CASE REPORT

Phlegmonous Gastritis and Streptococcal Toxic Shock Syndrome: An Almost Lethal Combination

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ABSTRACT

We report a case of phlegmonous gastritis in a 70-year-old woman without any predisposing factors, presenting with high fever, epigastric pain, and vomiting complicated by septic shock and multi-organ failure. The ultrasound and the computed tomography scan showed thickening of the stomach wall. *Streptococcus pyogenes* was isolated in the blood, thereby establishing the diagnosis of streptococcal toxic shock syndrome. An exploratory laparotomy excluded the need for a gastrectomy, and the patient was successfully treated with antibiotics. A short review of phlegmonous gastritis caused by *S. pyogenes* during the last 12 years is also presented.

**Keywords:** Multi-organ failure, Phlegmonous gastritis, Septic shock, *Streptococcus* group A.

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BACKGROUND

Phlegmonous gastritis is a rare but often lethal suppurative bacterial infection of the stomach. Antibiotic treatment has improved the prognosis but sometimes surgical treatment is necessary for a positive outcome. Most of the cases are caused by streptococci, pneumococci, *Escherichia coli*, *Proteus*, *Haemophilus*, staphylococci, and *Corynebacterium*. Suspecting and diagnosing this rare clinical entity is difficult and late diagnosis compromises survival. Group A *Streptococcus* (GAS) is the cause of severe clinical syndromes including invasive, life-threatening infections. Herein, we report a case of acute phlegmonous gastritis in an elderly woman, progressing to septic shock and multi-organ failure caused by *Streptococcus pyogenes*, successfully treated with antimicrobial agents. A short review of the recent literature about phlegmonous gastritis caused by *S. pyogenes* is also undertaken.

CASE DESCRIPTION

A 70-year-old woman with a history of arterial hypertension and hypothyroidism presented to the emergency department (ED) with diarrhea, weakness, epigastric pain, and vomiting for 4 days. During the last 24 hours, she also presented a high fever (40°C) with rigors. Before her admission into ED, the patient had visited her primary care physician who ordered several laboratory tests including a white blood cell (WBC) count, which was noted to be 3000/mm³, with 44% neutrophils while the rest of the laboratory values were unremarkable.

Physical examination in the ED revealed an epigastric tenderness especially localized to the left subcostal margin, scarce bowel sounds, a blood pressure of 130/75 mmHg, pulse 110/minute, temperature 39°C, and oxygen saturation of 96% (FiO₂ = 21%). An abdominal ultrasound revealed gastric wall thickening and a computed tomography (CT) scan of the abdomen showed a thickened gastric wall and small hyperdense areas near the gastroesophageal junction (Fig. 1).

Laboratory results in the ED showed a leukocyte count of 2230/mm³ (77% neutrophils), C-reactive protein 193 mg/dL, and total bilirubin 2.14 mg/dL, while the rest was normal. She was admitted to the internal medicine department, and empirical treatment was started with piperacillin/tazobactam 4.5 g q.i.d. IV and vancomycin 1 g b.i.d. IV after blood cultures were drawn. The patient’s situation quickly deteriorated with diffuse abdominal pain, confusion, hemodynamic instability, reduced level of consciousness, and acute respiratory and renal failure. She was then intubated and transferred to the intensive care unit (ICU) requiring high doses of epinephrine, 200 mg hydrocortisone as septic shock treatment, and continuous renal replacement therapy (CRRT). APACHE II severity score on admission was calculated to be 39 with a SOFA score of 15, while a second CT scan of the abdomen with IV contrast showed an increase in the edema and gastric wall thickening, a large ascitic collection, and a thickening of the colonic wall (Fig. 2). The patient underwent an exploratory laparotomy without, however, any abnormal findings. After her readmission from the operating room, she remained hemodynamically unstable and febrile, requiring mechanical ventilation with a high oxygen mixture and CRRT. The laboratory values in the ED, general ward, and first ICU admission day are demonstrated in Table 1.

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After punch cultures were collected, the empirical therapy was switched to meropenem 2 g t.i.d., gentamicin (6 mg/kg/day), and vancomycin (1 g b.i.d.). One day later, the hemodynamic situation of the patient improved, thus allowing the performance of an esophagogastroduodenoscopy with a biopsy showing diffuse mucosal edema. On the third ICU day, S. pyogenes was isolated in the blood culture but not in tissue cultures. Clindamycin and immunoglobulin were added to the therapeutic regimen. During the next few days, the patient’s situation slowly improved, with her renal function being restored, and 15 days later, she was finally able to resume a regular diet. At that time, her third CT scan showed a lessening of the edema but because of the generalized myopathy, she was extubated on day 25 and transferred to the general ward 3 days later. Histological examination showed only lesions associated with acute gastritis.

