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Superior Mesenteric Artery Compression Syndrome: A Case Report

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ABSTRACT

Superior mesenteric artery (SMA) syndrome is a rare vascular compression disorder resulting from compression of 3rd part of the duodenum between the aorta and SMA due to loss of intervening mesenteric fat pad. Management is usually conservative but failure of which warrants surgical intervention. Imaging modalities document and characterize the typical findings, and are considered paramount in the diagnosis and management of this disease. Here, we present a case of SMA syndrome in an 18-year-old adult presenting with nausea, vomiting, and abdominal pain. Contrast-enhanced study (CECT) of the abdomen and pelvis showed typical findings of SMA syndrome. The patient underwent surgery (duodenojejunostomy) with uncomplicated postoperative recovery.

Keywords: *Duodenal Obstruction; Superior Mesenteric Artery Syndrome; Vomiting*

INTRODUCTION

Superior mesenteric artery (SMA) syndrome is a rare condition that typically manifests as either acute or chronic obstruction in the upper gastrointestinal tract caused by the compression of the third part of the duodenum between the abdominal aorta and the SMA. Various factors can lead to SMA syndrome, including acquired anatomical abnormalities, prolonged wasting, and hypercatabolic states. The presentation of SMA syndrome can range from sudden to gradual, posing a challenge in diagnosis and often causing delays. Furthermore, effectively managing SMA syndrome continues to be a significant challenge, with conservative methods usually explored before resorting to surgical intervention.[1,2,3,4]

CASE REPORT

An 18-year-old male, presented to the Emergency department with complaints of acute onset of abdominal pain, vomiting, distension and not passing stool and flatus for 4 days. Systemic examination showed a mildly distended abdomen with normal bowel sounds.

An abdominal X-ray was done which showed air-fluid level at the stomach and duodenum. (Figure 1a). The patient then underwent CECT abdomen/pelvis which showed an over-distended fluid-filled stomach along with D1 & D2 segments of duodenum. The transition point at 3rd part of the duodenum is seen with the superior mesenteric artery coursing anterior to the transition point as shown in Figure 1b. The SMA angle was found to be 6 degrees only (normal: 25 to 60 degrees); the aorta mesenteric distance was 2.8 mm

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(normal: 10 to 28 mm) suggesting the diagnosis of the superior mesenteric syndrome. He was initially managed with nasogastric drainage for decompression and intravenous fluids. The patient underwent surgery which confirmed the diagnosis and the patient underwent a duodenojejunostomy. The postoperative state was uneventful and was subsequently discharged without any complications.

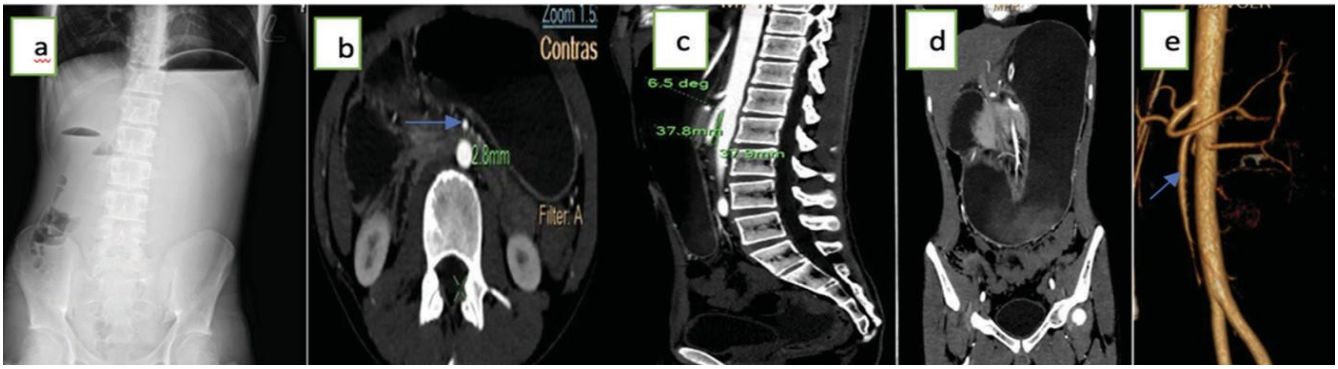

Figure 1: 1a. *X-ray abdomen shows a double bubble appearance.* ***1b.*** *Reduced aortomesenteric space and* ***1c.*** *aortomesenteric angle.* ***1d.*** *Fluid-filled dilated stomach.* ***1e.*** *3D reconstruction image showing narrowed aorto-mesenteric angle. The arrow in b and e corresponds to the superior mesentery artery*

