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Incarcerated umbilical hernia associated with gastric pneumatosis: A case report

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ABSTRACT

Gastric pneumatosis is a well-recognized clinical entity that is described in the literature as either a subtype of pneumatosis cystoides intestinalis or gastric emphysema. Gastric pneumatosis may be due to a variety of causes, which are classically categorized as infectious or non-infectious in nature. We report a case of gastric pneumatosis and pneumoperitoneum associated with a bowel obstruction secondary to an incarcerated umbilical hernia. Literature pertaining to gastric pneumatosis was reviewed and the different classifications and etiologies briefly described. Knowledge of the different types and natural history of gastric pneumatosis can be helpful when deciding on surgical versus nonoperative management of patients with this condition.

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INTRODUCTION

Pneumatosis cystoides intestinalis (PCI) is an uncommon clinical entity characterized by submucosal and/or subserosal collections of gas within the gastrointestinal tract and its peritoneal attachments.[1] Gastric pneumatosis is traditionally classified as a variant of PCI.[2,3] Gastric pneumatosis can be caused by gas-forming bacteria, severe gastritis, rupture of pulmonary bullae, and other conditions. We report an unusual case of gastric pneumatosis associated with an incarcerated umbilical hernia.

CASE REPORT

An 88-year-old woman presented to the emergency department complaining of 3-day history of diffuse abdominal pain, nausea and vomiting. Her past medical history included hypertension, coronary artery disease, congestive heart failure, gastroesophageal reflux disease and osteoarthritis. Her previous surgical history included appendectomy and right total hip arthroplasty.

On physical exam, the patient had moderate abdominal distension and non-specific tenderness, but no rebound or guarding. The patient was also noted to have an incarcerated umbilical hernia. Her temperature was 100.1ºF, with a heart rate of 82 and blood pressure of 140/90 mmHg. Laboratory studies demonstrated an elevated white blood cell count (15,000/mm^3) and normal lactate level (1.9 mmol/L).

Computed tomographic (CT) scan of the abdomen and pelvis showed dilated proximal small bowel loops, gastric pneumatosis and free intraperitoneal air (**Figure 1**). The patient was taken for an emergent laparotomy. Upon exploration, there was intramural gas along the lesser and greater curvatures of the stomach. There was no evidence of gastric volvulus, gastric or duodenal perforation. Inspection of the lesser sac revealed no abnormalities. An incarcerated umbilical hernia was also reduced and repaired. The small bowel proximal to the hernia was moderately dilated. Postoperatively, the patient underwent upper endoscopy, which demonstrated diffuse gastritis.

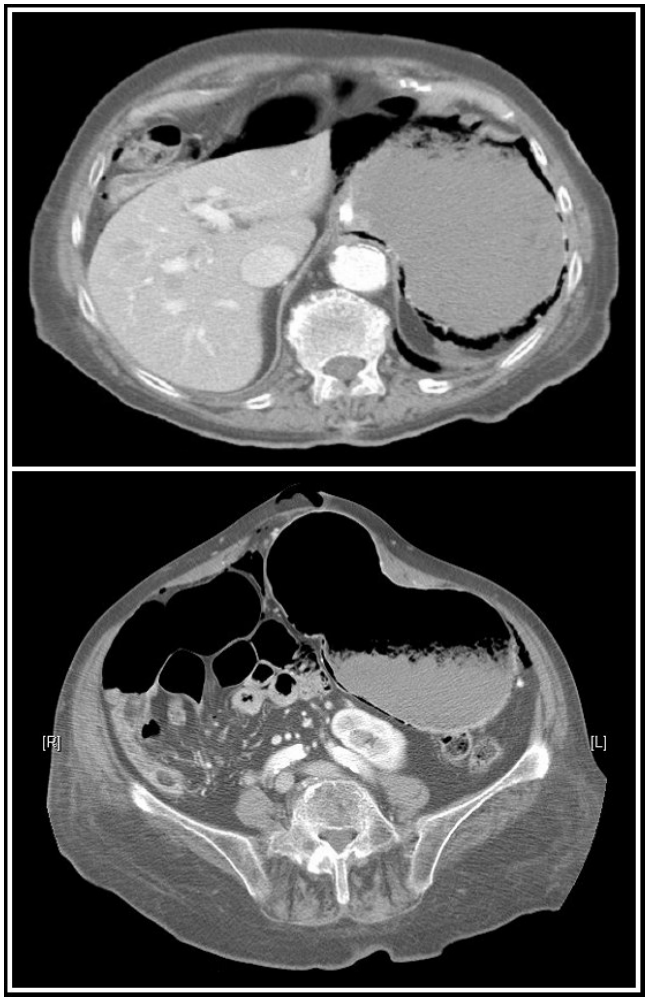

Figure 1. Computed tomographic scan demonstrating gastric pneumatosis and intraperitoneal air. Note the dependent nature of the intramural gastric air.

