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CASE REPORT

Superior Mesenteric Artery Syndrome: Case report and literature review on a rare cause of Chronic duodenal obstruction

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Summary
Superior mesenteric artery syndrome is a rare but potentially life-threatening cause of chronic duodenal obstruction. Patients frequently exhibit vague, non-specific symptoms that may mimic more common conditions such as gastritis and gastroesophageal reflux disease. A 16-year-old male, severely malnourished with a BMI of 12.6 kg/m^2 and a three-year history of recurrent epigastric pain and postprandial vomiting, was referred to our surgical outpatient department. Initial ultrasound and barium studies were inconclusive; however, an abdominal computed tomography confirmed SMA syndrome. He had duodeno-jejunal anastomosis, leading to complete relief of symptoms. His recovery went smoothly afterwards, and his BMI was 17.1 kg/m^2 at three months follow-up.

Keywords: Computed Tomography, Duodenal obstruction, Superior mesenteric artery syndrome

Introduction

Superior mesenteric artery (SMA) syndrome is a rare form of chronic duodenal obstruction with a prevalence rate of 0.013% to 0.3%.[1,2] It is caused by the compression of the third part of the duodenum between the superior mesenteric artery and the abdominal aorta.[1] This typically results from a decrease in the mesenteric fat pad, which cushions the space between these vessels, leading to a reduced aortomesenteric angle.[3] The aortomesenteric angle is between 38 and 65 degrees, and when it decreases below 25 degrees, the space becomes less than 10 mm, resulting in the compression of the third segment of the duodenum. The condition

commonly occurs in individuals who have experienced significant weight loss due to hypermetabolism from trauma or burns, eating disorders like anorexia nervosa, malabsorptive diseases, or illnesses associated with cachexia, such as AIDS and cancer.[1] Affected individuals often present with ambiguous and non-specific symptoms such as weight loss, bloating, early satiety, postprandial discomfort, nausea, vomiting, and epigastric pain. These symptoms mimic common conditions like gastritis, gastroesophageal reflux disease, anorexia nervosa, and functional dyspepsia.[4,5]

In the acute phase, severe duodenal obstruction may cause potentially life-threatening stomach dilation;[5,6] however, in the chronic phase, the repeated nausea and vomiting lead to poor food intake, significant weight loss, and worsening of the condition.[5] Studies have reported complications like malnutrition, gastric pneumatosis, dehydration, and gastrointestinal hemorrhage.[1,8] Diagnosing SMA syndrome is challenging and requires high suspicion. Radiological tests like ultrasound and barium studies are inconclusive, although they can indicate the condition by revealing a narrowed aorto-mesenteric angle and dilation of the proximal duodenum, respectively.[9] An abdominal CT scan is required for its confirmation, as it shows a distended stomach, a dilated proximal duodenum, and extrinsic compression of the third part of the duodenum between the aorta and the SMA.[9]

Case Description

A severely malnourished 16-year-old male patient was referred to our surgical outpatient clinic with a three-year history of recurrent epigastric pain and vomiting [Figure 1]. The epigastric pain was insidious, colicky, and relieved by vomiting. The vomiting was postprandial, occurring 2-3 times daily, often containing partly digested food or clear fluid, and was preceded by nausea. He was diagnosed with peptic ulcer disease at a primary care clinic. He began a triple therapy consisting of proton pump inhibitors (omeprazole), along with antibiotics (metronidazole and amoxicillin), and antacids. His symptoms initially improved; however, a deterioration and recurrence necessitated his referral to our facility.

Examination showed a chronically ill boy who weighed 33kg, with a height of 162cm and a body mass index (BMI) of 12.6kg/m^2[Figure 1]. He was pale, with a PCV of 28.8% and HGB of 9.7g/dl. Initial suspicion of gastric outlet obstruction from pyloric stenosis or pylorospasm was entertained. He was hospitalized for fluid resuscitation, gastric decompression, and blood transfusion, and received IV atropine 0.8mg qds; however, there was no resolution with the conservative management. Findings from abdominal ultrasound and barium studies indicated inconclusive outcomes, exhibiting turbulent luminal contents and distension of the stomach and duodenum, respectively. Contrast-enhanced CT of the abdomen revealed duodenal compression by the SMA, an aortomesenteric angle of 18°, a distance of 7 mm, and distension of the stomach and duodenum [Figures 2 & 3]. An

