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Case Report

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Clinical and Radiological Perspectives on Mesenteric Compression: Case Reports and Treatment Approaches

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ABSTRACT

Introduction: A uncommon condition known as superior mesenteric artery syndrome (SMAS) can clog the duodenum. Twelve individuals who had laparoscopic duodenojejunostomy to treat SMAS are examined in this study.

Patients & Methods: We are analyzing data of twelve patients (3 males and 9 females) underwent laparoscopic duodenojejunostomy for SMAS, one of them underwent laparoscopic antrectomy with Roux-en-Y gastrojejunostomy from NOV 2020 to FEB 2023, with mean age 23.3 years.

Results: Twelve patients (3 males and 9 females) were included with mean age 23.3 years. The most common cause was idiopathic in 58.3%. Abdominal pain (91.66%), nausea and vomiting (83.33%) and weight loss (66.6%) were the most frequent symptoms. The mean preoperative BMI was 16.06±2.3. The mean aortomesenteric angle was 15.8±4.6. All patients underwent laparoscopic duodenojejunostomy except one patient who underwent laparoscopic antrectomy with Roux-en-Y gastrojejunostomy with no conversion to open surgery.

Conclusion: Superior mesenteric artery syndrome (SMAS) is a rare entity that need high suspicious for diagnosis especially in females with low BMI with upper gastrointestinal symptoms. Surgical management is the treatment of choice to improve symptoms and quality of life.

Keywords:

Laparoscopic duodenojejunostomy, superior mesenteric artery syndrome, chronic duodenal obstruction

List of Abbreviations

SMAS: Superior Mesenteric Artery Syndrome

Introduction:

Superior mesenteric artery syndrome (SMAS) is a rare disease, it accounts 0.0024–0.3%, it occurs due to compression of the third part of duodenum between Superior mesenteric artery and aorta, it also known as Wilkie's syndrome, ''cast syndrome'', arteriomesenteric duodenal compression or chronic duo- denal ileus [1–3].

As per Akin et al.'s report, 40.4% of cases lacked a clear cause. However, congenital abnormalities like intestinal malrotation, high insertion of the ligament of Treitz, low origin of the superior mesenteric artery, weight loss following bariatric surgeries, psychiatric disorders like bulimia and anorexia nervosa, abdominal surgery like protocolectomy, or spinal surgery like spinal elongation for scoliosis could be the cause [4–9].

Aortomesenteric angle less than 22 (normal value 25–60) and aortomesenteric distance drop less than 8 (normal value 10–28) are regarded diagnostic criteria by the majority of authors[16]

Due to decreased oral intake, SMAS patients may have nausea, vomiting, dyspepsia, abdominal bloating, and pain in the epigastrium as well as weight loss. Pancreatitis, mesenteric ischemia, peptic ulcer, and biliary colic are among the differential diagnoses for SMAS [3,10].

Barium study and UGIT endoscopy help in diagnosis of SMAS, but CT mesenteric angiography is considered the golden standard in diagnosis of SMAS.

When conservative medical therapy fails or in extreme situations, surgical procedures may be necessary for the management of SMAS.

Surgery for the treatment of SMAS has included duodenojejunostomy, gastrojejunostomy, and Strong's technique (division of the Treitz ligament and duodenal mobilization).

From the lateral-lateral duodenojejunostomy described by Bloodgood in 1907 to the laparoscopic method by Massoud in 1995, this was the preferred course of treatment [11, 12].

Most surgeons believe that duodenojejunostomy is better than both gastrojejunostomy and Strong's operation [1].

Materials And Methods

Twelve patients (3 males and 9 females) underwent laparoscopic duodenojejunostomy for SMAS from NOV 2020 to FEB 2023 at Ain Shams University hospitals with mean age 23.3 years.

Preoperative evaluation as regard weight loss, comorbidities, dysphagia, vomiting and epigastric pain pre-operative assessment by Multidisciplinary team (MDT) of nutritional, anesthesia, endocrinal, psychiatric, and behavioral.