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DISCUSSION

Pneumatosis cystoides intestinalis (PCI) or cystic pneumatosis is a descriptive term denoting abnormal collections of intramural intestinal or gastric gas.[4,5] These air-filled pseudocysts are located in the submucosa or the subserosa of the digestive tract, and usually range from 0.5 to 2.0 centimeters in size. Pneumatosis cystoides intestinalis can be either primary or secondary in nature.[2] The primary type, also known as 'gastric emphysema', is due to an infectious process at the site of the intramural air.[2,6] In the secondary type, an underlying pathologic state or procedure-related trauma (perforated gastric ulcer, ruptured pulmonary bullae, neoplasm, nasogastric tube placement, upper endoscopy) may be contributory.[2,6]

Gastric pneumatosis was traditionally classified as a subtype of PCI. However, recent reports have re-classified these entities into either 'gastric emphysema' or 'cystic pneumatosis' because of their distinct associated radiographic and pathologic features.[2,6] In cystic pneumatosis, the cysts are usually ovoid in shape and the gas pattern is cystic in nature.[3] In case of gastric emphysema, there are linear radiolucent streaks that are usually seen parallel to the border of the stomach and are separated from the lumen by an area of water density that is few millimeters in thickness.[3]

Numerous etiologies of gastric pneumatosis have been described in the literature.[1,6-10] In general, these can be divided into either infectious or mechanical. Infectious gastric pneumatosis is usually caused by gas-forming bacteria. This is a relatively rare entity characterized by mucosal and submucosal inflammation and bacterial infiltration of most of the gastric wall layers on autopsy specimens.[6-8] These patients present with leukocytosis, high grade fevers, and other signs and symptoms of sepsis. Infectious gastric emphysema carries a very poor prognosis, with an overall mortality rate as high as 60% to70%.[1,6,9-10]

Gastric pneumatosis secondary to mechanical etiologies is far more common than the primary gastric emphysema. Here, causes include obstruction, trauma, rupture of pulmonary bullae, enteric tube placement and upper endoscopic procedures.[1,9-10] In these cases, the intraluminal gas dissects into the gastric wall thru a mucosal tear or defect. The tear usually results from increased intraluminal pressure secondary to an obstruction or as a direct result of trauma. The reported mortality in this group, although lower than mortality associated with gastric emphysema, is still high at 6% to 41%.[6] While other authors describe gastric pneumatosis secondary to bowel or gastric outlet obstruction, gastric pneumatosis specifically associated with an incarcerated umbilical hernia has not been previously reported.

When approaching gastric pneumatosis due to mechanical causes, clinical judgment should be carefully applied when determining which patients need surgical exploration and which ones can be observed safely. Selective nonoperative management has been used successfully in the setting of secondary gastric pneumatosis.[6]

CONCLUSIONS

Gastric pneumatosis is a relatively rare entity that can be due to either infectious or mechanical causes. We reported a case of pneumoperitoneum and gastric pneumatosis secondary to an incarcerated umbilical hernia with an associated bowel obstruction. While patients with primary (infectious) gastric emphysema warrant an emergent surgical exploration, carefully selected cases of secondary (mechanical) gastric pneumatosis may be observed clinically in the absence of other surgical indications.

REFERENCES

[1] Cordum NR, Dixon A, Campbell DR. Gastroduodenal pneumatosis: endoscopic and histological findings. Am J Gastroenterol 1997;92:692-695.

[2] Kussin SZ, Henry C, Navarro C, et al. Gas within the wall of the stomach report of a case and review of the literature. Dig Dis Sci 1982;27:949-954.

[3] Scheidler J, Stabler A, Kleber G, et al. Computed tomography in pneumatosis intestinalis: differential diagnosis and therapeutic consequences. Abdom Imaging 1995;20:523-528.

[4] Soon MS, Yen HH, Soon A, et al. Endoscopic ultrasonographic appearance of gastric emphysema. World J Gastroenterol 2005;11:1719-1721.

[5] Fischetti AJ, Saunders HM, Drobatz KJ. Pneumatosis in canine gastric dilatation-volvulus syndrome. Vet Radiol Ultrasound 2004;45:205-209.

[6] Taylor DR, Tung JY, Baffa JM, et al. Gastric pneumatosis: A case report and review of literature. Int Pediatr 2000;15:117-120.

[7] Yale CE, Balish E, Wu JP The bacterial etiology of pneumatosis cystoides intestinalis. Arch Surg 1974;109:89-94.

[8] Gillon J, Tadesse K, Logan RF, et al. Breath hydrogen in pneumatosis cystoides intestinalis. Gut 1979;20:1008-1011.

[9] Chintapalli KN. Gastric bezoar causing intramural pneumatosis. J Clin Gastroenterol 1994;18:264-265.

[10] Mandell GA, Finkelstein M. Gastric pneumatosis secondary to an intramural feeding catheter. Pediatr Radiol 1988;18:418-420.