appendicolith of 6 mm by 5 mm was observed at the base of the appendix, with no indications of appendiceal inflammation.
A diagnosis of SMA syndrome was made, and the patient was prepared for surgery. During the procedure, dense adhesions were found between the anterior abdominal wall and the parietal peritoneum. There was a significant amount of cloudy peritoneal fluid in the lesser sac and paracolic gutters. The stomach was severely dilated, and the duodenum was considerably enlarged with a thin, dusky wall, indicating a risk of rupture [Figure 4]. Additionally, the appendix contained a faecolith and showed signs of peri-appendicitis. He underwent a side-to-side duodenojejunostomy, incidental appendectomy, and peritoneal lavage. A nasogastric tube stayed in for 5 days until the ileus resolved. By postoperative day 6, he started and tolerated oral intake well. He was discharged on day 11. At the 3-month follow-up, he was healthy, symptom-free, and his BMI had risen to 17.1 kg/m².

Figure 1: Image of patient at presentation showing signs of malnutrition with severe weight loss





Figure 2: Contrast-enhanced abdominopelvic CT scan showing the superior mesenteric artery compressing the duodenum, narrowing the aortomesenteric angle. The aortomesenteric angle measures 18^0 and 7mm.

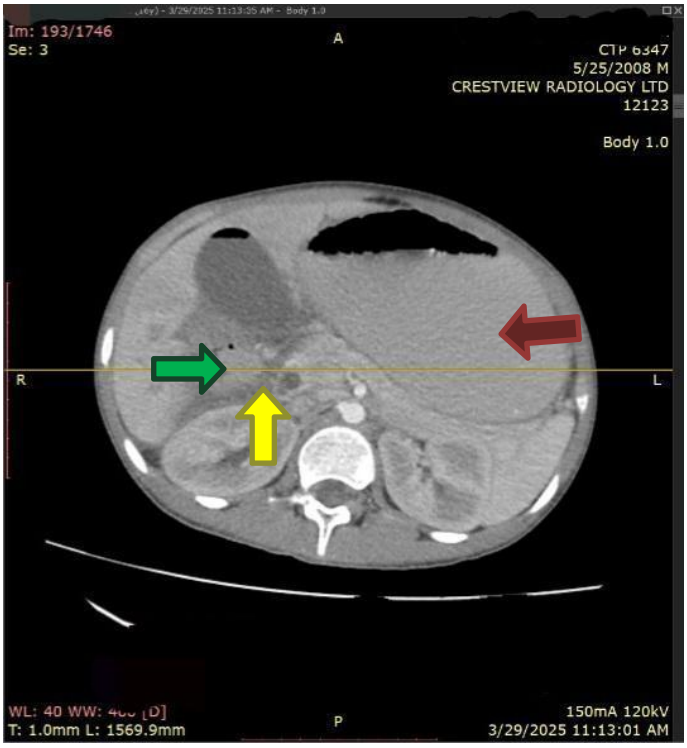


Figure 3: Computed tomography image showing a distended stomach (red arrow) and duodenal cap (green arrow) with a peritoneal collection (yellow arrow).