Multi-slice CT with mesenteric angiography (Fig. 1) and Upper GI endoscopy were performed to evaluate angle between SMA and Aorta, gastric or duodenal ulcer and hiatus hernia. All patients we

informed about the operation and the possibility of conversion to open surgery, informed about benefits of surgery and other alternatives, informed consent was obtained from all patients in the study.

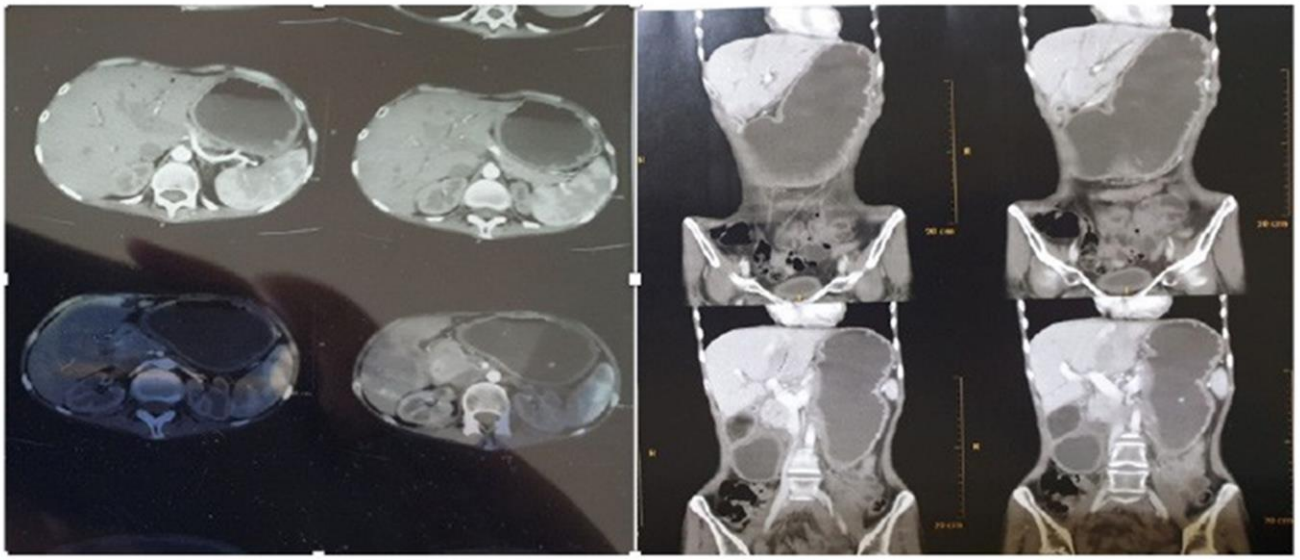

Fig 1: C.T mesenteric angiography.

Surgical Technique

Two to three days before to the procedure, each patient was admitted to address an electrolyte imbalance. An hour prior to surgery, patients were given a third-generation cephalosporin. Twelve hours before to surgery, subcutaneous low molecular weight heparin was administered as a DVT prophylactic. The patient placed in the table in supine reverse Trendelenburg position. The patient was placed in the reverse Trendelenburg position, supine, on the table. The patient was placed in the reverse Trendelenburg position, supine, on the table. An optical trocar, two working ports, and an assisting port were employed in the four port procedure.

Using cranial traction, the greater omentum and transverse mesocolon were discovered. SMA was then located, and before obstruction, the visceral peritoneum was separated from the duodenum (either with or without the duodenum being separated from the retroperitoneum). A 45-mm Endo GIA Universal Stapler (3.5-mm white cartridge) was used to establish a side-to-side duodenojejunostomy, and continuous V-loc sutures (Autosuture Division of Covidien) were used to close the stapling defect (Fig. 2).

Results

The age of our patients was ranging from 16 to 58 years with mean age 23.3 years.

