CASE REPORT

COMPUTED TOMOGRAPHY IN THE DIAGNOSIS OF CHRONIC GASTRIC VOLVULUS

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Abstract: *Gastric volvulus is a rare entity, which when acute can be potentially life threatening. On the other hand, chronic volvulus may be detected incidentally or may result in intermittent epigastric pain and abdominal fullness following meals. Organo axial variety is twice as common than mesenteroaxial variety. We report a case of an uncommon mesenteroaxial volvulus of the stomach that was incidentally detected on computed tomography of the abdomen and review the pathogenesis, classification and diagnosis of this rare entity.*

INTRODUCTION

Gastric volvulus is defined as an abnormal rotation of the stomach of more than 180°, creating a closed loop obstruction.[1] Stomach may rotate as much as 180° without becoming obstructed; more than 180° usually results in gastric obstruction. Emergent surgical intervention is indicated for acute gastric volvulus while for chronic gastric volvulus, surgery is performed mainly to relieve the symptoms and to prevent further complications.

CASE REPORT

A 35 years old male presented with a nonspecific complaint of episodic abdominal bloating since many years, which is mainly postprandial. Mild epigastric pain was also associated. The distension and pain was unresponsive to treatment. The patient had taken treatment for the tuberculosis of the chest 2 years back. Clinical examination did not yield any significant abnormality. Laboratory tests were unremarkable. Plain radiograph of abdomen revealed raised left dome of diaphragm with a large air fluid level underneath it. Computed tomography (CT) of abdomen was then performed to detect any occult disease of the gastrointestinal or hepatobiliary system and to determine the cause of the elevated left dome of diaphragm (fig 1-4). It revealed an over distended stomach in an upside down position. The gastroesophageal junction (GEJ) was normally positioned. The gastroduodenal junction was positioned abnormally higher than the GEJ and was to the left of spine. The left dome of the diaphragm was elevated and the left crux was thinner compared to the right crux. There was no associated diaphragmatic defect. Spleen and other viscera on the left side of the abdomen were abnormally high placed due to elevated left dome. Based on the above findings the radiological diagnosis of the chronic mesenteroaxial gastric volvulus with eventration of the left dome of diaphragm was made. The diagnosis was confirmed at surgery, which was performed to relieve the symptoms and to prevent further complications after which the patient remained asymptomatic.

DISCUSSION

The stomach is anchored at the cardia and tethered by the gastrocolic, gastrohepatic, gastrophrenic and gastrosplenic ligaments. Dalggard[2] demonstrated that it is easier to rotate a fluid-filled stomach than an empty one, and that a normal stomach cannot rotate more than 180º



Figure 1: Plain radiograph of the abdomen shows raised left dome of diaphragm with a large air fluid level underneath it



Figure 2: Axial contrast enhanced CT image shows superiorly displaced viscera on left side due to raised left dome

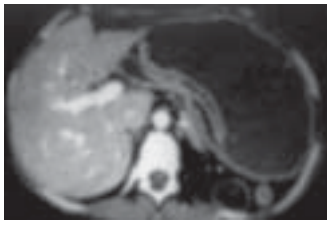


Figure 3: Axial contrast enhanced CT image shows over distended stomach filled with water and food material with gastroduodenal junction crossing the midline anterior to the spine



Figure 4: Coronal MPR CT image shows the upside down appearance of the stomach, elevated left dome of diaphragm, thin left crux and raised viscera on left side

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unless the gastrosplenic or gastrocolic ligaments are divided.

According to etiology, gastric volvulus is classified as either type 1 (idiopathic – two-third) or type 2 (congenital or acquired – one-third). Type 1 is due to the laxity of the gastric ligaments and is seen in elderly when any cause of gastric distention can predispose to excessive rotation, setting the stage for volvulus.[3] A major cause for type 2 is a diaphragmatic defect that allows stomach displacement in to atypical spaces. In adults, the commonest defect is a paraesophageal hernia.[4] Other predisposing factors include diaphragmatic injury or surgery, congenital hernias, and diaphragmatic eventration associated with phrenic nerve paralysis, left lung resection, or pleural adhesions. Intrinsic lesions (e.g., gastric ulcer or neoplasm) or extrinsic pressure from adjacent masses can alter normal anatomy, and may predispose to volvulus.

According to Singleton,[5] gastric volvulus is classified based on the axis around which the stomach rotates,:

- ***Organoaxial***

➢ The stomach rotates around an axis that connects the GEJ and the pylorus with the greater curvature rotating (most often) anteriorly.[6]. The antrum rotates in opposite direction to the fundus of the stomach.

