

CASE REPORT

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Superior mesenteric artery syndrome managed laparoscopically: a case report

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Abstract

Background Superior mesenteric artery syndrome is a rare condition that has only around 400 reported cases so far. Typically, the superior mesenteric artery branches off the abdominal aorta at 45° to create an aortomesenteric distance of 10–28 mm, with the duodenum passing through. However, if this aortomesenteric angle reduces to less than 25°, the third portion of the duodenum becomes compressed between the SMA and aorta, causing mechanical obstruction.

Case presentation This case report aims to demonstrate the diagnostic difficulties and the laparoscopic management of a 52-year-old Indian male presenting with abdominal pain and vomiting, with associated weight loss. Imaging was further suggestive of high intestinal obstruction, and he was later found to have superior mesenteric artery syndrome.

Conclusion Taking into account a significant reduction in morbidity, we propose laparoscopic duodenojejunostomy to be the new procedure of choice for superior mesenteric artery syndrome.

Keywords SMA syndrome, Aortomesenteric angle, Subacute bowel obstruction, Laparoscopic duodenojejunostomy, Case report

Introduction

Superior mesenteric artery (SMA) syndrome is an unusual condition with only 400 reported cases so far [1] and an incidence of 0.013–0.3% [2]. Typically, the SMA branches off the abdominal aorta at 45° (40–65°) to create an aortomesenteric distance of 10–28 mm, with the duodenum passing through. However, if this aortomesenteric angle reduces to less than 25° [2], the third portion of the duodenum becomes compressed between the SMA and aorta, causing mechanical bowel obstruction.

The underlying etiology may be congenital or acquired. Congenital causes are centered around a change in the insertion of the ligament of Trietz, the low origin of the

SMA, and spinal deformities. Acquired causes may be secondary to those causing rapid reduction in weight such as malabsorption syndromes, eating disorders, and bariatric surgery, as well as chronic debilitating conditions such as human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), tuberculosis, and malignancies [2].

These patients may present acutely or with chronic symptoms, including recurrent epigastric pain, early satiety, vomiting, and weight loss.

Surgery becomes the mainstay of management in case of longstanding disease or complications. Although this is conventionally done by the open technique, with the advent of minimally invasive surgery, laparoscopic surgery can be used effectively.

We report a case of a 52-year-old Indian male patient with SMA syndrome managed laparoscopically.

This case was reported in line with the SCARE criteria [3].

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Case report

A 52-year-old Indian male farmer presented with complaints of intermittent epigastric pain and bilious vomiting for 10 days. His symptoms increased postprandially and relieved partly on lying laterally. There was associated significant weight loss (12 kg over 6 months). The patient reported no history of altered bowel habits, peptic ulcer disease, prior *Helicobacter pylori* treatment, or nonsteroidal anti-inflammatory drugs (NSAID) use. There was no history of any previous illness or operative procedure or any known comorbid conditions or addictions.

On examination, the patient was lean (body mass index of 18 kg/m^2) with a pulse rate of 90 beats per minute and blood pressure of 104/70 mmHg. On per abdomen examination, the abdomen was mildly distended and nontender, without any palpable mass. Bowel sounds were present. Per rectal examination was normal. The rest of his systemic examination revealed no abnormality. Routine laboratory findings were within the normal limits.

A plain erect abdominal X-ray displayed a distended stomach, and ultrasonography of the abdomen and pelvis (USG A + P) was unremarkable. Contrast-enhanced computed tomography of the abdomen and pelvis (CECT A + P) showed severe thickening (12–13 mm) and luminal narrowing of the lower esophagus. The stomach was overdistended with dilatation of the proximal duodenum. Reactive inflammatory thickening was seen on upper gastrointestinal (GI) endoscopy with esophageal biopsy. Computed tomography (CT) angiography performed revealed severe compression of the third portion of the duodenum between the SMA and aorta. This patient was found to have an aortomesenteric angle of 18° , suggestive of SMA syndrome (Figs. 1, 2).