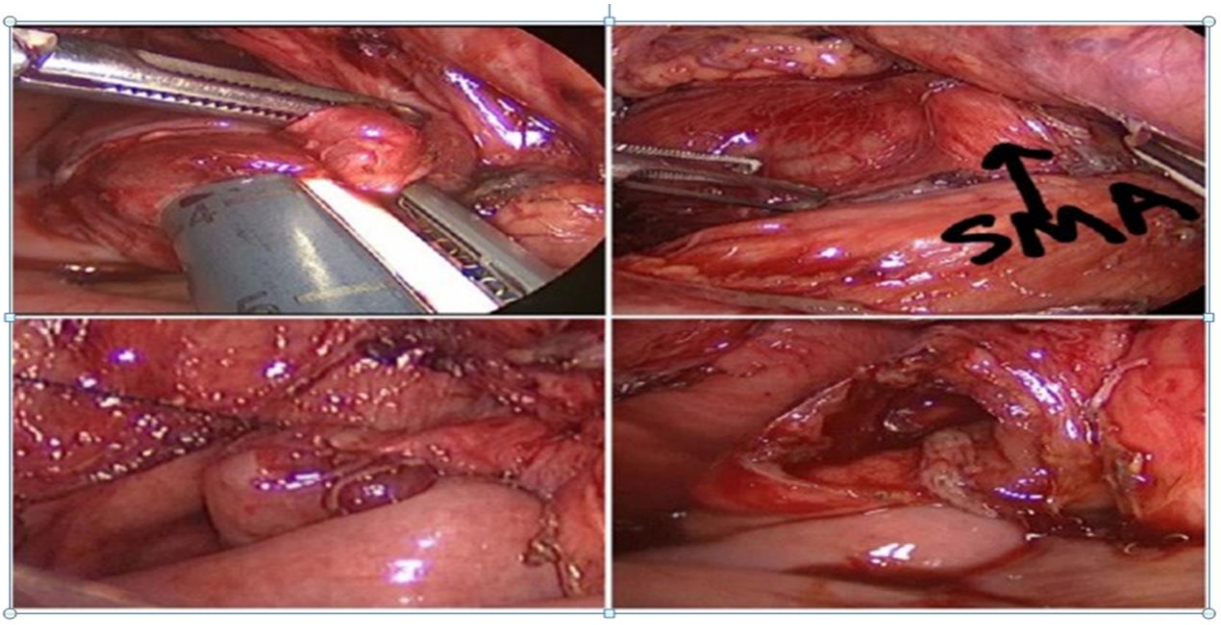

Fig 2: Laparoscopic duodenojejunostomy.

Most of our patients were females; eight patients (66.66% of cases) (Table 1).

The most common cause was idiopathic (Seven cases were of idiopathic cause 58.3% and three cases had psychiatric disorder and two cases after orthopedic spine operation) shown in Table 1. The most frequent symptoms at time of presentation were abdominal pain (91.66%), nausea and vomiting (83.33%) and loss of weight (66.6%). The mean preoperative weight was 38.58±5.7 and the mean preoperative BMI was 16.06±2.3. the mean aortomesenteric angle at C.T angiography was 15.8±4.6.

With the exception of one patient who had a laparoscopic antrectomy with Roux-en-Y gastrojejunostomy owing to a severely dilated atonic stomach, all patients had laparoscopic duodenojejunostomy. Not converting to an open procedure. The average duration of surgery was 74±18 minutes, and the average hospital stay was 5±2.5 days.

neuroleptics.

There were no problems during the procedure; one patient experienced a postpartum melena that was treated conservatively with packed red blood cells and fresh frozen plasma; no postoperative leaking was found. Case No. 4 experienced delayed stomach emptying, which was treated cautiously with prokinetics and was resolved in 7 days. A week after being discharged, patient case No. 9 experienced refeeding syndrome (hypophosphatemia, vitamin B deficiency, and hypokalemia). The patient was readmitted to the intensive care unit and was given nutritionist care; after three days, the patient's condition improved.

All patients follow up was done everyone week in the first month by surgeon and nutritionist then monthly follow up by nutritionist for one year.

