



## Gastric volvulus following left pneumonectomy in an adolescent patient



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### ABSTRACT

Gastric volvulus is a rare post-pneumonectomy complication. Although it has been described previously, published cases are limited to an older patient population. We report the youngest case of post-pneumonectomy gastric volvulus to date, occurring in an 18-year-old male with a history of inflammatory myofibroblastic pseudotumor who underwent left intrapericardial pneumonectomy, and presented 13 years later with chronic intermittent mesenteroaxial gastric volvulus. While post-pneumonectomy gastric volvulus is a rare occurrence, it should remain in the differential diagnosis in postoperative thoracic surgical patients presenting with chest pain.

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Gastric volvulus is uncommon among pediatric and adolescent patients [1–4], and is even more rare as a sequela of pneumonectomy, even when broadening the population to include adults. Volvulus of the stomach is defined as twisting or turning of the stomach over 180° and can be organoaxial, mesenteroaxial, or a combination of the two, depending on the axis of rotation of the stomach (Fig. 1) [5,6]. Gastric volvulus has been associated with diaphragmatic eventration, congenital diaphragmatic hernia, intestinal malrotation, wandering spleen, asplenic, and hiatal hernia [5]. Although gastric volvulus following pneumonectomy has been described in the literature, the reports are limited to patients over 30 years old [7–11]. This report describes the history, treatment, and outcome of an adolescent patient who presented with mesenteroaxial gastric volvulus 13 years after undergoing left pneumonectomy.

