

SUPERIOR MESENTERIC ARTERY SYNDROME - AN UNUSUAL CAUSE OF DUODENAL OBSTRUCTION

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SUPERIOR MESENTERIC ARTERY SYNDROME - AN UNUSUAL CAUSE OF DUODENAL OBSTRUCTION. (Abstract): Superior mesenteric artery (SMA) arising from aorta at the level of first lumbar vertebra usually takes an angular downward course from ventral surface of aorta. It is through this vascular angle that the 3rd part of duodenum passes at the level of 4th lumbar vertebra. Fat and lymphatics around SMA maintains the angle at 25° to 60° with a mean of 45° and provide protection against duodenal compression. In Superior Mesenteric Artery Syndrome, the SMA-aorta angle is narrowed down to 7° to 22° with a mean of 8° leading to entrapment of the transverse part of duodenum between the artery and the vertebral column and aorta with resultant partial or complete duodenal obstruction. We report a case of Superior Mesenteric Artery Syndrome which was diagnosed by CECT abdomen. Duodeno-jejunostomy was done to treat this condition.

KEY WORDS: SUPERIOR MESENTERIC ARTERY; DUODENUM; SUPERIOR MESENTERIC ARTERY SYNDROME; DUODENO-JEJUNOSTOMY.

RUNNING HEAD: Superior mesenteric artery syndrome

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INTRODUCTION

Superior mesenteric artery (SMA) arising from aorta at the level of first lumbar vertebra usually takes an angular downward course from ventral surface of aorta.

It is through this vascular angle that the 3rd part of duodenum passes at the level of 4th lumbar vertebra.

Fat and lymphatics around SMA maintains the angle at 25° to 60° with a mean of 45° and provide protection against duodenal compression.

In Superior Mesenteric Artery Syndrome, the SMA-aorta angle is narrowed down to 7° to 22° with a mean of 8° leading to entrapment of the transverse part of duodenum between the artery and the

vertebral column and aorta with resultant partial or complete duodenal obstruction.

SMA-aorta distance is also reduced to 2 -8 mm (normal range 10 to 28 mm) at the level of 4th lumbar vertebra in Superior Mesenteric Artery Syndrome. [1-4].

CASE REPORT

A 58 year old female was admitted with history of upper abdominal discomfort, recurrent bilious vomiting containing undigested food material and significant weight loss since last 8 months.

The symptoms used to disappear when the patient used to lie in left lateral or prone position. For the similar complaints she was repeatedly hospitalized and managed

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conservatively for the last 8 months at local hospitals.

On examination patient was dehydrated and malnourished with a weight of 45 kg.

Examination of abdomen revealed epigastric distension with a visible peristalsis moving from left to right and no palpable mass.

Routine investigation revealed Hemoglobin 12 mg/dL, total leukocyte count $8000/\text{mm}^3$. Renal function tests were within normal limits. Upper GI endoscopy after gastric lavage revealed a normal study upto 2nd part of duodenum. Sonography of abdomen was normal.

Oral and IV contrast – enhanced- CT scan of abdomen was planned which revealed dilatation of stomach and duodenum upto 3rd part and narrowing of 3rd and 4th part of duodenum.

The angle between superior mesenteric artery and aorta was 20° confirming superior mesenteric artery syndrome (Fig. 1).



Fig. 1 CT scan

A: CECT abdomen showing dilatation of stomach and duodenum up to 3rd part and narrowing of 3rd and 4th part of duodenum.

B: CECT abdomen showing the 20° angulation between superior mesenteric artery and aorta along with the duodenal compression confirming superior mesenteric artery syndrome.

Exploratory laparotomy revealed superior mesenteric artery compression of the 3rd part of duodenum with dilatation of proximal duodenum and stomach.

Lysis of ligament of Treitz along with side to side duodenojejunostomy with the 3rd part of the duodenum and a loop of jejunum

was done. Patient had an uneventful post operative recovery (Fig. 2, 3).

DISCUSSION

Superior Mesenteric Artery Syndrome (SMAS) was first described in literature by von Rokitansky in 1861 on autopsy studies. The largest and most complete study of this disease was published by Wilkie in 1927, based on 75 cases.

Chronic duodenal ileus, arteriomesenteric duodenal compression, gastromesenteric ileus, aortomesenteric artery compression, duodenal vascular compression, Wilkie's syndrome and Cast syndrome are the various alternative nomenclatures given to this entity [3-7].

Reviews of literatures have reported the incidence of this entity in the range of 0.013–0.53%. Females are affected more commonly than males with the age of presentation ranging between 10-39 years. This condition has been reported at the extremes of age with the youngest patient being a 35-week gestational age newborn in whom the diagnosis was made prenatally, and the oldest patient a woman over 90 years of age.

Lack or loss of retroperitoneal and periduodenal fat pads is attributed to this acute angulation resulting in the duodenal “clamping”.

