabetes mellitus and advanced age. The mortality and morbidity of EC are high due to the high risk of perforation and sepsis. Therefore, EC is a condition that requires urgent surgical treatment (3). Patients present to the emergency department (ED) most frequently with right upper quadrant pain. The symptoms of EC can sometimes be vague and indistinguishable from uncomplicated acute cholecystitis. Fever, nausea, and vomiting are the other main clinical symptoms. Demonstrating the presence of gas in the gallbladder wall and lumen with computed tomography (CT) is necessary for differential diagnosis (5,6). In this article, we present a case of emphysematous cholecystitis involving the gangrenous gallbladder and necrotizing cystic duct, which developed suddenly in an immunosuppressed patient who presented to the ED with complaints of abdominal pain, constipation, loss of appetite, and nausea, and was treated with rapid emergency surgery.

## Case Report

A 68-year-old man presented to the ED with complaints of widespread abdominal pain, constipation, anorexia and nausea for 3 days. His past medical history included chronic obstructive pulmonary disease (COPD) for 10 years and non-small cell lung cancer for 3 years. He was undergoing immunotherapy treatment for lung cancer. There was no previous history of gallstones. On physical examination, he was conscious and had orientation-cooperation. His blood pressure was 110/65 mmHg, heart rate was 115/min (rhythmic), oxygen saturation was 93%, fever was 36.7°C, and respiratory rate was 22/min. There was widespread tenderness on abdominal examination, Murphy's sign was positive, defense and rebound signs were positive. In blood tests, leukocyte count 10.37x109/L, neutrophil count 8.34x109/L, hemoglobin 11 g/dl, platelet count 187x109/L, C-reactive protein 235.02 mg/L, aspartate aminotransferase 13 U/L, alanine aminotransferase 6.2 U/L, alkaline phosphatase 65 U/L, gamma glutamyl transferase 36 U/L, lactate dehydrogenase 306 U/L, total bilirubin 1.08 mg/dl. In the standing direct abdominal X-ray, a large oval radiolucent area was seen around the radiopaque area in the region compatible with the gallbladder lodge (Figure 1). Abdominal CT with oral contrast was performed because the patient had abnormal kidney function tests (creatinine

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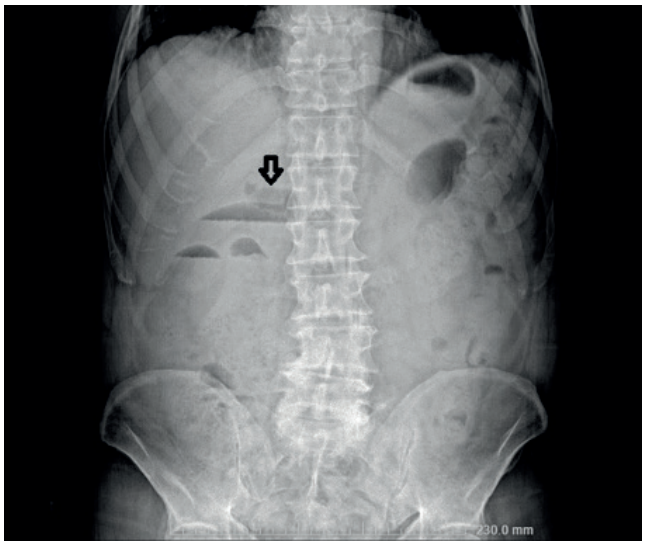

**Figure 1.** Gas image in the gallbladder wall on the direct radiograph, indicated by the arrow.

and blood urea nitrogen). In addition, oral contrast-enhanced abdominal CT was preferred to better visualize the presence of air-fluid levels in the intestines. The reason for choosing this was explained to the patient. Air-fluid level in the gallbladder lumen, air image in the gallbladder wall and cystic duct were present in CT with oral contrast (Figure 2). The patient was taken to an emergency operation with a preliminary diagnosis of EC. Laparoscopic cholecystectomy was started with the

