

Case report

CHRONIC GASTRIC VOLVULUS : CASE REPORT AND REVIEW OF THE LITERATURE

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Abstract Gastric volvulus is a rare but potentially life-threatening cause of upper gastrointestinal obstruction. Emergency physicians must maintain a high index of suspicion in patients who present with signs and symptoms suggesting foregut occlusion. We report an illustrative case and review the pathogenesis, classification, diagnosis and treatment of this rare entity. **Chiang Mai Medical Journal 2008;47(2):89-95.**

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The term volvulus is derived from the Latin word *volvere*, meaning to turn or roll. Gastric volvulus is defined as an acquired rotation of the stomach, or parts thereof, more than 180° creating a closed loop obstruction.⁽¹⁾ Though rare, gastric volvulus is a true surgical emergency that is life-threatening if not recognized and treated quickly. Since Berti's initial description in 1866,⁽²⁾ there have been approximately 300 reported cases. This paper reports a case of chronic gastric volvulus, reviews the pathogenesis, clinical features, diagnosis, and treatment options, and offers some practical suggestions for physicians.

Case report

A 51-year-old woman presented with a 2-month history of abdominal pain, vomiting and weight loss. She experienced a gradual onset of problems when swallowing solids. These symptoms resolved spontaneously and she did well until about 2 weeks prior to her clinic visit. She again noted problems swallowing, with a sensation of material being hung up in her retrosternal area. Her physician had prescribed an H₂ blocker and an anti-emetic drug. Twenty four hours prior to her arrival at the emergency room, she persisted in vomiting and experienced weakness.

Physical examination demonstrated a woman who appeared cachexic. Her tempera-

ture was 37 °C, pulse 96 /min and regular, respiratory rate 20 /min, BP 140/100. Gurgling sounds were heard at her right chest and a positive splashing sound. There was no tenderness, guarding, masses or organomegaly. Rectal exam revealed no gross blood.

The initial clinical impression was vomiting and dehydration, probably secondary to gastric outlet obstruction. At this point, a 500 mL normal saline fluid bolus was initiated, IV analgesics and anti-emetics were provided, and a nasogastric tube was placed, with some difficulty. Her leukocyte count was $11.3 \times 10^9/L$ with 95% neutrophils. Serum sodium was 151 mEq/L, potassium 3.4 mEq/L, chloride 110mEq/L and HCO_3^- 29 mEq/L. Her serum creatinine and BUN were 143 mEq/L and 15.8 mmol/L, respectively. The remainder of her lab results, including liver function tests, were normal. Chest radiographs demonstrated a large intra-thoracic hiatus hernia with an air fluid level (Fig. 1).

A surgical consultancy was obtained. The

consultant's impression of the problem was a gastric outlet obstruction. A radiological consultancy was requested and an emergent barium swallow performed. This revealed a large Morgagni hernia with organoaxial volvulus of the stomach (Fig. 2). Gastroscopic finding revealed elongation of the stomach with abnormal upward of the pyloric ring and chronic duodenitis.

At laparotomy, the gastric pylorus and duodenal bulb, lying in the right diaphragmatic hernial sac, was reduced back to its anatomical position. The stomach was found to be viable and the hernia was surgically repaired. The patient recovered uneventfully and was discharged on the seventh post-operative day.

Discussion

Pathogenesis

The stomach is anchored at the cardia and tethered by the gastrocolic, gastrohepatic, gastrophrenic and gastrosplenic ligaments; however, the stomach's need to store, grind,

