CASE REPORT

Successful Conservative Treatment of Emphysematous Gastritis

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Abstract

Emphysematous gastritis is an extremely rare disease with an unfavorable prognosis. To date, very few studies have been conducted regarding the intragastric recovery process based on endoscopic findings. We herein report a case of emphysematous gastritis that improved with long-term (five months) conservative treatment in which we were able to observe the intragastric recovery process endoscopically. In cases in which emphysematous gastritis is suspected, it is important to provide prompt diagnostic imaging (including CT) and early appropriate treatment in order to improve the prognosis.

Key words: emphysematous gastritis, conservative treatment, endoscopic findings

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Introduction

Emphysematous gastritis is an inflammatory disease characterized by the presence of air within the stomach wall caused by gas-producing bacteria. It has an extremely unfavorable prognosis and is a very rare condition, with a search of the English-language medical literature yielding only approximately 70 cases worldwide. Only a few such studies have mentioned the intragastric recovery process based on endoscopic findings. In the present study, we report a case that improved with long-term conservative treatment in which we were able to observe the intragastric recovery process endoscopically.

Case Report

The patient was a 58-year-old man with a history of chronic renal failure (under maintenance dialysis), type 2 diabetes and an old myocardial infarct. The patient presented to the emergency room with hemaatochezia requiring endoscopic hemostasis to control bleeding from a rectal ulcer. He was hospitalized and showed satisfactory progress; however, six days after admission, he complained of sudden intense abdominal pain. An examination of his vital signs indicated a blood pressure of 128/90 mmHg, heart rate of 118 beats per minute and temperature of 37.7°C. An abdominal examination demonstrated intense pain upon pressure in the epigastrium, with rebound tenderness, but no abdominal guarding. Blood tests revealed a white blood cell count of 19,260/μL and C-reactive protein level of 27.8 mg/dL, indicating the presence of a marked inflammatory response. Plain abdominal radiography (in the recumbent position) revealed gas in the distended stomach (Fig. 1).

Plain and contrast-enhanced computed tomography (CT) of the abdomen (Fig. 2-4) showed irregular, mottled gas in the wall of the greater curvature of the stomach. No clear evidence of thrombi was observed in the celiac or superior mesenteric arteries; however, severe arteriosclerosis was noted in the splenic artery. Based on these characteristic findings, the patient was diagnosed with emphysematous gastritis. Due to the fact that there were no signs of panperitonitis or gastrointestinal perforation, such as ascites and free air, a course of conservative treatment was selected.
The treatment was implemented immediately, comprising broad-spectrum antibiotics (meropenem 0.5 g/day × 14 days), proton pump inhibitors, a nasogastric tube, bowel rest and central venous hyperalimentation. A bloody gastric juice culture was positive for *Escherichia coli* and *Enterococcus avium*, both of which were sensitive to meropenem. Meanwhile, two sets of blood cultures were both negative.

Upper gastrointestinal endoscopy was performed one month after symptom onset, when the patient’s general condition had improved. The examination disclosed a large ulcer with purulent drainage that extended from the fundus to the greater curvature of the gastric corpus (Fig. 5). Bowel rest was therefore maintained for an additional two months, and, thereafter, repeat endoscopy revealed a large amount of necrotic tissue at the base of the ulcer (Fig. 6). The patient attempted to resume oral intake on several occasions; however, as his fever and abdominal pain worsened, central venous hyperalimentation was continued as his only source of nourishment for five months. Although enteral nutrition was considered during the observation period, due to the large size of the ulcer and the patient’s prolonged inflammation, it was believed that the long-term placement of a feeding tube would induce damage to the mucosa of the stomach wall and/or exacerbate the infection. Therefore, we opted for central venous hyperalimentation as the only source of nourishment. We also repeatedly considered surgical treatment (total gastrectomy or enterostomy) but were unable to obtain consent from the patient and his family.

Repeat upper gastrointestinal endoscopy performed five months after symptom onset demonstrated a marked improvement, with nearly complete epithelization of the ulcer (Fig. 7). Abdominal CT also showed an improvement in the stomach distension and the complete disappearance of the interstitial emphysema in the stomach wall. The oral intake of food was subsequently reinitiated, and the patient’s progress was satisfactory. Therefore, he was discharged from the hospital six months after his initial presentation.