**Figure 2.** Gas image in the gallbladder wall in computed tomography, indicated by arrow.

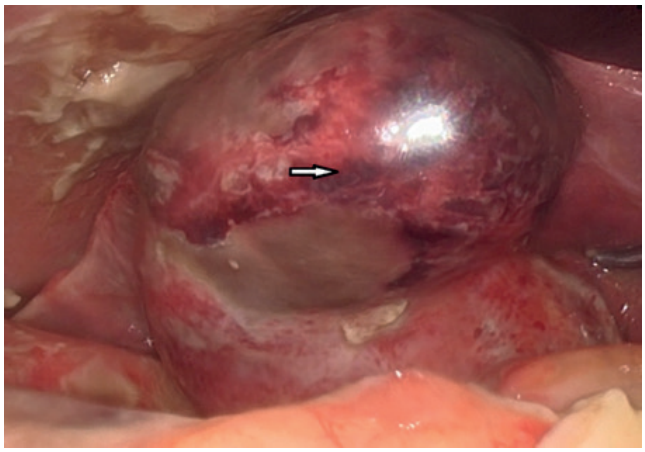

**Figure 3.** Gangrenous gallbladder, indicated by arrow.

classical 4 trocar method. The omentum, hepatic flexure, and proximal transverse colon were attached to the fundus of the gallbladder. The duodenum was attached to the gallbladder. After these areas were separated, the gallbladder was exposed. The gallbladder was hydropic and most of its anterior wall was gangrenous (Figure 3). Air bubbles appeared to come out of the wall as the gallbladder was suspended. The triangle of Callot was tried to be revealed. Necrosis of the cystic duct was observed (Figure 4). The cystic duct was clipped and cut, seeing intact tissue closest to the common bile duct. Then, the gallbladder was separated from the liver lodge and taken out of the subxiphoid incision with the help of an endobag. Drainage and intravenous antibiotics were applied to the patient in the postoperative period. The patient was successfully treated and was discharged from the hospital on the 6th postoperative day. The pathology of the resected gallbladder was reported as chronic cholecystitis material with full-thickness infarct necrosis in the entire organ and cystic duct.

## Discussion

EC is an emergency surgical condition that should be considered in the differential diagnosis of patients presenting to the ED with the acute abdomen (7). Although EC is

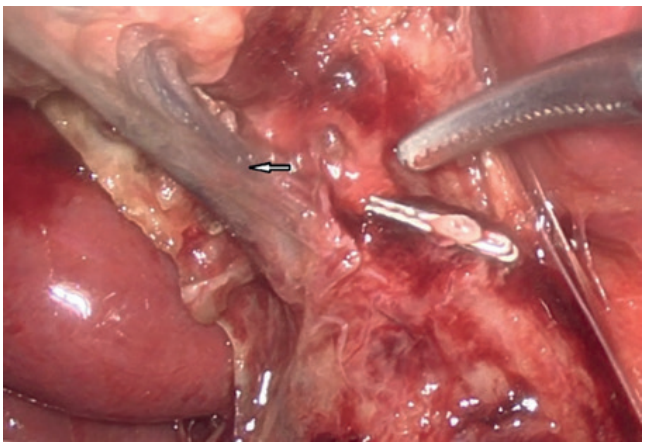

**Figure 4.** Necrosis cystic duct, indicated by arrow.

thought to be a type of acute cholecystitis, some features are different. A higher mortality rate (15-20%), more frequent gangrenous cholecystitis (75%), more frequent perforation (20%), and more frequent Murphy sign negativity can be seen in EC (8). EC progresses in 3 phases. Gas is seen in the gallbladder lumen in the first stage, in the gallbladder wall in the second stage, and in the pericholecystic tissues in the third stage.

With careful observation, EC findings are frequently detected on direct abdominal radiographs. However, sometimes the pathology may not be seen clearly on direct radiographs. This requires other views. CT is the most specific and sensitive imaging method that shows these gas presences for diagnosis. Recent studies still support the use of oral contrast. In a study conducted by Jensen et al. on cancer patients admitted to the ED, it was shown that abdominal CT performed with oral contrast material provides an acceptable benefit in diagnosing emergencies for oncology patients (9).

Today, complications of the gallbladder have decreased thanks to the early diagnosis and treatment of cholecystitis. Gangrenous cholecystitis is a serious complication of EC (10,11). In our case, acute abdomen accompanied by constipation first suggested ileus. However, the absence of air-fluid levels and distension on direct abdominal X-ray and abdominal CT ruled out the ileus. Severe gas found around the gallbladder on abdominal CT made us think of severe emphysematous cholecystitis. The gallbladder of the patient who was taken for an emergency laparoscopic operation had a gangrenous appearance. In a case of EC presented in the literature, the gallbladder was gangrenous and was successfully treated laparoscopically (12). In another case presented, necrotizing EC was detected without a predisposing factor and was successfully treated laparoscopically (13). In our case, like these cases in the literature, the operation was successfully completed laparoscopically. There was no need to convert to open surgery. In the literature, it has been shown that cystic duct necrosis can rarely accompany classical complications in surgical interventions (14). In our case, it was observed that the cystic duct had a necrotized appearance during the laparoscopic operation and it was successfully resected.

## Conclusion

Patients presenting to the ED with the complaint of abdominal pain should be evaluated for acute cholecystitis, which is one of the causes of acute abdomen. Emphysematous cholecystitis, a type of acute cholecystitis, should be kept in mind if there are predisposing factors such as diabetes mellitus, congestive heart failure, and immunosuppressive therapy in cases where acute cholecystitis is considered. Early diagnosis and successful surgical treatment save the patient from the fatal complications of emphysematous cholecystitis.

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