Review of conservative treatment in suspected cases of gastric emphysema versus emphysematous gastritis

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♦ Introduction

Gastric pneumatosis is a condition within the pneumatosis intestinalis spectrum that presents between the esophagus and the rectum. The stomach is the least frequent site, accounting for 9% of all reported cases [1]. The conditions range from benign to acutely life threatening and include: emphysematous gastritis (EG) and gastric emphysema (GE). The diagnosis requires a high index of suspicion and timely intervention to prevent sequelae [2]. Emphysematous gastritis is life-threatening due to bacterial invasion of stomach mucosa resulting in a mortality rate of 60-80% [4]. Gastrointestinal and biliary tract wall gas is a corresponding finding attributed to ischemia, tracking of air through the mucosa, and/or inflammation/compromise of the submucosa, muscle layers, and tissue planes. It carries a mortality rate of up to 56-90% [3]. Gastric emphysema is generally a benign disease attributed to disruption of stomach mucosa by air. It's linked to increased intraabdominal pressure, repeated emesis, and retching. These states cause trauma to the gastric mucosa and increased intragastric pressure [3].

♦ Case #1 Description

Patient one, a 68-year-old male, presented with chest pain and resolved nausea and vomiting. The abdomen was soft, nontender, and non-distended without guarding, rigidity or peritonitis. Computed tomography (CT) scan of the chest without contrast demonstrated a pulmonary artery measuring 4.6 cm suggestive of pulmonary hypertension. A computed tomography angiography (CTA) thorax showed pulmonary artery ectasia without effusion, dissection, pneumothorax, or emboli. CT abdomen and pelvis displayed air in the stomach wall, air tracking within the vessels of the upper abdomen, and portal venous gas (Fig. 1A and Fig. 2A).

Diagnosis of emphysematous gastritis with potential contained gastric perforation versus gastric emphysema were considered. The benign nature of the abdomen, lack of leukocytosis, and lack of lactic acidosis warranted a trial conservative management including a pantoprazole (protonix) drip, intravenous (IV) piperacillin/tazobactam (Zosyn) and fluconazole, and nothing by mouth (NPO) status. A repeat CT scan on day three of admission showed interval resolution of residual air and portal venous gas (Fig. 1B, Fig. 2). Diet was slowly advanced over five days. The patient remained hemodynamically stable without complaints of abdominal pain, distention, nausea or emesis and was discharged.

♦ Case #2 Description

Patient two, a 57-year-old male, presented after an apneic episode with loss of pulse necessitating cardiopulmonary resuscitation (CPR). Return of spontaneous circulation (ROSC) was obtained after two minutes. The patient received a CT pulmonary embolism (CTPE) angiogram which was concerning for a right lower lobe pulmonary embolism, ground-glass opacification associated with pulmonary infarction, and portal venous gas. CT abdomen and pelvis showed portal venous gas, gastric emphysema without evidence of gastric wall thickening, and congestion (Fig. 1C and Fig. 2C). The small bowel had no signs of ischemia or mesenteric congestion (Fig. 2C).

The patient was hemodynamically stable on physical examination with a soft, non-distended abdomen. The decision was made to monitor the patient and pursue conservative treatment.

A 36-hour repeat CT scan was obtained as well as computed tomography arterial portography (CTAP) with IV contrast. The imaging showed a resolution of portal venous gas without evidence of bowel obstruction, ischemia, or perforation (Fig. 1D and Fig. 2D). As a result of the resolution of pneumobilia and maintenance of hemodynamic stability, no surgical intervention was performed. On hospital day nine, the patient was discharged. The appearance of pneumobilia and gastric emphysema may have been secondary to barotrauma from CPR in this case.

♦ Case #3 Description

Patient three, a 53-year-old female, presented with altered mental status and abdominal distension that began 24 hours prior to arrival at the emergency department. She had a history of a long standing sacral decubitus ulcer, enlarging pelvic sidewall mass with complex septation, pulmonary nodules suspicious for metastasis, and aggressive osteomyelitis of the left sacrum and iliac bones. Work up in the emergency department demonstrated a leukocytosis to 30 x 10^3/uL, lactic acid of 2.1, and transaminitis. CT imaging of the abdomen showed a partial small bowel obstruction, biliary pneumatosis, gastric pneumatosis and a dilated common bile duct (CBD) (Fig. 1E and Fig. 2E). The physical examination showed moderate abdominal distension but no signs of peritonitis.

