Superior mesenteric artery syndrome: CT findings

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DESCRIPTION

A 45-year-old woman presented to the emergency department, with epigastric pain and multiple episodes of vomiting. History revealed significant weight loss, and similar episodes of epigastric pain and vomiting in the past, which had been self-limiting. On examination, the patient had epigastric fullness and tenderness. Contrast-enhanced CT of the abdomen revealed a grossly dilated stomach and duodenum, with an abrupt narrowing at the third part of the duodenum, with the superior mesenteric artery crossing anterior to the transition point (figures 1 and 2). The aortomesenteric angle (AMA) and aortomesenteric distance (AMD) were 14° and 2.3 mm, respectively, and were reduced (figure 3). Based on the clinical and imaging findings, a diagnosis of superior mesenteric artery (SMA) syndrome was made. The patient was treated conservatively.

SMA syndrome, also known as Wilkie’s syndrome, was first described by Rokitansky, in 1861. It consists of an obstructed third part of the duodenum, due to compression between the SMA and the aorta.1 Its incidence is reported to be 0.1%–0.3% on the basis of barium studies.2 It occurs more commonly in females aged between 10 and 40 years of age. Patients may present with postprandial epigastric pain and fullness, nausea, vomiting and weight loss.3 The pain is typically relieved in the prone or left lateral decubitus position.3

The aetiopathogenesis may be explained by reviewing the aortomesenteric anatomy. The SMA arises from the aorta at L1-L2 level, coursing anteroinferiorly. It forms an angle with the aorta, known as the AMA. The distance between the SMA and the aorta is known as the AMD. The normal AMA varies between 28 and 65°, and the AMD between 10 and 34 mm.1 The third part of the duodenum crosses between the aorta and the SMA at ~L3 level, and is normally ‘cushioned’ by retroperitoneal fat (of the mesenteric root). Decreased fat in this region would contribute to reduced AMA and AMD, respectively, thereby making the third part of the duodenum prone to compression between the aorta and SMA.3 It is for this same reason that SMA syndrome occurs in patients who have rapid weight loss due to underlying conditions such as malignancy, malabsorption, AIDS, burns, bariatric surgery and eating disorders.3 Surgical correction of scoliosis (as lengthening of the spine may increase tension in the mesentery and decrease the AMA and AMD) and a low origin of the SMA (predisposing the duodenum to lie cranially in the narrow AMA) have also been implicated in causing SMA syndrome.3,4

Imaging features on CT include a dilated stomach and proximal duodenum, with an abrupt transition point at the third part of the duodenum, where the SMA crosses the duodenum. Multiplanar reconstruction in sagittal view shows reduced AMA and AMD. The AMA and AMD in patients with SMA syndrome have been reported to be 6–22° and 2–8 mm, respectively.2,3

Treatment is usually conservative, and includes fluid and electrolyte resuscitation, nasojejunal feeding and mobilisation of the patient into the prone or left lateral decubitus position. Following this, conservative management focuses on nutritional support.

Figure 1 Axial contrast-enhanced CT of the abdomen shows a grossly dilated stomach and proximal duodenum with an abrupt transition point (red arrow). The SMA is seen crossing anterior to the transition point. SMA, superior mesenteric artery.

Figure 2 Coronal multiplanar reconstruction of CECT of the abdomen showing the dilated stomach and proximal duodenum, with the SMA (yellow arrow) crossing anterior to the transition point (red arrow). CECT, contrast-enhanced CT; SMA, superior mesenteric artery.
aimed at restoration of retroperitoneal fat and weight gain.\(^2\)\(^3\) If conservative treatment fails, surgical procedures aiming to bypass the obstructed segment may be indicated. Options include duodenojejunostomy, gastrojejunostomy or lysis of the ligament of Treitz with derotation of the bowel (Strong’s procedure).\(^2\)

**Learning points**

- A history of epigastric pain, post prandial vomiting and rapid weight loss, with pain being relieved in the prone/left lateral decubitus position should raise the clinical suspicion of superior mesenteric artery syndrome.
- Imaging findings include a dilated stomach and proximal duodenum, with reduced aortomesenteric angle and aortomesenteric distance.

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**REFERENCES**


**Figure 3** Sagittal multiplanar reconstruction of CECT of the abdomen showing the SMA arising from the aorta, forming a narrow aortomesenteric angle (red lines) and a reduced aortomesenteric distance (dashed white arrows). CECT, contrast-enhanced CT; SMA, superior mesenteric artery.