Severe wasting diseases such as burns, cancer and endocrine diseases; severe injuries such as head trauma; spinal trauma, deformities like scoliosis and application of a body cast; dietary disorders such as anorexia nervosa or malabsorptive syndromes; and the postoperative states are associated with this entity.

Anatomical deformities resulting in this entity includes a high insertion of the duodenum at the ligament of Treitz, a congenitally low origin of the superior mesenteric artery and compression of the duodenum caused by peritoneal adhesions, which are a results of duodenal malrotation.

A surgical intervention which reduces the width of the aortomesenteric angle includes bariatric surgery, scoliosis surgery,

ileoanal pouch anastomosis, and aortic aneurysm disease as well as its repair is associated with this entity [8-17].

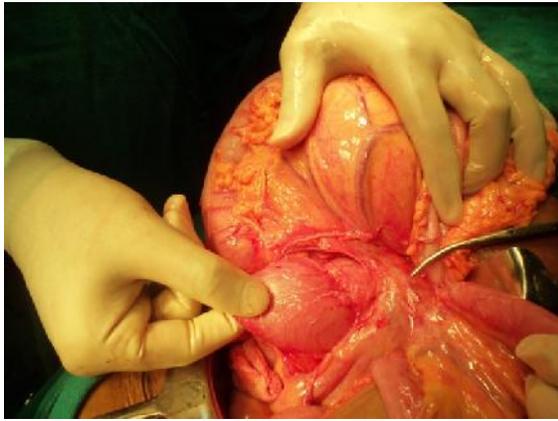


Fig. 2 Intraoperative view

Exploratory laparotomy showing superior mesenteric artery compression of the 3rd part of duodenum along with dilatation of the proximal duodenum

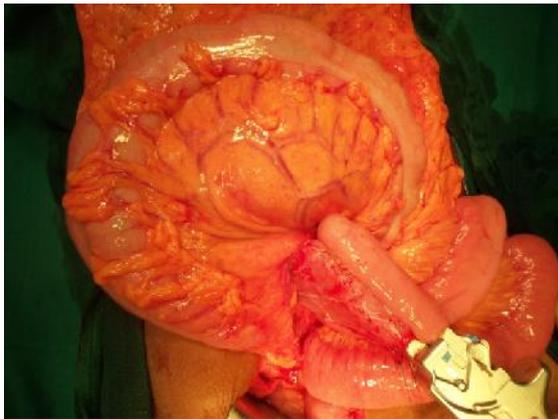


Fig. 3 Intraoperative view

Duodenojejunostomy with the 3rd part of proximal duodenum and a loop of jejunum done in the SMA syndrome

Postprandial upper abdominal pain and fullness, voluminous bilious vomiting and rapid weight loss are the most characteristic symptoms of presentation of superior mesenteric artery syndrome. Certain postural adjustments like left lateral, knee chest or prone position may relieve these abdominal symptoms.

Epigastric distension and a tympanic and tender upper abdomen are usually present. Laboratory findings will show evidence of dehydration and electrolyte abnormalities [4,7].

Plain abdominal radiography may suggest the diagnosis if it shows a dilatation

of the first and second portions of the duodenum, with or without gastric dilatation.

Barium studies may show abrupt vertical and oblique compression of the mucosal folds; antiperistaltic flow of barium proximal to the obstruction, producing to-and-fro movement; delay of 4 to 6 hours in transit through the gastroduodenal region and relief of obstruction when the patient is placed in a position (prone or knee-chest).

Contrast enhanced CT scan abdomen and MRI abdomen is helpful in estimation of the actual aortomesenteric gap as well as visualization of the retroperitoneal and mesenteric fat and the level of duodenal compression. Selective SMA arteriography against a barium-filled duodenum will demonstrate the extrinsic compression and measure the aortomesenteric angle and the distance from the aorta [17].

Conservative management includes rest to GI tract, fluid and electrolyte resuscitation, parenteral nutrition and lying in left decubitus or knee chest position. Efforts to induce weight gain with high calories liquid diet in left decubitus or knee chest position have been tried with varying results.

Aggressive nutritional support using a nasojejunal tube placed past the point of obstruction via endoscopic or radiographic guidance may be necessary if the patient does not tolerate or achieve adequate oral intake.

Surgery is indicated if there is a long history of vomiting, progressive weight loss, pronounced dilatation and stasis of the duodenum.

Open or laparoscopic approach can be adopted with equal success. Loop duodeno-jejunostomy from the third portion of the duodenum to the jejunum is the procedure of choice with 80% success rate.

Gastro-jejunostomy, Roux-en-Y duodeno-jejunostomy, anterior transposition of the third part of the duodenum above the SMA and lysis of ligament of Treitz (Strong's operation) and mobilization of duodenum have been tried with varying results [8,18,19].

CONFLICT OF INTERESTS

None to declare

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