DISCUSSION

Superior mesenteric artery (SMA) is a rare cause of small bowel obstruction first documented by Carl Freiherr von Rokitansky in 1861. The superior mesenteric artery originates at an acute angle from the aorta, near the first lumbar vertebra where the duodenum crosses over. The aorto-mesenteric angle ranges from 25-600, and the distance measures between 10-28 mm. Superior mesenteric artery syndrome can develop due to a reduction in retroperitoneal fat cushion. The incidence of this syndrome is low at 0.1-0.3%, but it carries a high mortality rate of 33%. Women are more likely to be affected, particularly between the ages of 30 and 50.[1,2,3]

Both acquired and congenital factors can contribute to the etiology of SMA syndrome. Congenital displacement of the duodenum may result from high insertion of the Treitz ligament or low takeoff of the SMA. Acquired causes include weight loss, neoplasms, malabsorption syndromes, AIDS, trauma, burns, anatomically distorting surgeries like scoliosis surgeries, and psychiatric disorders. This condition is often seen in young individuals with anorexia nervosa, leading to a reduction in perivascular adipose tissue. SMA syndrome may also occur alongside other vascular compression diseases, with the nutcracker phenomenon being a common co-existing condition.[2,4]

The predominant symptom of upper gastrointestinal obstruction is abdominal discomfort, present in 91% of cases. The discomfort is often experienced after meals (62%) or physical activity, but can also occur spontaneously (33%). Other symptoms include unintended weight loss, nausea, vomiting, and an epigastric bruit. Relief can be found through the Hayes maneuver, assuming a posture with knees drawn towards the chest, or repositioning the body to create an angle between the superior mesenteric artery and the aorta. Pain may worsen with recumbency a maneuver that diminishes the aorto-mesenteric angle. Our patient presented to the emergency department with vomiting, abdominal pain, and distension.[2,5]

Common differential for SMA syndrome include duodenal stricture, diabetic gastroparesis, scleroderma, and hereditary megaduodenum. Various imaging modalities such as CT scans, angiography, endoscopy, ultrasound, and MRI can be utilized for this purpose. Barium examinations may reveal the presence of duodenal dilatation and, in some cases, gastric dilatation with sluggish gastroduodenojejunal transit. In cases where there is megaduodenum, which refers to a dilated proximal duodenum with a sudden interruption of the barium flow in the third section, the presence

of this condition may indicate SMA syndrome. On the other hand, the Upper gastrointestinal series does not appear to be sufficiently sensitive in detecting SMA symptoms due to their intermittent nature, and therefore it is typically more suitable to be performed during an active attack.[6,7]

The most common modality for diagnosis is an abdominal CT scan with contrast which can detect compression and reduced angle in both symptomatic and asymptomatic individuals. Unal et al reported the cutoff value is 22 degrees on the SMA-Aortic angle and 8 mm on a distance with a 42.8% sensitivity and 100% specificity. It is worth noting that in a normal population, the aorto-mesenteric angle and distance tend to exhibit a significant correlation with BMI. Gastrointestinal injury, hypovolemic shock, aspiration pneumonia, and sudden death, even in young patients are common complications of SMA syndrome.[7,8,9]

Typically, the approach to treatment is conservative and involves gastric decompression, correction of fluid electrolyte imbalances, and providing nutritional support. The main focus of conservative treatment is to restore retroperitoneal fat and promote weight gain. However, if conservative treatment does not alleviate the obstruction, surgical procedures should be considered. Commonly used options for surgical intervention include Gastrojejunostomy, Subtotal gastrectomy, Billroth II gastrojejunostomy, and repositioning of the duodenum anteriorly. Our patient was managed with duodenal-jejunostomy with uneventful post-operative recovery. [2,6,7]

CONCLUSION

SMA, although rare, should be considered as one of the differentials in the presence of partial or complete gastrointestinal obstruction. When there is a strong suspicion in the appropriate clinical context, symptoms, and radiographic imaging can help reach a diagnosis

CONFLICT OF INTEREST

None

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