Superior Mesenteric Artery Syndrome: A Case Report

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Superior mesenteric artery (SMA) syndrome is an uncommon cause of proximal intestinal obstruction. Obstruction results from the vascular compression of the third portion of the duodenum between the aorta and the SMA. We describe a case of SMA syndrome in a 21-year-old female who presented at our emergency department with a 2-day history of nausea, vomiting, and abdominal pain. The diagnosis was established by abdominal KUB and computed tomography. She received conservative medical treatment, which resulted in a good outcome.

Key words: superior mesenteric artery syndrome, proximal intestinal obstruction, abdominal pain

Introduction

Superior mesenteric artery (SMA) syndrome is relatively rare etiology of upper intestinal obstruction. It results from vascular compression of the third portion of the duodenum between the aorta and the SMA(1). The result is chronic, intermittent or acute obstruction of the duodenum, which may be either complete or partial(2,3). We present a case of SMA syndrome in a 21-year-old female who presented at our emergency department with a 2-day history of nausea, postprandial vomiting, and abdominal pain.

Case Report

A 21-year-old female presented at our emergency department (ED) with a 2-day history of nausea, postprandial vomiting, and abdominal pain. The patient looked ill and was dehydrated. She denied having any significant medical history, having an abnormal eating disorder or having ever undergone abdominal surgery. On arrival at the ED, her blood pressure was 110/68 mmHg, with a heart rate of 92 beats per minute and respiratory rate of 18 breaths per minute. Physical examination revealed abdominal distension, and right upper quadrant abdominal tenderness but without the peritoneal sign. Her symptoms became aggravated after meals and were relieved by lying in the prone position and/or in a knee-chest position. Her biochemical profile, coagulation function, and platelet count were within the reference range except for prerenal azotemia. An abdominal KUB radiograph (Fig. 1A) showed gaseous distension of the stomach and duodenum. Subsequent computed tomography (CT) of the abdomen (Fig. 1B and C) revealed compression of the third portion of the duodenum between the aorta and the SMA, which had created mild distension of the stomach. The patient was admitted to the medical ward and treated with nothing per mouth together with fluid and electrolyte replacement as well as by administration of prokinetic agents and by nasogastric tube drainage. On the next day, her condition was found to have gradually improved.
Fig. 1 A 21 year-old female with SMA syndrome. (A) The KUB radiograph shows gaseous distension of the stomach and the duodenal bulb (white arrows). (B) An axial image and (C) a reformatted sagittal image of an abdominal multi-detector CT reveal extrinsic compression (black arrow) of the third portion of the duodenum between the aorta (Ao) and the SMA that has resulted in duodenal obstruction. The aortomesentric angle and distance are 18° (normal: 25°-60°) and 4 mm (normal: 10-28 mm) respectively.

under this conservative therapy regimen. Her vital signs remained stable and a satisfactory hydration status was maintained. At this point, the patient was allowed oral fluids, which was followed by a normal diet; she was discharged on the third hospital day. She was well when examined at her 3-month follow-up visit.

**Discussion**

Superior mesenteric artery (SMA) syndrome is an unusual form of intestinal obstruction caused by vascular compression of the third portion of the duodenum between the aorta and the SMA. This syndrome is often precipitated by conditions that narrow the aortomesentric angle, including possible immobilization, external compression due to body cast treatment of a spinal fracture, or rapid weight loss for any reason\(^1\). In previous reports, many other causes have also been suggested, such as a high insertion of the duodenum at the ligament of Treitz, a congenitally low origin of the SMA and compression of the duodenum caused by peritoneal adhesions after duodenal malrotation\(^4,5\). The exact prevalence of the disorder is not well established; nonetheless, the estimated prevalence rates based on a gastrointestinal barium series range vary from 0.01% to 0.3%\(^3\). SMA syndrome occurs in females more often than in males; some authors believe that SMA syndrome is not rare, but rather is a mat-
ter of degree with many people showing only mild compression not presenting with symptoms. In the presence of vascular compression, a variety of gastrointestinal symptoms, including nausea, vomiting, postprandial abdominal pain and weight loss, may develop; these seem to occur when the aortomesenteric angle is less than 22° and/or the distance is less than 8 mm. Gastric and/or duodenal dilatation and a diminished SMA-aorta distance show a significant correlation with the clinical symptoms of SMA syndrome. In our case, the aortomesenteric angle was measured to be 18° (normal: 25°-60°) and the distance was measured as 4 mm (normal: 10-28 mm). The patient presented with nausea, postprandial vomiting, and abdominal pain; these were improved when the patient underwent conservative treatment. Patients suffering from SMA syndrome usually find relief from the symptoms by assuming a left lateral decubitus, lying prone, or assuming a knees-to-chest positioning, as was seen in the present case. The clinical diagnosis can be confirmed radiologically in 95% of cases. The following radiological criteria have been established for the diagnosis of SMA:

- dilatation of the first and second portions of the duodenum, with or without gastric dilatation;
- abrupt vertical and oblique compression of the mucosal folds;
- antiperistaltic flow of barium proximal to the obstruction, producing a to-and-fro movement;
- delay of 4 to 6 hours in transit through the gastroduodenal region;
- relief of obstruction when the patient is placed in a position (prone or knee-chest) that the drag on the small-bowel mesentery being diminished.

Ultrasonography has been shown to be able to measure the aortomesenteric distance accurately and may provide a useful alternative method of assessment in pediatric and obstetric populations. Conventional diagnostic evaluation begins with a UGI series; nonetheless, multi-sliced CT scanning has been shown to be able to provide accurate radiographic findings and has the additional ability of being able to identify complications that may require immediate surgical intervention. Once identified, supportive therapy includes the correction of fluid and electrolyte abnormalities and decompression via a nasogastric tube. The majority of cases respond well to conservative therapy, with surgical correction being reserved for chronic refractory cases, such as those with a long history of vomiting, those showing progressive weight loss, those with pronounced dilatation and those having stasis of the duodenum.

References

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上腸繫膜動脈症候群：病例報告

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上腸繫膜動脈症候群是近端小腸阻塞的一種罕見原因。因為十二指腸第三部位介於主動脈和上腸繫膜動脈之間，受到兩邊血管壓迫而造成阻塞的結果。我們報告一位21歲女性因為噁心、嘔吐、腹痛2天至本院急診室就醫。最後經由腹部X-光及電腦斷層掃描確認診斷。她接受了內科治療後恢復良好。

關鍵詞：上腸繫膜動脈症候群，近端腸阻塞，腹痛