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Superior mesenteric artery syndrome in a patient with anorexia nervosa: A case report

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Abstract

Superior mesenteric artery (SMA) syndrome occurs with an estimated incidence rate of 0.1% to 0.3%. Patients with this condition typically present with non-specific signs and symptoms such as epigastric pain, nausea, and vomiting – making its clinical diagnosis difficult.

This is a case of a 39-year-old Filipino female with an acute presentation of epigastric pain and abdominal bloatedness. A history of restrictive eating pattern with frequent self-induced vomiting associated with rapid and sudden onset of weight loss were disclosed, the symptoms of which were consistent with anorexia nervosa. Esophagogastroduodenoscopy was done which showed presence of retained food particles at the body and antrum of the stomach. Contrast-enhanced CT scan of the abdomen revealed a narrowing of the aortomesenteric distance, with an aortomesenteric angle measuring 22.2°, indicating the presence of SMA syndrome. Her symptoms resolved with gradual introduction of frequent feedings in addition to fluid and electrolyte correction.

SMA syndrome may be rare, but should be included in the differential diagnoses of patients presenting with sudden or acute abdominal pain. A high index of suspicion is needed to facilitate workup for its diagnosis. When left untreated, a cycle of abdominal pain and vomiting occurs, leading to further weight loss and aggravation of the condition.

Keywords: *Superior mesenteric artery syndrome, Anorexia nervosa, Case report*

Introduction

Superior mesenteric artery (SMA) syndrome is an uncommon cause of small bowel obstruction, with an incidence rate of 0.1-0.3%, occurring more frequently in females.[1] This is marked by the compression of the third portion of the duodenum as it traverses between the aorta and the superior mesenteric artery.[2] Factors such as sudden significant weight loss can cause narrowing of the aorto-superior mesenteric artery angle due to the loss of intra-abdominal fat[3], causing impingement of the duodenum and leading to functional obstruction.[4] This condition presents with non-specific signs and symptoms, and when left undiagnosed, leads to a mortality rate of 33%.[2]

This report aims to present a case of a 39-year-old Filipino female with epigastric pain and bloatedness with a background of restrictive eating patterns, who was worked up and subsequently diagnosed with superior mesenteric artery syndrome.

Objectives

General Objective:

- To present a case of superior mesenteric artery syndrome in a 39-year-old Filipino female with epigastric pain and bloatedness

Specific Objectives:

- To discuss the etiology, pathophysiology and clinical manifestations of superior mesenteric artery syndrome
- To present the diagnostics and general management of superior mesenteric artery syndrome

Case Presentation

A 39-year-old Filipino female had complaints of recent-onset epigastric pain and abdominal bloatedness. The patient had no known comorbidities with an unremarkable history for hereditary or familial diseases. She disclosed to have had restrictive eating patterns with frequent self-induced vomiting for the past 3 months, associated with rapid and sudden onset of weight loss of 3 to 4 kilograms. A consult with psychiatry during admission deemed this history to be consistent with anorexia nervosa. She was assessed to weigh 45.9 kg and measured 170 cm tall, with a body mass index (BMI) of 15.88, classifying the patient as underweight based on the Asia-Pacific cut-off points. Physical examination revealed an asthenic body habitus with direct tenderness on the epigastric area. The rest of her physical examination findings was unremarkable. Abnormalities in her laboratory workup revealed hypokalemia at 2.4 mmol/L (normal value 3.5-5.0 mmol/L), which was likely due to gastrointestinal losses, and hypermagnesemia at 2.6 mg/dL (normal value 1.2 -2.2 mg/dL), which was often seen in moderate to severe malnutrition. Electrolyte abnormalities were corrected intravenously. Oral potassium was not given as this may be associated with esophageal ulcerations, strictures and gastritis, and may worsen gastric irritation in patients with persistent vomiting. Esophagogastroduodenoscopy was done (Figure 1) showing retained food particles in the body and antrum of the stomach with no visualized intraluminal mass, with unremarkable findings in the duodenum. Contrast-enhanced CT scan of the abdomen revealed narrowing of the aortomesenteric distance of 7mm (normal limits: 10-28 mm) with the aortomesenteric angle measuring 22.2°(normal limits: 38-65°) [Figure 2a], and mild extrinsic compression of the third portion of the duodenum, [Figure 2b]; findings which were consistent with SMA syndrome.