This clinical presentation, in conjunction with the aforementioned investigations, confirmed the diagnosis of SMA syndrome. After a thorough preoperative workup and optimization, the patient was prepared for elective laparoscopic duodenojejunostomy.

After taking due consent, the patient was placed in the supine position under general anesthesia. Carbon dioxide was insufflated using a Veres needle infra umbilically, and ports were placed as shown (Fig. 3).

A complete diagnostic scopy was performed with intraoperative evidence of a distended stomach, second and third part of the duodenum proximal to the SMA. The SMA was found compressing the third part of the duodenum. After bowel mapping, the ligament of Trietz was cut. A stapled side-to-side duodenojejunostomy was constructed using a loop of jejunum 30–35 cm from the ligament of Trietz and the third part of duodenum proximal to the SMA, using a 60 mm three-row linear endostapler (Fig. 4). The enterotomy was closed with Vicryl 2–0. An

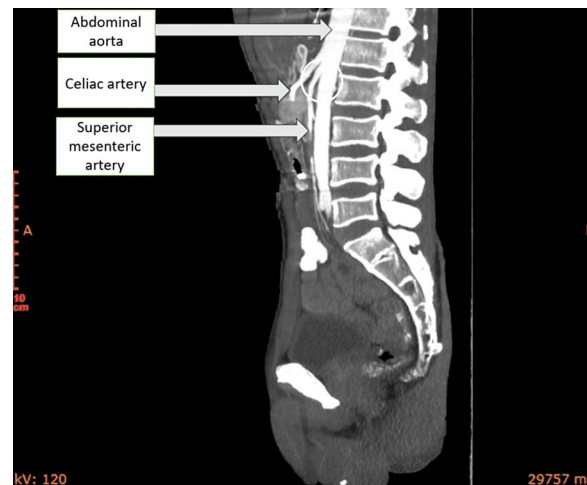


Fig. 1 Computed tomography angiography (sagittal) showing aortomesenteric angle



Fig. 2 CT angiography (axial) showing duodenal compression

abdominal drain no. 28 was placed near the anastomotic site. After confirming hemostasis, port closure was done with Vicryl 2–0, followed by Ethilon 2–0.

The duration of surgery was approximately 2.5 hours with a blood loss of 75–100 mL. The patient made an uneventful recovery, tolerating oral feeds well on discharge (day 3). He remained happily asymptomatic on follow up at 1, 3, and 6 months, without any reported complications, adverse events, or readmissions.

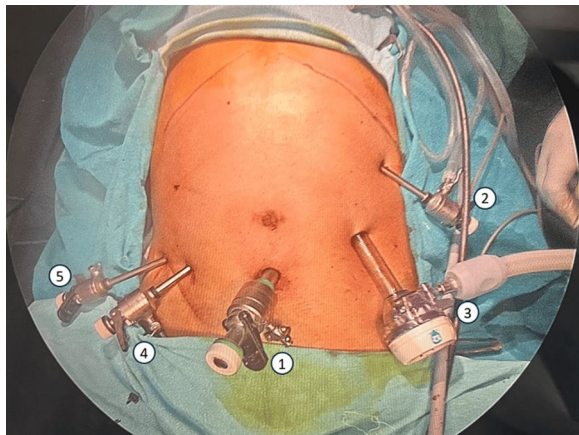


Fig. 3 (1) 10 mm infraumbilical. (2) 5 mm on left anterior axillary line. (3) 12 mm on left midclavicular line. (4) 5 mm on right midclavicular line. (5) Additional trocar on right for retraction