➢ It is the commonest variant, seen in approximately 59% of cases.[7] and is usually associated with diaphragmatic defects.

- ***Mesenteroaxial***

➢ The stomach rotates around the transgastric axis i.e. a line connecting the middle of the lesser and the greater curvature. The antrum rotates anteriorly & superiorly so that posterior surface of the stomach lies anteriorly and the greater curve lies most superiorly.

➢ It comprises 29% of cases.[7] Gastrosplenic ligament laxity is the predisposing factor, and this form often occurs without concomitant diaphragmatic defects.[4] Complete obstruction and strangulation are unlikely and spontaneous detorsions with recurrent acute episodes may occur. Most cases of chronic volvulus are related to this type.

- ***Combined / Mixed / Unclassified***

➢ This rare form exhibits features of both mesenteroaxial and organoaxial volvulus or remains unclassified

➢ It comprises the remaining 12% of volvuli

Ten to 20% of gastric volvulus occur in children, usually before one year, and are often secondary to congenital diaphragmatic defects. The condition is uncommon in adults < 50 years. Males and females are equally affected.

Gastric volvulus manifests as an acute abdominal emergency or as a chronic intermittent problem. The presenting symptoms depend on the degree of twisting and the rapidity of onset. Chronic volvulus, which accounts for 2/3 of adult cases, may be asymptomatic, may be reported as an incidental finding on radiography, barium studies or computed tomography[8], or may present with vague, spontaneously resolving epigastric pain, abdominal fullness following meals, early satiety, dyspnea, and sometimes chest discomfort. Dysphagia occurs if the GEJ is distorted. Because of the nonspecific nature of the symptoms, patients are often investigated for other entities as cholelithiasis and peptic ulcer disease.

Imaging by chest radiograph may reveal a retrocardiac gas-filled viscus in cases of intrathoracic stomach. Plain abdominal radiograph may reveal a massively distended viscus. In mesenteroaxial volvulus, the stomach appears spherical on supine abdominal radiographs while erect films often show double air fluid level; inferior representing the fundus & superior representing the displaced antrum.[9] A helpful finding is a nasogastric tube arrested at the GEJ secondary to obstruction. On an upper GI series, the GEJ is usually below the diaphragm, the distal portion of the stomach appears cephalad, and a "beak" may appear where the GEJ is normally located.[10] CT abdomen not only delineates the exact type of volvulus better than barium studies but also helps in detecting the complication as well as the cause of volvulus.

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 and a paucity of distal gas. An upper GI contrast study may show a low lying GEJ and a horizontal or inverted stomach with the cardia and pylorus at the same level.[11] 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. CT abdomen delineates the abnormality better. In cases of organoaxial volvulus, plain films and contrast studies may both be falsely negative.

Although the treatment of gastric volvulus is surgical, endoscopic reduction can be attempted in selected patients.

Strangulation and necrosis occur most commonly with organoaxial gastric volvulus (5-28% of cases). Gastric emphysema and perforation occurs secondary to ischemia and necrosis. Perforation can also complicate endoscopic reduction. The nonoperative mortality rate is reportedly as high as 80%. With advances in diagnosis and management, the mortality rate from acute gastric volvulus has been brought down to 15-20%; the mortality rate from chronic gastric volvulus ranges from 0-13%.

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ETHICAL GUIDELINES FOR BIOMEDICAL RESEARCH

The need for uniform ethical guidelines for research on human subjects is universally recognised. It has acquired a new sense of urgency as the critical issues in the area of biogenetic research involving human subjects have become acute. Apart from the mandatory clinical trials on new drugs, a number of diagnostic procedures, therapeutic interventions and prevention measures including the use of vaccines, are being introduced which involve human subjects. Further the advent of new medical devices and radio-active materials and therapeutic benefits of recombinant DNA products have added a new dimension to the ethical issues that need to be considered before evaluating these for their efficacy, utility and safety.

Any research using the human beings as subjects shall bear in mind the following **principles** of : (i) **essentiality**, (ii) **voluntariness, informed consent**, (iii) **non exploitation**, (iv) **privacy** and **confidentiality**, (v) **precaution** and **risk minimisation**, (vi) **professional competence**, (vii) **accountability & transparency**, (viii) **maximisation of public interest** and **distributive justice** (ix) **institutional arrangements** (x) **public domain** (xi) totality of **responsibility** and (xii) **compliance**.

Recent advances in the field of **Assisted Reproductive technologies, organ transplantation, Human genome analysis** and **gene therapy** promise unquestionable benefits to mankind. At the same time, they raise many questions of law and ethics, stimulating public interest and concern.

(Source : ICMR Publication 2000)