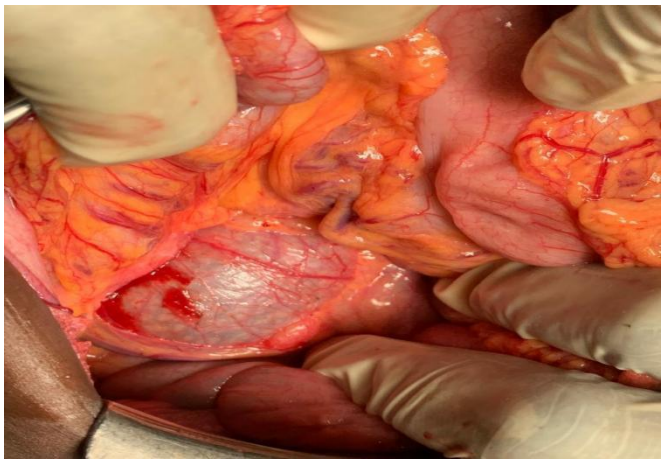


Figure 4: Dilated proximal duodenum with thinned out wall

Discussion

Chronic duodenal obstruction is associated with significant morbidity and can sometimes be fatal.[6] SMA syndrome affects individuals across all ages, with increased incidence in young adults,[10] a pattern consistent with our patient. Symptoms like epigastric pain, post-meal discomfort,[1,6] and vomiting are non-specific, which complicates diagnosis and often results in delays. Before specialized assessment in our center, this patient had been on treatment for peptic ulcer disease and other gastrointestinal conditions for three years. This emphasizes the importance of quickly referring patients with ongoing, unresolved gastrointestinal symptoms that do not improve with standard treatments for further assessment.

The diagnosis of SMA syndrome involves assessing the clinical symptoms with imaging studies. Lukas et al.[11] recommended employing hypotonic duodenography as a diagnostic method for patients suspected of having SMA syndrome. Gustafsson et al.[12] supported this approach and reported that conventional barium meal exams were positive in just one case, whereas hypotonic duodenography detected

10 out of 11 cases. However, this method is not widely available in emergency settings and is not used in our practice. Ultrasound provides a rapid, non-invasive alternative with sensitivity similar to CT scans,[6] but its effectiveness relies on the operator's skill and may be influenced by bowel gas. Contrast-enhanced CT scans provide clear visualization of the obstructed duodenum relative to the superior mesenteric artery, with a high diagnostic accuracy.[6,13] In this case, the aortomesenteric angle and distance were successfully measured on the CT, which confirmed the diagnosis.

Conservative treatment is typically the initial approach for SMA syndrome, but previous studies have often reported poor outcomes,[14] with success rates ranging from 14% to 71%.[6] In a study by Shin and Kim,[15] the response rate to medical treatment was 72.2%, with a recurrence rate of 30.8%. In our patient, there was no significant improvement with his conservative management and he required surgery. The aim of surgery is to bypass the blockage by linking the proximal bowel to the distal segment, thus restoring bowel function. This can be achieved using gastrojejunostomy or duodenojejunostomy, performed either through open surgery or laparoscopic surgery.[16,17] Gastrojejunostomy has largely been abandoned due to higher risks of postoperative issues such as blind loop syndrome and symptom recurrence caused by inadequate duodenal decompression. It may also worsen duodenal motility issues and promote bacterial overgrowth.[5] Mosalli et al.[18] described relieving the obstruction by dissecting the ligament of Treitz and mobilizing the third and fourth parts of the duodenum, a procedure known as Strong's procedure, which has a failure rate of up to 25%.[19] Other surgical options include subtotal gastrectomy and Billroth II gastrojejunostomy, anterior reposition of the duodenum and duodenal derotation.[5,6] In this patient, an open duodenojejunostomy was performed with a good outcome.

Several authors have concluded that enteric bypass is safe, effective, and should be considered the best treatment for patients with duodenal obstruction caused by SMA syndrome.[9,12,19] If surgical drainage becomes necessary in cases of SMA syndrome, duodenojejunostomy is the preferred procedure to relieve the obstruction, with a success rate of up to 90%.[5,19] After successful bypass surgery for SMA syndrome, patients' symptoms resolve, and they experience weight gain, as seen in our patient. However, they may still face recurrence of symptoms other than vomiting.[2] Our patient experienced complete symptom resolution and significant BMI increase within three months after surgery. However, longer-term follow-up is still necessary.

Conclusion

SMA syndrome is a rare yet potentially life-threatening cause of chronic duodenal obstruction that necessitates a high level of suspicion. An abdominal CT scan is essential for a prompt diagnosis. Surgical intervention remains the gold standard, with duodeno-jejunal anastomosis being an effective treatment option.