**Discussion**

We report a case of severe phlegmonous gastritis and multi-organ failure caused by *S. pyogenes* in a 70-year-old female with a positive outcome.
First described by Cruveilhier in the early 18th century, acute phlegmonous gastritis is a rare but rapidly progressing and often fatal bacterial infection of the stomach wall affecting both sexes (mostly men) between the ages of 30 and 70, especially over 50 years.1,2 Until 1994, 500 cases were described in the literature, most of them in the preantibiotic era.3 Although most of the cases were caused by hemolytic group A streptococci spp, a variety of bacteria were also implicated, e.g., staphylococci spp., E. coli, Proteus, Haemophilus influenzae, Clostridia, and Actinomycetes.3–5 The infection can be local with a focal abscess formation or diffuse.6 The inflammation procedure involves mainly the submucosa diffusing into the mucosa and the serous membrane. Typical pathologic findings include infiltration with neutrophils and plasma cells. Since the thickening of the gastric wall is more prominent in the submucosa, biopsy involving only the mucosa may be normal as in our case. Consequently, a negative biopsy cannot exclude the diagnosis.7

Although the etiology of the disease is unknown, possible mechanisms include hematogenous bacteria spread or direct invasion through a lesion in the stomach wall.8 Several predisposing factors (either local or general) and underlying situations have been associated with the disease. Local factors include mucosal injury, achlorhydria, gastritis, alcohol use, gastrointestinal malignancies, invasive endoscopic procedures, and gastric lymphoma.8–10 General debilitating conditions like age, diabetes mellitus, and alcohol consumption or cases of impaired immune status, such as gastric lymphoma, HIV infection, hematologic malignancies, or connective tissue disorders may contribute to the manifestation of the disease.11,12 An association with pregnancy has also been described.9 In almost 50% of the cases, no predisposing factors have been identified as in the case of our patient.

Intense epigastric pain is the most frequent symptom followed by guarding, nausea, vomiting sometimes purulent, fever, and chills.7 Abdominal tenderness or generalized guarding may be present. The diagnosis is supported by increased WBC while gastrectomy was necessary for four patients. Mortality varies between 10 and 54% and is higher with local complications, such as perforation or cases that have evolved to gastric necrosis. Total gastrectomy is sometimes necessary. Mortality varies between 10 and 54% and is higher in the diffuse type of diseases, especially in gangrenous or necrotizing gastritis.5 Early initiation of prompt antibiotic therapy is the cornerstone of a positive outcome. In our case, although the diagnosis was established later, early cover with broad-range antimicrobials prevented the evolution to necrotizing gastritis.

Table 2 summarizes cases of acute phlegmonous gastritis published between 2010 and 2019 caused by Streptococcus pyogenes.

| Author | Publication year | Country | Sex | Age | Outcome | Risk factor | Shock | MOF (site of isolation) | Surgery | Gastric resection |
|--------|----------------|---------|-----|-----|---------|-------------|-------|------------------------|---------|-----------------|
| Kan-no et al. | 2007 | Japan | M | 36 | Discharged | None | HIV | Yes (tissue and blood) | No | No |
| Hari Kumar et al. | 2007 | India | F | 70 | Death | Gastric lymphoma | Yes (askites) | No | No |
| Hommel et al. | 2007 | France | F | 43 | Discharged | Pregnancy | Yes (peritoneal fluid) | Yes | No |
| Paik et al. | 2010 | United States | M | 45 | Discharged | Paranasal surgery | Yes (peritoneal fluid) | Yes | No |
| Sahnan et al. | 2013 | UK | F | 56 | Death | Rheumatoid arthritis and corticosteroids | Yes (pus and blood) | Yes | Yes |
| Rada-Palomino et al. | 2014 | Spain | M | 62 | Discharged | HIV | Yes (pus and blood) | No | No |
| Min et al. | 2014 | South Korea | F | 51 | Discharged | None | Yes (pus) | Yes | Yes |
| Morimoto et al. | 2018 | Japan | M | 77 | Death | Diabetes and hypertension | Yes (blood and pus) | No | No |
| Yang et al. | 2018 | China | M | 47 | Discharged | Alcohol | Yes (tissue) | Yes | Yes (total) |
| Ramphal et al. | 2018 | Netherlands | M | 45 | Discharged | None | Yes (tissue) | Yes | Yes |

Table 2: Summary of cases of acute phlegmonous gastritis published between 2010 and 2019 and caused by Streptococcus pyogenes.

Phlegmonous gastritis is a rare and difficult-to-diagnose clinical entity, sometimes demanding partial or total gastrectomy along with the early start of antimicrobial treatment. The presence of multi-organ failure and septic shock may be associated with the isolation of S. pyogenes as part of the toxic shock syndrome.

**Conclusion**

Phlegmonous gastritis is a rare and difficult-to-diagnose clinical entity, sometimes demanding partial or total gastrectomy along with the early start of antimicrobial treatment. The presence of multi-organ failure and septic shock may be associated with the isolation of S. pyogenes as part of the toxic shock syndrome.
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