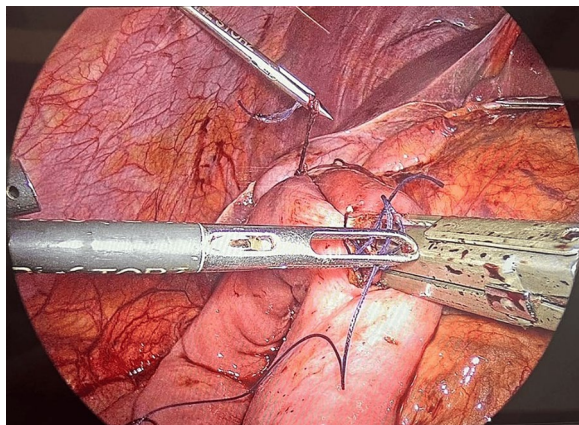


Fig. 4 Intraoperative image showing endostapler anastomosis

Discussion

Historically, Rokitsky [4] reported the first case of SMA syndrome in 1861 as an autopsy finding. In 1921, Wilkie published a detailed article describing its manifestations and compiled a case series, which led to its other name—Wilkie's syndrome [2, 5].

These patients may present acutely or commonly with chronic symptoms such as recurrent epigastric pain, early satiety, intermittent emesis, and weight loss. Symptoms are aggravated postprandially and on lying supine, as the angle between the SMA and spine is decreased. Releasing the aortomesenteric angle, such as the left lateral decubitus or prone position, gives partial relief. The Hayes manoeuvre (applying pressure to the infraumbilical region and lifting anteriorly to open the aortomesenteric angle by elevating the mesenteric root) temporarily relieves the duodenal compression [5].

Diagnosis depends on clinical and radiological evidence. Abdominal X-ray may reveal an enlarged gastric bubble and proximal duodenum. USG A + P with Doppler was earlier used to measure the aortomesenteric angle, but CECT A + P is now the standard for diagnosis. Upper GI endoscopy is performed to rule out intraluminal causes of similar symptoms (primarily malignancy). Rarely, pulsatile extrinsic compression may be visualized.

Diagnosing SMA syndrome requires a high clinical index of suspicion. However, early diagnosis is lifesaving, mitigating against complications such as massive gastric dilatation, gastric/esophageal ulceration, and perforation. Other complications relating to emesis include shock, electrolyte and acid–base derangements, aspiration pneumonia, and malnourishment.

Conservative management is the mainstay for uncomplicated cases. Gastrointestinal decompression, nutritional support, and lifestyle modifications, such as smaller meals and positional eating, are recommended.

In case of longstanding disease or complications, surgery becomes definitive. This should not be deferred till the very end stage of the disease. Surgical options include the Strong procedure (division of the ligament of Trietz), gastrojejunostomy (end-to-side GJ), and duodenojejunostomy (DJ).

While the Strong procedure is appealing, as bowel integrity is not compromised by an anastomosis, it boasts a failure rate of 25% [6]. GJ decompresses the stomach but does not relieve duodenal obstruction, causing recurrent symptoms, ulceration, and blind loop syndromes. DJ avoids this, making it the standard. A 7-year-long follow-up study of 16 patients treated with duodenojejunostomy found that 3 patients regarded their outcome as excellent, 6 as good, 5 as satisfactory, and only 2 patients found it poor [7]. As first shown by Gersin and Heniford in 1998 [6], the laparoscopic approach outweighs open duodenojejunostomy in SMA syndrome [8, 9]. In conjunction with our experience, Richardson in 2001 also showed that the average time for the laparoscopic approach was 113 minutes, with only a 3-day hospital stay and no reported complications [10].

Conclusion

A high clinical index of suspicion is required to diagnose SMA syndrome. Laparoscopic duodenojejunostomy can be considered the new procedure of choice in terms of symptomatic relief and reduction in morbidity and highlights the increasing shift of surgery to a minimally invasive and patient-oriented perspective.

Abbreviation

SMA Superior mesenteric artery

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Author contributions

All the authors were involved in the diagnosis and the management of the patient's condition in various capacities. AZ and MB oversaw care, with RV working at the resident level. AZ and MB were the primary surgeons in the laparoscopic duodenojejunostomy performed. RV and AZ were major contributors to the manuscript. All authors read and approved the final manuscript.

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Declarations**Ethics approval and consent to participate**

This study is exempt from ethical approval at our institution.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare that they have no competing interests.

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