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CASE REPORT

Superior Mesenteric Artery Syndrome Demonstrated by Computed Tomography

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ABSTRACT

Superior mesenteric artery syndrome is caused by narrowing of the angle between the aorta and the superior mesenteric artery, resulting in compression of the third part of the duodenum. This report is of an elderly emaciated woman who presented with a history of epigastric pain and vomiting. The computed tomography features were diagnostic of superior mesenteric artery syndrome.

Key Words: *Abdominal pain; Aorta; Duodenal obstruction; Mesentery; Superior mesenteric artery syndrome*

INTRODUCTION

Superior mesenteric artery (SMA) syndrome is a well-described rare syndrome caused by narrowing of the angle between the aorta and the SMA, with resultant compression of the third part of the duodenum. Although barium meal has conventionally been used for the diagnosis of this syndrome, the examination is non-specific. Examination of the aortomesenteric angle and aortomesenteric distance by computed tomography (CT) has been used for more objective diagnosis of SMA syndrome.

CASE REPORT

A 65-year-old woman was referred in 2004 for abdominal CT for diffuse intermittent pain in the epigastrium for 3 months. The pain was associated with postprandial fullness and occasional bilious vomiting. Her symptoms were aggravated after meals and were relieved by lying in the prone position. The patient was emaciated.

A CT was performed to look for an abdominal mass and to rule out stenosis of the abdominal vessels. The patient was administered oral iohexol 750 mL over 2 hours. The scan was performed on a multidetector 16-slice CT scanner with intravenous iohexol 80 mL given via a pressure injector at a rate of 3 mL/second. Images were obtained in the arterial and venous phases.

In the arterial phase of the study, the distance between the abdominal aorta and the SMA was reduced to such an extent (approximately 5 mm) that the third part of the duodenum was compressed (Figure 1). The stomach and proximal duodenum were dilated (Figure 2). However, the contrast filled up the distal bowel loops implying that the obstruction was incomplete.

On the reconstructed multiplanar reformatted (MPR) images, the angle of the SMA and the aorta was

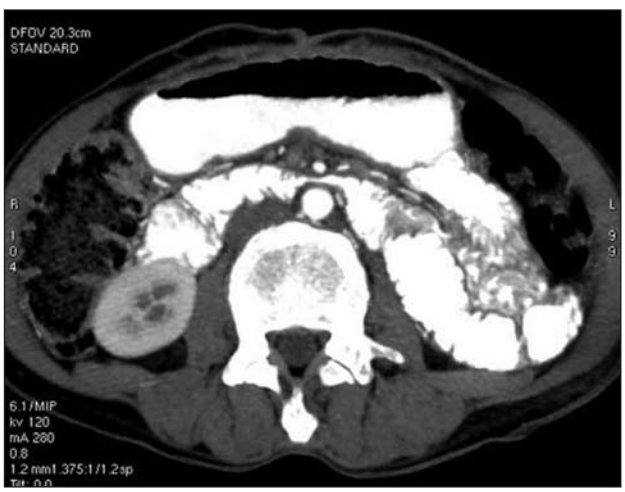

Figure 1. Contrast-enhanced computed tomography scan showing a narrowed aortomesenteric distance. The third part of the duodenum is compressed between the superior mesenteric artery and the aorta.

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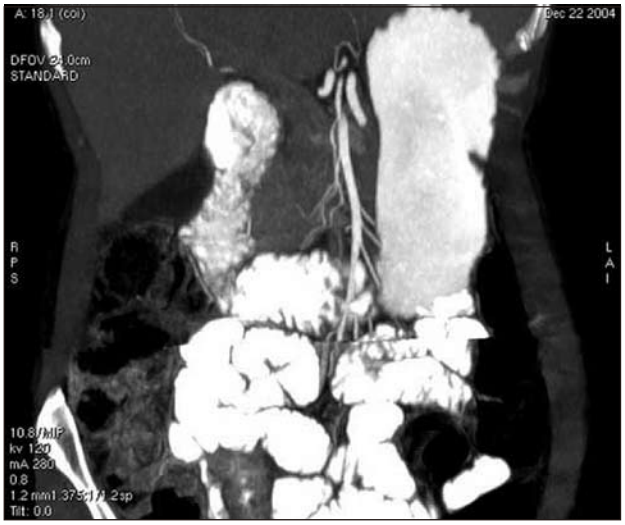

Figure 2. Coronal multiplanar reformatted image showing a dilated stomach and a prominent duodenum. Note the abrupt decrease in the calibre of the third part of the duodenum beyond the crossing of the superior mesenteric artery.

severely narrowed (14°) [Figure 3]. On the basis of the clinical history and the imaging findings, a diagnosis of SMA syndrome was made. After diagnosis, the patient was lost to follow-up.