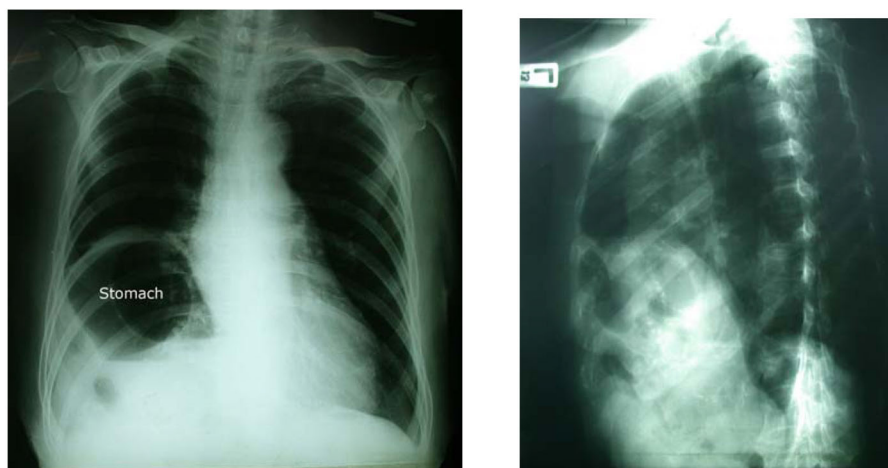


Figure 1. CXR. Upright (left) and lateral (right): Large intra-thoracic hiatus hernia with associated air-fluid level.

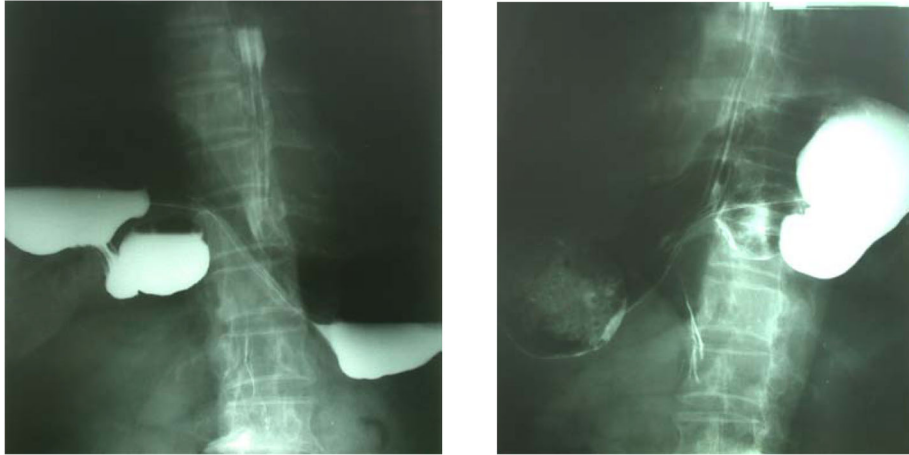


Figure 2. Upper GI series: A large hiatus hernia is noted. The lower portion of the stomach has flipped into the thoracic cavity consistent with an organoaxial volvulus.

and mix food requires it to be relatively mobile. As a result, some movement is normal and intermittent episodes of asymptomatic gastric rotation do occur.⁽³⁾ Using a cadaver model, Dalggaard⁽⁴⁾ demonstrated that it is easier to rotate a fluid-filled stomach than an empty one, and that a normal stomach cannot rotate more than 180° unless the gastrosplenic or gastrocolic ligaments are divided. Thus, if the gastric ligaments are relaxed, any cause of gastric distention can predispose to excessive rotation, setting the stage for volvulus.⁽⁵⁾

A second major predisposing factor for gastric volvulus is a diaphragmatic defect that allows stomach displacement into the thoracic cavity. In adults, the most common of such defects is a paraesophageal hernia.⁽⁶⁾ Other predisposing factors include diaphragmatic injury or surgery, congenital hernias, and diaphragmatic eventration associated with phrenic nerve paralysis, left lung resection, or

pleural adhesions. In some cases, intra-abdominal adhesions act as a rotational axis for the stomach.⁽⁷⁾ Intrinsic lesions (e.g., gastric ulcer or neoplasm) or extrinsic pressure from adjacent masses can obstruct the stomach, altering normal anatomy, and predisposing to volvulus.