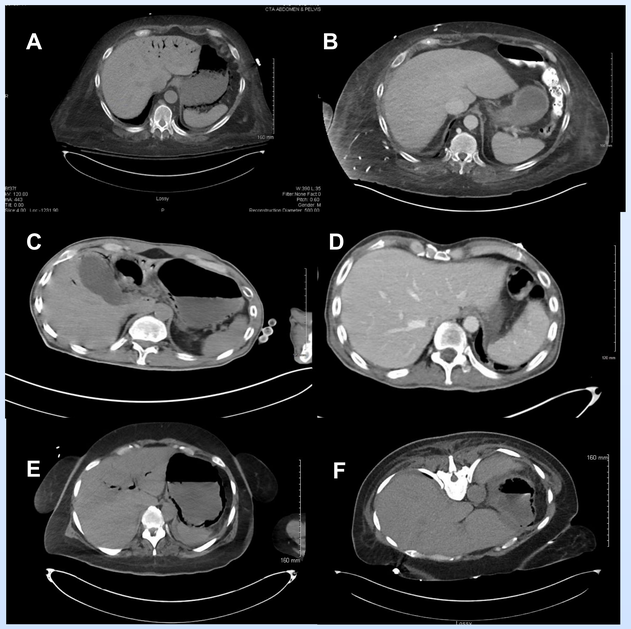

Fig 1. A. CT scan of Patient 1 demonstrating pneumobilia and posterior stomach wall air tracking **B.** Repeat CT scan of Patient 1 on day 3 of admission demonstrating resolution of pneumobilia **C.** CT scan of Patient 2 demonstrating portal venous gas and mild gastric emphysema without evidence of gastric wall thickening with predominant posterior stomach gastric pneumatosis **D.** Repeat CT scan of Patient 2 demonstrating resolution of portal venous gas 36 hours after initial scan **E.** CT scan of Patient 3 demonstrating circumferential gastric emphysema along with pneumobilia **F.** Repeat CT scan of Patient 3 demonstrating reduction in gastric emphysema 5 days after initial scan

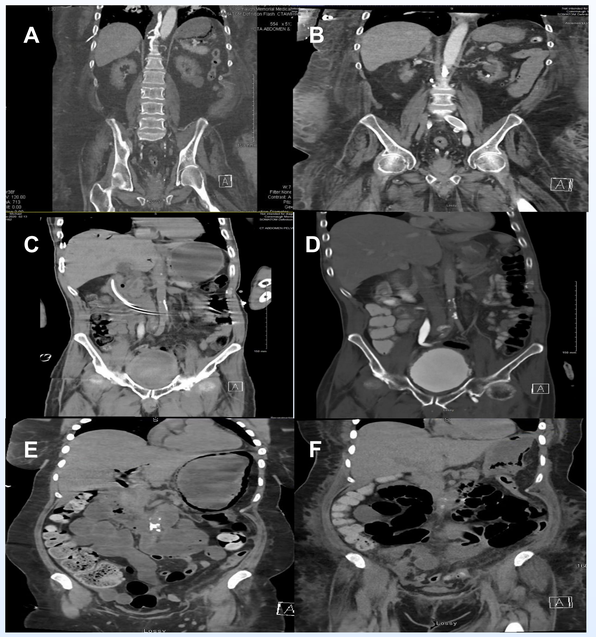

Fig. 2. A. CT scan of Patient 1 demonstrating gastric pneumatosis **B.** Repeat CT scan of Patient 1 on day 3 of admission showing resolution of gastric pneumatosis and pneumobilia **C.** CT scan of Patient 2 demonstrating portal venous gas and gastric emphysema **D.** Repeat CT scan of Patient 2 showing resolution of portal venous gas 36 hours after initial scan **E.** CT scan of Patient 3 demonstrating free fluid in abdomen surrounding small bowel and bowel distention **F.** Repeat CT scan of Patient 3 showing reduced gastric emphysema with resolution of portal pneumatosis 5 days after initial imaging

The patient was assessed by gastroenterology and general surgery who attributed her pneumobilia to either endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy, hypoperfusion based ischemia, or emphysematous gastritis in the setting of bacteremia related to the patient's history of aggressive osteomyelitis. The decision was made to pursue conservative treatment with pressure support, proton pump inhibitor (PPI) drip, naso-gastric tube, antibiotics, and close monitoring of the abdominal clinical examination.

The patient's lactic acidosis resolved and clinical picture improved, including the abdominal exam, during the next few days of her hospital stay. Repeat CT abdomen and pelvis demonstrated marked decrease of air within the stomach wall and resolution of free air within the biliary tract five days after initial imaging (Fig. 1F and Fig. 2F). The resolution of lactic acidosis and clinical/radiographic improvement suggest this patient had gastric emphysema secondary to ischemia as opposed to sepsis induced by emphysematous gastritis. The patient was transferred to a larger musculoskeletal tumor facility to address the lesion of the left hemipelvis extending from the acetabulum back to the sacral wing.

♦ Discussion

The case studies illustrate the importance of the physical exam and presentation to steer treatment. Two patients presented hemodynamically stable and all had relatively benign abdomens suggesting conservative treatment. Signs of gastric perforation, sepsis, gastric wall necrosis, a decline in hemodynamic stability, etc. would indicate more aggressive management. Additionally, opting for conservative, less invasive, management should always be prioritized.

♦ Conclusion

Combining a clinical picture and identifying the underlying cause, whether it be barotrauma, increased intraabdominal pressure, emesis, retching, or hypotension, can provide a crucial picture of gastric emphysema or bacteria invading the gastric mucosa in emphysematous gastritis. Etiology, abdominal examinations, and clinical picture should be closely monitored. Based on these findings, conservative treatment may be recommended in those who are hemodynamically stable with relatively benign abdomens.

♦ References

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♦ For further information

For further information or questions pertaining to the cases and/or research please contact:

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