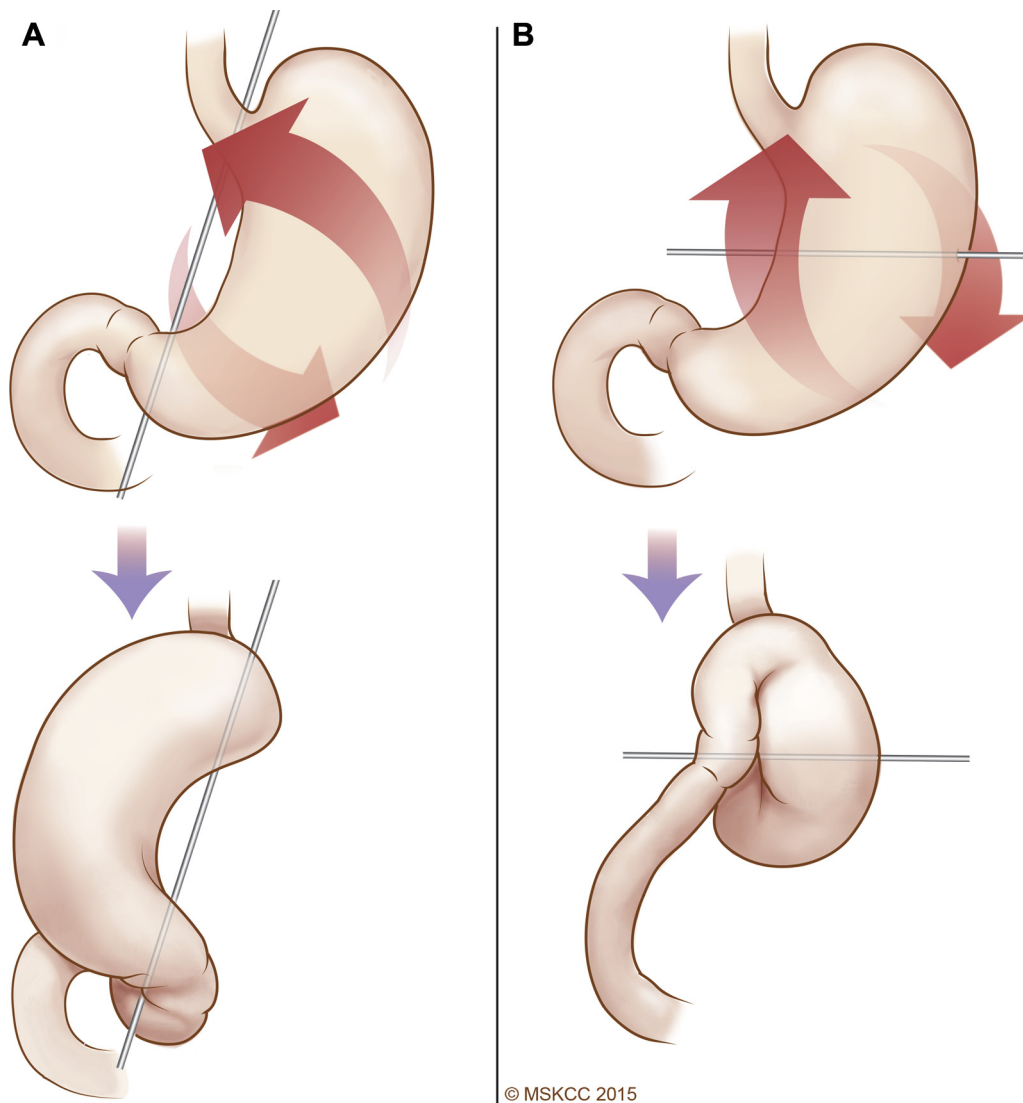
### 1. Case report

Our patient is an 18-year-old male with a history of inflammatory myofibroblastic tumor (IMT) that was diagnosed and surgically treated during childhood. At 5 years of age, the patient presented with left-sided pain and nausea and was seen by his pediatrician who noted diminished breath sounds on the left. A chest X-ray revealed a mass, and a confirmatory computed tomography (CT) scan showed a 7-cm mediastinal mass occupying the upper third of the left hemithorax. The mass was subsequently excised through a left thoracotomy, and pathologic analysis supported a diagnosis of IMT. On follow-up imaging, a 2.7 × 2 cm left upper-lobe density was found and the patient was referred to our institution for further care. After consultation with our institution's tumor board, the patient underwent a thoracotomy and left intrapericardial pneumonectomy with placement of a McGhan tissue expander, initially inflated to 300 cc with saline. Follow-up magnetic resonance imaging (MRI) showed no evidence of recurrent disease.

Thirteen years later, the patient presented to an outside emergency department with left-sided chest pain. The patient had an extensive workup of his pain, including blood work, a cardiac workup, and CT of the chest, all of which were initially

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**Fig. 1.** (A) Organoaxial volvulus occurs when the stomach rotates along its long axis, placing the greater curvature anteriorly and the lesser curvature posteriorly. (B) Mesenteroaxial volvulus occurs when the stomach rotates along its short axis placing the antrum anteriorly and superiorly. Figure courtesy of Memorial Sloan Kettering Cancer Center. Used with permission.

unremarkable. The patient's chest pain recurred, at which time he was referred to our institution. Upon review of the outside CT scan at our institution, the diagnosis of mesenteroaxial gastric volvulus was suspected. An upper gastrointestinal imaging series was performed and revealed mesenteroaxial position of the stomach without obstruction (Fig. 2). Additionally, an abdominal ultrasound showed cholelithiasis. The patient was prepared for surgery during which a laparoscopic gastropexy, Stamm gastrostomy, and cholecystectomy were performed.

At the time of laparoscopy, the stomach was located in the left upper quadrant due to the high eventration of the left hemidiaphragm secondary to prior left pneumonectomy. The stomach was easily reduced and no hiatal hernia was found. A gastropexy was carried out by suturing the lesser curvature of the stomach to the round ligament, and a lateral Stamm gastrostomy high on the greater curvature of the stomach was performed. Intraoperative esophagogastroduodenoscopy showed a normal esophagus without evidence of reflux or inflammation. The patient tolerated the procedure well, but suffered postoperative left chest and axillary pain, for which he has been followed by neurology and pain

teams. Postoperative clinical assessments were undertaken by the surgeon, who removed the gastrostomy tube and has noted no further evidence of gastric volvulus. No subsequent surgeries have been attempted to remove the deflated tissue expander.

## 2. Discussion

Gastric volvulus is an uncommon diagnosis as the stomach is held in place by multiple structures, including its attachments to the fixed esophagus and duodenum, the gastrophrenic and gastrosplenic ligaments, the short gastric vessels, and the gastrocolic ligament. Cases of gastric volvulus in pediatric and adolescent populations are even more uncommon as illustrated in a review by Cribbs et al. in which 581 cases of gastric volvulus in infants and children were identified over a 78-year period [5]. Regardless of age, the most common type of gastric volvulus described is organoaxial volvulus; however, mesenteroaxial or a combination of the two is also possible [2,6,10,12]. Gastric volvulus is commonly seen secondary to hiatal hernia, laxity or absence of gastric ligaments, postoperative adhesions, congenital and acquired diaphragmatic

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