Types of volvuli

Singleton⁽⁸⁾ classified gastric volvulus into 3 types: organoaxial, mesenteroaxial and combination-unclassified. Organoaxial volvulus is the most common type, comprising approximately 59% of all cases.⁽⁹⁾ Because the esophagogastric (EG) junction and duodenum are relatively fixed, the stomach rotates around the longitudinal axis, with the greater curvature more commonly rotating anteriorly.⁽¹⁰⁾ This rotation is analogous to “wringing out a wet rag.”⁽¹¹⁾ In such cases, obstruction can occur at the EG junction, the pylorus, or both, and strangulation is more likely to occur. In mesen-

teroaxial volvulus, 29% of cases,⁽⁹⁾ rotation occurs around the transgastric axis (a line connecting the middle of the lesser curvature to the middle of the greater curvature). This results in the anterior gastric wall folding upon itself. Gastrosplenic ligament laxity is thought to be the predisposing factor,⁽⁴⁾ and this form of volvulus often occurs without concomitant diaphragmatic defects.⁽⁶⁾ Complete obstruction and strangulation are unlikely and spontaneous detorsions with recurrent acute episodes may occur. Most cases of chronic volvulus are related to mesenteroaxial rotation.

The remaining 12% of volvuli exhibit features of both the above or remain unclassified.⁽³⁾ These usually present with chronic or recurrent symptoms.

Clinical features

Gastric volvulus most often occurs during the 5th decade of life,⁽⁷⁾ but there have been over 100 pediatric cases reported.⁽¹²⁾ Signs and symptoms depend on the speed of onset, severity of torsion, age of the patient, degree of obstruction and presence of complications.

Gastric volvulus can present as an acute surgical emergency or a chronic, recurring problem. One-third of all episodes present acutely with sudden, severe left upper quadrant or left lower thoracic pain. Pain may radiate to the back, neck or interscapular area and may be accompanied by dyspnea. Vomiting occurs and quickly progresses to dry heaves. The upper abdomen may be distended while the lower abdomen remains flat and soft. Borchartd's triad⁽¹³⁾ includes: 1) acute severe epigastric pain with distention; 2) vomiting followed by violent, intractable, nonproductive retching; and 3) difficulty or inability to pass a nasogastric tube into the stomach. This

progression of symptoms reflects an initial pyloric obstruction followed by obstruction at the cardia and, finally, gastric distention secondary to a closed loop obstruction.

Carter⁽⁷⁾ reported 3 additional findings that may facilitate early diagnosis. These include: minimal abdominal findings when the stomach is completely intrathoracic; a gas-filled viscus in the lower chest or upper abdomen on chest X-ray; and obstruction at the site of the volvulus shown by an upper gastrointestinal series.

The most common complications of acute volvulus are strangulation and perforation. Because of the stomach's luxuriant blood supply, strangulation occurs in only 5% to 28% of patients.⁽⁷⁾ Of note, most reported cases of gastric strangulation were related to a traumatic diaphragmatic hernia. Patients suffering a gastric infarction may present with gastrointestinal hemorrhage, cardiopulmonary failure or shock. Mortality is 30% to 50%^(12,14) for acute gastric volvulus and 60% if strangulation and infarction occurs.

Chronic volvulus, occurring in approximately two-thirds of adult cases, may be asymptomatic, may be reported as an incidental finding on routine chest x-ray or upper GI series, or may present with vague, spontaneously resolving symptoms-usually nondescript upper abdominal pain. Patients may also experience dysphagia, early satiety, bloating, shortness of breath and bouts of eructation. Some patients, especially those with diaphragmatic hernias, exhibit features similar to angina pectoris, complete with ECG changes,^(14,15) and in one reported case, pyloric rotation led to common bile duct compression and obstructive jaundice.⁽¹⁶⁾ Because of its remitting nature, chronic gastric volvulus is easily confused with peptic ulcer disease or cholecysti-

tis⁽¹⁷⁾ and may remain undiagnosed for years.

Diagnosis

Diagnosis is based on clinical suspicion and radiographic studies. Organoaxial volvulus is difficult to image, particularly if no diaphragmatic defect is present. Plain films may show a horizontally oriented stomach with a single air fluid level⁽¹⁸⁾ and a paucity of distal gas. An upper GI series may show a low lying EG junction⁽¹⁹⁾ and a horizontal or inverted stomach with the cardia and pylorus at the same level.⁽²⁰⁾ If the pylorus is obstructed secondary to organoaxial torsion, there may be marked gastric dilatation with “beaking” of the contrast material at the site of torsion.⁽²¹⁾ In cases of organoaxial volvulus, plain films and contrast studies may both be falsely negative, depending on the degree of torsion.