Table 1: Distribution and causes of SMAS

Age	Mean±SD	23.3±10.3
	Range	16-58
Sex	Female	8
	Male	4
Cause	Idiopathic	7
	Post spine operation	2
	Psychiatric disorder	3
Weight	Mean±SD	38.58±5.7
	Range	30.5-50
BMI	Mean±SD	16.06±2.3
	Range	13-18.4
Aortomesenteric angle	Mean±SD	15.8±4.6
Operative time	Mean±SD	74±18 min
Hospital stay	Mean±SD	5±2.5

Discussion

First documented by Carl von Rokitansky13 in 1842, Bloodgood11 in 1907 reported surgical therapy by latero-lateral duodenojejunostomy. However, SMAS is also known as Wilkie's condition because Wilkie,14 published the first surgical series in 1921.15

The uncommon condition known as superior mesenteric artery syndrome (SMAS), which affects 0.0024–0.3% of cases, is brought on by compression of the duodenum's third segment. Between the aorta and the superior mesenteric artery.[1-3] Aortomesenteric angle less than 22 (normal value 25–60) and aortomesenteric distance drop less than 8 (normal value 10–28) are regarded diagnostic criteria by the majority of authors.[16]

Distinguishing SMAS from other conditions such as GERD, cyclic vomiting syndrome, functional dyspepsia, gastroparesis, and eating disorders (such as bulimia and anorexia) is important.[17–19]

SMAS need high suspicious index for diagnosis as it is a rare disease, so it is misdiagnosed and treated improbably with PPIs, antacids, prokinetics, H2- receptor blockers or

Diagnosis of SMAS depend on clinical presentations, Multi-slice CT or MRI with mesenteric angiography and Upper GI endoscopy were performed to evaluate angle between SMA and Aorta, gastric or duodenal ulcer and hiatus hernia.

SMAS prevalence more common in young females, children, and adolescents,20 that is like our study (Mean age 23.3 years and 66.66% of cases were females).

Weight loss and low BMI are clinical features of SMAS,21 in our study the mean preoperative BMI was 16.06±2.3. Korea authors,[22] observed the most common presenting symptoms are vomiting (70%), abdominal pain (65%), post-prandial fullness (33.8%), anorexia (33.8%) and early satiety (12.5%).

In our study abdominal pain (91.66%), nausea and vomiting (83.33%) and weight loss (66.6%).

Some authors support conservative medical treatment as first-line,[23] Merrett et al. Welsch et al.[15] advocate surgical management following unsuccessful medical treatment in symptomatic patients, while Merrett et al.[24] reported that medical treatment in patients with chronic complaints required protracted hospital stays with low success rates.

Sun et al., [23] advised that, because to its high success rate and low recurrence rate, surgical therapy be pursued first when SMAS is confirmed clinically and radiologically.

Many surgical procedures to bypass obstruction as gastrojejunostomy, Strong's procedure (Division of ligament of Treitz and mobilization of duodenum) and duodenojejunostomy, these surgical procedures can be done either open surgery or laparoscopic. [25,26]

Strong's procedure (Division of ligament of Treitz and mobilization of duodenum) is less invasive but associated with high failure rate. [27]

Gastrojejunostomy has been associated with blind loop syndrome and complications of duodeno- gastric reflux with risk of anastomotic ulcer and bleeding. 15]

Duodenojejunostomy is the treatment of choice by most of surgeon than gastrojejunostomy and Strong's procedure as it has good postoperative results and less risk of adhesions. [1-22]

Barner's series, Lee and Mangla and Lee's series reported that good results and improvement of symptoms after Duodenojejunostomy that is like our study. [28,29]

Chang et al. reported that laparoscopic Duodenojejunostomy is more feasible, safe, less postoperative pain, less hospital stay and immediate improvement of symptoms after surgery. [30]

Conclusion

In order to distinguish SMAS from other functional GIT problems, a high degree of suspicion must be used to the diagnosis. Laparoscopic duodenojejunostomy is the recommended treatment for SMAS, and it has favorable postoperative outcomes.

For diagnosis, therapy, and postoperative follow-up, a multidisciplinary team comprising surgeons, gastroenterologists, radiologists, and nutritionists should handle SMAS cases.

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