The patient was referred to a nutrition specialist for dietary enhancement with small, frequent meals (5-6 meals/day) of low fiber, low fat, liquid or semi-solid diet, to avoid duodenal overdistention. To prevent refeeding syndrome, calorie intake was gradually increased by 200-300 kcal every 2-3 days with supplemental electrolytes as needed. She was then discharged and a continual reassessment of her condition was done as outpatient.

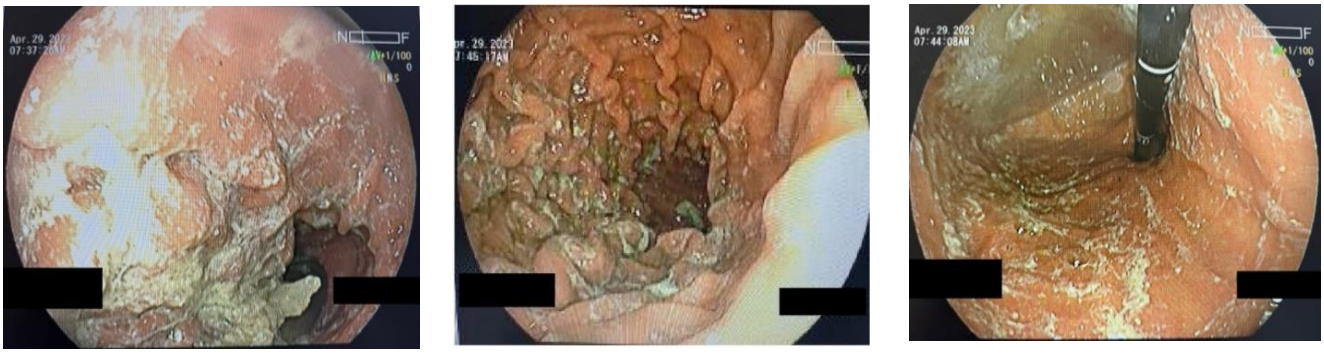

Figure 1. Esophagogastroduodenoscopy showing retained food particles in the body and antrum of the stomach

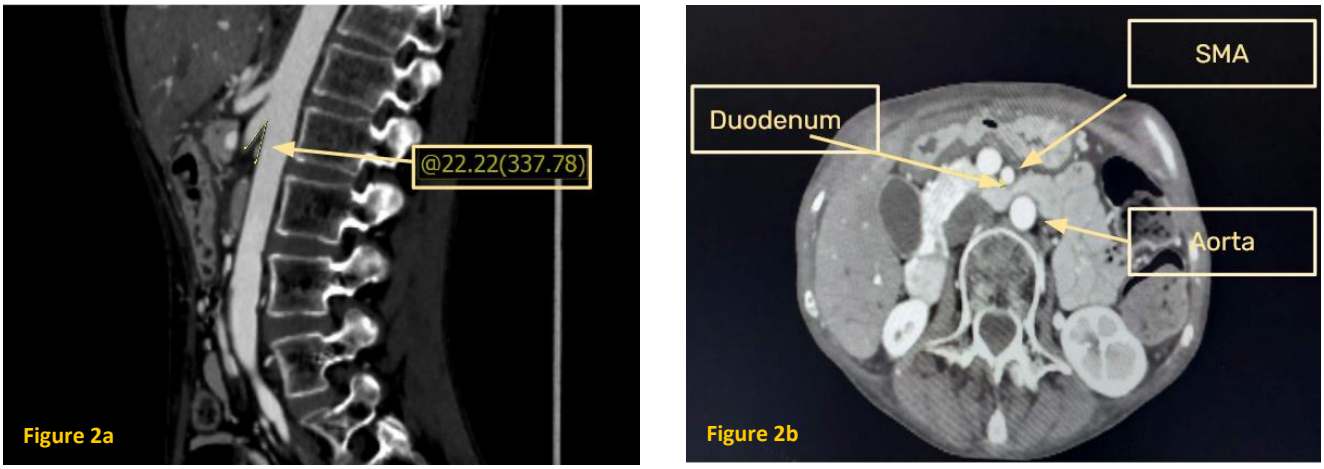

Figure 2. Contrast-enhanced CT scan of the abdomen. **Figure 2a.** Narrowed aortomesenteric angle of 22.2^0 **Figure 2b.** Mild extrinsic compression of the 3rd portion of the duodenum