In mesenteroaxial volvulus, the stomach appears spherical on supine radiographs. Upright films often show a double air fluid level, one inferior and left, representing the normally situated fundus, and the other superior and right, representing the displaced antrum.⁽²²⁾ Occasionally the inferior air-fluid level is located in a normal position beneath the diaphragm, while the upper one (herniated antrum) lies in the retrocardiac mediastinum.⁽²³⁾ A helpful finding on chest x-ray is a nasogastric tube that is arrested at the EG junction secondary to obstruction. On an upper GI series, the EG junction is usually below the diaphragm, the distal portion of the stomach appears cephalad, and a “beak” may appear where the EG junction is normally located.⁽²⁴⁾

Treatment

Acute gastric volvulus is a surgical emergency and treatment delays lead to increased

mortality. Volume resuscitation, analgesics and antiemetics should be initiated, and early gastric decompression with a nasogastric tube is advocated, although this may be difficult or impossible if the EG junction is obstructed.⁽²⁵⁾ Non-operative therapy may be successful in selected patients, but this does not address the underlying predisposing factors that led to volvulus. Because volvulus is unpredictable, potentially catastrophic, and may recur, most authors recommend expeditious surgical intervention, with gastric decompression, reduction of the volvulus, correction of predisposing factors, and fixation of the stomach to prevent recurrence.⁽⁶⁾ The preferred surgical procedure is anterior gastropexy, in which the greater curvature of the stomach is affixed to the anterior abdominal wall, but if gastric necrosis has occurred, partial or total gastrectomy may be required depending on the extent of ischemic injury.⁽¹⁷⁾ In high risk patients, endoscopic decompression and reduction may be an option.⁽²⁶⁾

Intraoperative details:

- Reduction of the volvulus.
- Assessment of gastric viability with resection of the gangrenous portions by segmental, subtotal, or total gastrectomy.
- Prevention of recurrence by anterior gastropexy, which is most often accomplished with a gastrostomy tube.
- Recent reports have described a laparoscopic approach to both acute and chronic gastric volvulus.
- The technique involves placement of the scope through the umbilicus.
- The stomach is visualized, and its viability confirmed.
- The stomach is grasped with a

nontraumatic grasper and is then reduced and reoriented.

- A gastrostomy tube is placed to provide postoperative decompression and prevent recurrence.

- A combined laparoscopic and endoscopic approach has also been used to assess the intraluminal and intra-abdominal status of the stomach better as well as its position before, during, and after fixation.

Conclusion

Acute gastric volvulus is a rare and often unrecognized surgical emergency that should be considered in patients who present to the ED with severe epigastric pain, nonproductive retching, and evidence of a gastric outlet obstruction -especially if there is difficulty passing a nasogastric tube. Critically ill patients and those with peritonitis should go directly to the operating room, but if time permits and the diagnosis is in doubt, an upper GI series should be requested. Currently, surgical repair remains the treatment of choice.

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รายงานกรณีศึกษาผู้ป่วย ภาวะกระเพาะอาหารบิดขั้ว

บัญญัติ เกียรติสิงหนคร พ.บ., บริษัท์ เจริญศิลป์ พ.บ., ชูศักดิ์ หงส์ดามรงค์ พ.บ.

กลุ่มงานศัลยกรรม โรงพยาบาลสวรรค์ประชารักษ์ จังหวัดนครสวรรค์

บทคัดย่อ ถึงแม้ว่าภาวะกระเพาะอาหารบิดขั้วจะพบได้น้อยแต่ก็มีความสำคัญเพราะอาจทำให้ผู้ป่วยเสียชีวิตจากลำไส้อุดตันได้ แพทย์ที่ดูแลต้องคำนึงถึงเสมอ เมื่อผู้ป่วยมีอาการหรืออาการแสดงถึงภาวะลำไส้ส่วนต้นอุดตัน ทางคณะผู้จัดทำจึงได้รายงานกรณีศึกษาและศึกษาย้อนหลังถึงกลไกการเกิดโรค การวินิจฉัย และการรักษาโรค **เชียงใหม่เวชสาร 2551;47(2):89-95.**

คำสำคัญ: ภาวะกระเพาะอาหารบิดขั้ว ภาวะไส้เลื่อนผ่านรูกระบังลม
