Case of emphysematous cholecystitis in a patient with type 2 diabetes mellitus associated with schizophrenia

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ABSTRACT
Emphysematous cholecystitis is a rare, but life-threatening, form of acute cholecystitis caused by gas-forming organisms in the gallbladder. A 73-year-old male patient with type 2 diabetes mellitus complicated with neuropathy associated with schizophrenia was admitted to Okayama University Hospital, Okayama, Japan, because of a high fever and general malaise. On the fourth hospital day, despite normal liver function tests and little abdominal pain, his abdominal computed tomography showed huge gas formation in the gallbladder lumen along with a dilated gallbladder with a thickened wall, consistent with emphysematous cholecystitis. The patient underwent an emergency open cholecystectomy. Few abdominal symptoms appeared because of the hyposensitivity to pain caused by not only diabetic neuropathy, but also antipsychotic agents the patient was taking for schizophrenia. Emphysematous cholecystitis should be taken into consideration for the differential diagnosis of high fever in diabetic patients with schizophrenia, irrespective of the level of liver function tests and clinical symptoms. (J Diabetes Invest, doi: 10.1111/j.2040-1124.2012.00232.x, 2012)

KEY WORDS: Emphysematous cholecystitis, Schizophrenia, Type 2 diabetes mellitus

INTRODUCTION
Emphysematous cholecystitis (EC) is a rare, but life-threatening, form of acute cholecystitis caused by gas-forming organisms in the gallbladder1. Here we present a case of a diabetic patient with schizophrenia who suffered from EC with no specific abdominal symptoms except fever, but had normal liver function tests (LFTs).

CASE REPORT
A 73-year-old man with a 10-year history of type 2 diabetes mellitus and a 46-year history of schizophrenia visited Okayama University Hospital, Okayama, Japan, with a high fever and general malaise. On admission, the patient had blood pressure of 170/68 mmHg, a pulse rate of 88 b.p.m. and a body temperature of 38.1°C. No cardiac murmur was detected, his lung sounded clear, his abdomen was soft and non-tender, and bowel sounds were good, although he had costovertebral angle tenderness. Laboratory data showed a white blood count (WBC) of 8130/lL with 79% neutrophils, hemoglobin of 12.2 g/dL, glycated hemoglobin of 6.6% (National Glycohemoglobin Standardization Program), aspartate aminotransferase (AST) of 26 IU/L, alanine aminotransferase (ALT) of 19 IU/L, alkaline phosphatase (ALP) of 268 IU/L, total bilirubin of 0.86 mg/dL, γ-glucosamine triphosphate (γ-GTP) of 81 IU/L, serum creatinine of 0.84 mg/dL and C-reactive protein of 5.51 mg/dL. Urinary analysis showed 3+ glucose and 3+ bacteria. Escherichia coli was detected by the culture of urine. A chest radiograph and computed tomography (CT) showed no infiltrates. Abdominal CT showed stranding of bilateral perinephric fat tissue. Based on these observations, the patient was thought to have pyelonephritis, and was then treated with antibiotics. On the fourth hospital day, his physical examination showed diffuse abdominal tenderness and decreased bowel sounds; in addition, he complained for the first time of slight right upper abdominal pain. Laboratory data showed WBC of 10,700/lL with 88% neutrophils, hemoglobin of 10.7 g/dL, AST of 14 IU/L, ALT of 16 IU/L, ALP of 310 IU/L, total bilirubin of 0.64 mg/dL, γ-GTP of 84 IU/L, serum creatinine of 1.24 mg/dL and C-reactive protein of 39.16 mg/dL. Unexpectedly, abdominal CT showed huge gas formation in the gallbladder lumen along with a dilated gallbladder with a thickened wall, consistent with EC (Figure 1). The patient underwent an emergency open cholecystectomy. The gallbladder was found to be necrotic. The culture of the bile collected during the operation did not show any pathogens. Pathological analysis of the resected gallbladder reported full-thickness infarctive necrosis and infiltration of neutrophils of the whole organ. The patient’s postoperative course was uncomplicated. Finally, the patient was discharged on the 18th hospital day.
DISCUSSION

To our knowledge, this is the first report that shows EC in a diabetic patient with schizophrenia. EC is a rare, but severe, form of acute cholecystitis caused by gas-forming organisms. Most of the patients are aged 50–70 years, and approximately 50% of them have diabetes mellitus and peripheral vascular disease. Unlike acute cholecystitis, males are affected by EC more often than women. In addition, gallstones are found in 40% of EC cases, whereas they are found in 90% of acute cholecystitis patients. Furthermore, ischemia of the gallbladder and obliteration of the cystic artery are thought to have an important role in the development of EC. Thus, it is likely that EC might occur in elderly men with diabetes mellitus and peripheral vascular disease, implying that the mortality of EC results in 15% compared with 4% for acute cholecystitis. In the present case, the patient had a few typical characteristics, such as being aged, a man and having diabetes mellitus, but he had no gallstones.

In general, right upper quadrant abdominal pain, and also fever, nausea and vomiting are the main clinical symptoms of emphysematous cholecystitis. In the present case, however, the patient remained asymptomatic except for fever. One of the possible reasons was that he had diabetes neuropathy. This was proved by a loss of vibratory sense in both legs and a decrease of coefficient of variation of R-R intervals. Another potential reason was that he was taking several antipsychotic drugs, including a major tranquilizer he took for schizophrenia of more than 40-years duration. These reasons might explain his hyposensitivity to pain. Furthermore, laboratory data showed normal LFTs until cholecystectomy. Thus, it was difficult to make a rapid diagnosis of EC.

The diagnosis of EC is made by finding gas in the lumen and/or wall of the gallbladder, or in the pericholecystic tissue on plain abdominal roentgenogram, ultrasound or CT scan in the proper clinical setting. The present case represents a typical CT image of this disease (Figure 1).

Regarding the treatment of EC, early cholecystectomy should be carried out because of the rapid progression of the disease. Antibiotics that have broad coverage against anaerobes, enteric Gram-negative organisms and Gram-positive organisms should be initiated immediately. In the present case, the patient was given antibiotics and then underwent an emergency open cholecystectomy, leading to successful treatment.

The pathogens responsible for the gas formed in emphysematous EC are usually anaerobes, such as Clostridium, or other microorganisms, such as E. coli, Proteus vulgaris, Aerobacter aerogenes, Staphylococcus, Streptococcus, Klebsiella and Salmonella derby, that are able to produce gas under special conditions. In the present case, we failed to find the microorganism responsible, possibly because the responsible anaerobes might have diminished immediately after they were exposed to air on cholecystectomy.

In conclusion, we report for the first time a case of EC in a diabetic patient with neuropathy associated with schizophrenia. Because patients with diabetic neuropathy who suffer from schizophrenia might have no or little specific abdominal complaints, EC should be taken into consideration for the differential diagnosis of non-specific abdominal complaints except fever in diabetic patients with schizophrenia irrespective of the level of LFTs.

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