Discussion

Superior mesenteric artery syndrome, also known as Cast syndrome, Wilkie syndrome, arteriomesenteric duodenal obstruction, or chronic duodenal ileus, is an unusual cause of proximal intestinal obstruction. Its incidence is estimated to be at 0.1% to 0.3% of the general population.[1] SMA syndrome typically occurs in adolescents and young adults ranging 10 to 39 years old but can also occur at any age. It is seen more commonly in females over males with a ratio of 3:2.[1] Up to date, there has been no reported ethnic predisposition, although familial cases have been described. Moreover, there has been no published reports on SMA syndrome associated with anorexia nervosa in the Philippines.

The SMA originates on the anterior surface of the aorta at the level of the L1 vertebrae, and is enclosed in fatty and lymphatic tissue which extends caudally at an acute angle into the mesentery. Normally, the angle between the superior mesenteric artery and the aorta is between 38-65° due to the presence of mesenteric fat pad.[3] When this angle is

narrowed to less than 25 degrees, the SMA impinges on the third portion of the duodenum, leading to gastric and intestinal obstruction.[4] This may be seen in post-surgical patients or in those with sudden massive weight loss resulting in loss of the mesenteric fat pad, leading to a decrease of the normal angle formed by the root of the SMA and the aorta.

Patients typically present with non-specific signs and symptoms, and they may be acute or chronic, typically including epigastric pain, nausea, and vomiting.[4] Other symptoms include abdominal distention, weight loss and early satiety.[1] The perpetuating cycle of nausea and vomiting would further lead to inadequate food intake which results in weight loss, further aggravating this syndrome.

The diagnostic workup for SMA syndrome includes a contrast-enhanced computed tomography (CT) scan, which would reveal an aortomesenteric angle of less than 22-25 degrees.[5] This has a sensitivity of 42.8% and specificity of 100%. It may also be diagnosed when the aortomesenteric distance is less than 8 mm, with a 100% sensitivity and specificity for the condition.[5] Another advantage for the use of the CT scan as an imaging modality is its ability to detect other possible causes of duodenal obstruction, such as a presence of an intestinal mass. Other imaging modalities that may also be used to help in the diagnosis of SMA syndrome include an upper GI series, CT angiography, and MR angiography.[4,5]

The primary management for SMA syndrome includes decompression of the obstruction and addressing any fluid or electrolyte abnormalities in the patient. A conservative approach incorporates nutritional enhancement with the goal of replacing the lost fat pad[6] to increase the aortomesenteric angle. Adults with acute onset of symptoms for SMA syndrome treated with conservative management via nutritional buildup have been shown to have good prognosis.[7] For patients who presented with more chronic onset of symptoms, however, and those with no relief with conservative management, surgical interventions are considered. Those requiring surgery are managed with the Strong's procedure, a technique in which the ligament of Treitz is divided and the duodenum is mobilized to the right of the superior mesenteric artery, thus avoiding duodenal obstruction, gastrojejunostomy, and duodeno-jejunostomy.[7,8] The mortality rate of patients with SMA syndrome is 33%, if undiagnosed, due to fatal complications such as dehydration and metabolic alkalosis brought by the increased intragastric pressure and gastric wall shear stress leading to acute gastric dilatation and gastric vascular insufficiency, respectively, resulting to mucosal necrosis.[2]

Conclusion

Superior mesenteric artery syndrome is an uncommon cause of duodenal obstruction. The most common risk factor for the occurrence of this condition is significant or massive weight loss due medical disorders, whether because of psychological disorders or surgery. Symptoms can be non-specific; thus, a high index of suspicion is required for its diagnosis. Unless the etiology of the SMA syndrome requires immediate surgical intervention, conservative management via nutrition enhancement is first considered. A multidisciplinary approach should be taken into consideration to provide a thorough workup and management for these patients. With a significant mortality rate when diagnosis is delayed, this syndrome should not be overlooked and should be included in the differential diagnoses of patients with sudden and acute abdominal pain.

Ethical Consideration

Patient consent was obtained before submission of this manuscript.

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