Authors' contributions: OIO conceptualised the study and wrote the initial draft of the manuscript. ALO, AAO, IAT and NCC provided additional contents to the manuscript and reviewed the final draft. AAO and AOE did the literature search and participated in data acquisition. All the authors approved the final version of the manuscript.
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References

1. Ganss A, Rampado S, Savarino E, Bardini R. Superior Mesenteric Artery Syndrome: a Prospective Study in a Single Institution. J Gastrointest Surg. 2019 May;23(5):997-1005.
2. Ylinen P, Kinnunen J, Hockerstedt K. Superior mesenteric artery Syndrome: a follow up study of 16 operated patients. J ClinGastroenterol 1989; 11:386-391.
3. Silva G, Moreira-Silva H, Tavares M. Iatrogenic superior mesenteric artery syndrome. Rev EspEnferm Dig. 2018 Nov;110(11):742-743.
4. Marecek GS, Barsness KA, Sarwark JF. Relief of superior mesenteric artery syndrome with correction of multiplanar spinal deformity by posterior spinal fusion. Orthopedics. 2010;33:519. doi: 10.3928/01477447-20100526-26.
5. Mandarry M, Zhao L, Zhang C, Wei Z. A comprehensive review of superior mesenteric artery syndrome. Eur Surg. 2010;42:229-236.
6. Oka, A., Awoniyi, M., Hasegawa, N., Yoshida, Y., Tobita, H., Ishimura, N., & Ishihara, S. (2023). Superior mesenteric artery syndrome: Diagnosis and management. *World journal of clinical cases*, *11*(15), 3369–3384. https://doi.org/10.12998/wjcc.v11.i15.3369
7. Kensinger CD, Mukherjee K, Nealon WH, Solorzano CC. Superior mesenteric artery syndrome presenting with pneumoperitoneum and pneumomediastinum. Am Surg. 2013;79:E240–E242
8. Majumder S, Shergill S, Loftus CG. A Young Man With Abdominal Pain, Weight Loss, and Jaundice. Gastroenterology. 2017;152:1836–1838. doi: 10.1053/j.gastro.2016.12.044
9. Marchie TT, Adaikpoh EO, Demaki A. Case Report of a Superior Mesenteric Artery Syndrome, Diagnosis Based On Computerized Axial Tomographic Scan Image Features and Review of Literature. www.iarjournals.com.
10. Wayne ER, Burrington JD. Duodenal obstruction by the superior mesenteric artery in children. Surgery 1978; 72:204-1 4.
11. Lukes PJ, Rolny P, Nilsson AE *et al*. Diagnostic value of hypotonic duodenography in superior mesenteric artery syndrome. ActaChirScand 1978; 144: 39-43.
12. Gustafsson L, Falk A, Lukes PJ, Gamklou R. Diagnosis and treatment of superior mesenteric artery syndrome. British Journal of Surgery. 1984 Jul;71(7):499-501.
13. Agrawal GA, Johnson PT, Fishman EK: Multidetector row CT of superior mesenteric artery syndrome. J ClinGastroenterol 2007;41:62–65.
14. Matheos E, Vasileios K, Ioannis B, Dimitrios Z, Kostas H. Superior mesenteric artery syndrome. Case Reports in Gastroenterology. 2009 May 27;3(2):156-61.
15. Shin MS, Kim JY. Optimal Duration of Medical Treatment in Superior Mesenteric Artery Syndrome in Children. J Korean Med Sci. 2013 Aug;28(8):1220-1225. https://doi.org/10.3346/jkms.2013.28.8.1220
16. Baltazar U., Dunn J., Floresguerra C., Schmidt L., and Browder W., Superior mesenteric artery syndrome: an uncommon cause of intestinal obstruction, Southern Medical Journal. (2000) 93, no. 6, 606–608, https://doi.org/10.1097/00007611-200093060-00014, 2-s2.0-0034581872.
17. Munene G., Knab M., and Parag B., Laparoscopic duodenojejunostomy for superior mesenteric artery syndrome, The American Surgeon. (2010) 76, no. 3, 321–324, 2-s2.0-77949508051.
18. Mosalli R., El-Bizre B., Farooqui M., and Paes B., Superior mesenteric artery syndrome: a rare cause of complete intestinal obstruction in neonates, Journal of Pediatric Surgery. (2011) 46, no. 12, E29–

E31, https://doi.org/10.1016/j.jpedsurg.2011.08.021, 2-s2.0-83455229741.

19. Merrett ND, Wilson RB, Cosman P, Biankin AV. Superior mesenteric artery syndrome: diagnosis and treatment strategies. J Gastrointest Surg. 2009;13(2):287-92.

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