DISCUSSION

SMA syndrome is a rare disease caused by narrowing of the angle between the aorta and the SMA, with resultant compression of the third part of the duodenum. The incidence of this condition is reported to be as low as 0.2%.[1] The condition is also known as arterial mesenteric duodenal compression, cast syndrome, or Wilkie syndrome. There are multiple predisposing factors, including congenital anomalies such as high insertion or hypertrophy of the Treitz ligament, marked weight loss due to severe wasting diseases such as cancer and burns, and the application of a body cast to treat scoliosis or vertebral fracture, as well as idiopathic causes due to emaciation and loss of mesenteric fat. Rarer causes of human immunodeficiency virus and aortic aneurysm have also been described.

The clinical presentation may be acute or chronic. Characteristic clinical symptoms include postprandial epigastric pain, nausea, fullness, early satiety, weight loss, and vomiting, which may be bilious. The symptoms are often relieved by postural changes.

Conventional barium meal and hypotonic duodenography are important for the diagnosis of SMA syndrome. However, the radiological appearances of these studies are non-specific, and have been reported as various

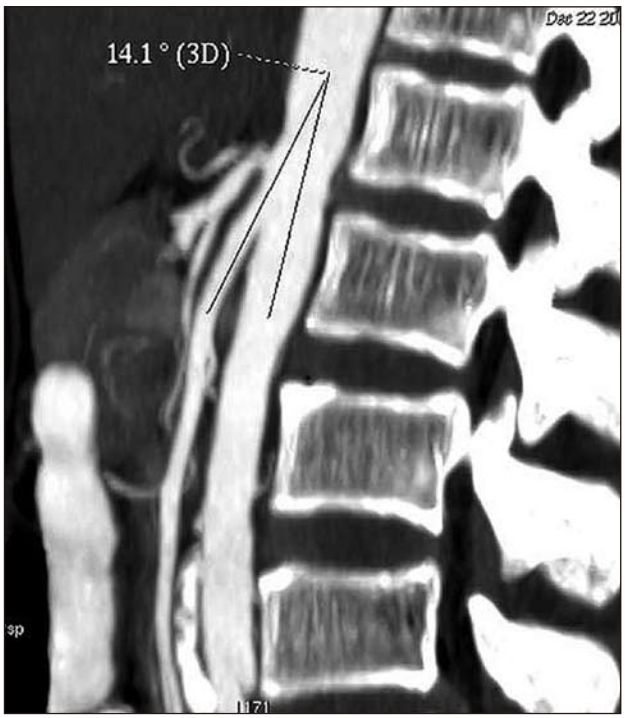

Figure 3. Sagittal multiplanar reformatted image showing a narrowed aortomesenteric angle.

conditions such as scleroderma, diabetes, pancreatitis, peptic ulcer, lupus erythematosis, or idiopathic intestinal pseudo-obstruction.[1,2] In the past, angiographic measurement of the aortomesenteric angle was noted as being a more accurate investigation than routine barium meal examination.[3] However, the procedure is invasive, and some patients are unable to tolerate it.

Recently, Konen et al have noted the advantage of 3-dimensional CT angiographic reconstruction, which can help to eliminate the erroneous diagnoses that originate from the angulations of the SMA.[4] The important criteria for CT diagnosis of SMA syndrome are the aortomesenteric angle and the aortomesenteric distance. The aortomesenteric angle is the angle between the SMA and the aorta, which is measured on sagittal MPR images. The aortomesenteric distance is the shortest distance between the walls of the SMA and the aorta at the level where the third part of duodenum passes between them. In the study by Konen et al, the aortomesenteric angle among patients with SMA syndrome was 8° to 10° compared with 28° to 65° for a control group.[4] The aortomesenteric distance in patients was 5.7 to 11.0 mm compared with 13.4 to 34.3 mm for control participants. CT has been found to be highly consistent for diagnosing gastric and duodenal dilatation, which may be not well demonstrated by barium studies.[5] The features described above were present in this patient.

SMA syndrome is a rare condition, that is clinically a diagnosis of exclusion. However, multidetector CT scan can conclusively diagnose this condition based on the objective parameters of aortomesenteric distance and aortomesenteric angle.

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