Emphysematous gastritis has an unfavorable prognosis and is often fatal. This study reports an extremely rare case in which an improvement was achieved with conservative therapy and the recovery process was observed endoscopically.

**Discussion**

Emphysematous gastritis, first described by Fraenkel in 1889 (1), is a rare disease caused by gas-producing bacteria
and characterized by the presence of air within the stomach wall with diffuse gastric wall inflammation. The prognosis is extremely unfavorable, with a mortality rate of 55-61% (2-4). The condition is associated with the ingestion of corrosives, such as ammonia and acid, alcohol abuse, diabetes, renal failure, gastroenteritis, recent abdominal surgery, long-term steroid use, pancreatitis and nonsteroidal anti-inflammatory drug use (5). In other words, it is believed that emphysematous gastritis is triggered by factors such as pharmaceutics and ischemia that damage the gastric mucosal barrier.

There is no established diagnostic standard for detecting emphysematous gastritis. Previous studies have diagnosed emphysematous gastritis based on the following four criteria: 1. severe clinical symptoms such as abdominal pain, fever and vomiting, 2. marked elevation in the inflammatory response, as observed on blood tests, 3. imaging findings indicating intramural gastric emphysema (air within the stomach wall), 4. evidence of bacterial infection, based on gastric juice culture or pathology specimens. The present patient met all four of these criteria.

In addition, the present patient suffered from both diabetes and chronic renal failure, which is strongly suggestive of arteriosclerosis and the possibility of ischemia. Furthermore, abdominal CT showed severe arteriosclerosis in the splenic artery. Branches of the splenic artery (left gastroepiploic artery and short gastric artery) supply blood to the greater curvature of the stomach (6). Considering that, in this case, the lesion was located in the greater curvature of the stomach, we believe the underlying mechanism was as follows: ischemia in the splenic artery, which supplies the greater curvature of the stomach, induced necrosis of the stomach wall, subsequently leading to infection.

Furthermore, because a rectal ulcer was observed, we cannot rule out the possibility of the hematogenous transmission of infection from the rectal ulcer to the stomach.

Patients with emphysematous gastritis usually present with severe abdominal pain, nausea, vomiting, fever and occasionally hematemesis (7). Physical findings include abdominal distension and decreased bowel sounds. Affected individuals may also display signs of peritoneal irritation.

The most frequently isolated organisms are streptococci, E. coli, Enterobacter species, Pseudomonas aeruginosa and Clostridium perfringens (8). Some studies have reported that infection caused by fungi can occur in patients with emphysematous gastritis, although this finding is rare (9).

CT is the most effective diagnostic imaging modality, as it can be used to identify even small areas of interstitial emphysema (3, 5). Plain abdominal radiography is useful for imaging gas within the distended stomach as well as detecting interstitial emphysema. Both modalities are therefore helpful in making a diagnosis.

The main differential diagnoses for gas in the stomach wall are emphysematous gastritis and gastric emphysema or gastric pneumatosis (10, 11). It is important to differentiate
emphysematous gastritis from gastric emphysema because their clinical courses are completely different. In gastric emphysema, gas is observed in the stomach wall without bacterial infection; the condition is usually asymptomatic and resolves spontaneously without treatment. Studies have identified gastric outlet obstruction, excessive vomiting, nasogastric tube placement, cardiopulmonary resuscitation and stomach ulcers to be causative factors in such cases (11). Characteristic CT findings of emphysematous gastritis include irregular, mottled gas in the stomach wall, while gastric emphysema is indicated by the presence of thin linear gas in the stomach wall (5).

No consensus exists as to the optimal treatment strategy, although a small number of studies have reported successful results with conservative treatment in recent years (7, 8, 12, 13). These reports focused on the use of broad-spectrum antibiotics, bowel rest and nutritional management. Conservative treatment is considered a therapeutic option in cases of emphysematous gastritis that do not present with perforation or pan-peritonitis. However, surgery should be considered in patients complicated with perforation, intestinal necrosis or peritonitis.

In comparison with that observed in other cases reported in the medical literature, the present patient took an extremely long time to improve. This observation appears to be due to the severity of the emphysematous gastritis and the fact that the patient was undernourished.

The authors state that they have no Conflict of Interest (COI).

References