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SUPERIOR MESENTERIC ARTERY SYNDROME: CASE REPORT

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### SUMMARY

**Superior Mesenteric Artery Syndrome (SMAS) is caused by trapping of the third part of the duodenum between Superior Mesenteric Artery (SMA) and aorta as result of narrowing of the angle between the two vessels due to acute loss of mesenteric fat which is secondary to rapid weight loss. A fifteen year old caucasian female on a mountain climbing expedition with an acute on chronic upper gastrointestinal obstruction is presented. The diagnosis was confirmed with a barium meal and at surgery, a bypass procedure performed to relieve the obstruction.**

### INTRODUCTION

SMAS is a rare form of duodenal destruction caused by compression of the duodenum between the SMA and aorta(1). Most commonly it occurs after rapid weight loss following trauma, burns and patients in casts are particularly susceptible (2).

The SMA normally leaves the aorta at an angle of 50 to 60 degrees and the distance between the two vessels is 10 to 20mm through which the duodenum passes. In patients with the SMAS, the angle of origin of the SMA from the aorta decreases to approximately 20 degrees and the distance between the vessels drops to 2.5mm(3). Acute loss of mesenteric fat due to rapid weight loss is main cause of the SMA dropping posteriorly, trapping the duodenum like a scissors(4).

The symptoms are typical of intermittent partial upper gastrointestinal obstruction and include epigastric bloating with cramps causing pain that is relieved by vomiting. Anorexia with pain after meals leads to malnutrition and weight loss that may lead to a further decrease of the mesenteric fat pad under the SMA.

A barium meal examination is a useful investigation and demonstrates a large stomach with dilated bulb and second part of the duodenum(2,5). When the patient is positioned in the knee chest position, the passage of barium may be suddenly unimpeded.

Other diagnostic modalities include angiography, contrast enhanced CT and abdominal echography but these are not recommended for routine evaluation of cases with a diagnostic barium meal(6). Malrotation with duodenal obstruction by congenital bands and scleroderma are the main differential diagnosis.

Therapy in acute cases may comprise postural changes with relief obtained in the knee chest or prone positions. Chronic obstruction may require surgical division of the ligament of treitz with mobilization of the duodenum but more often a bypass procedure is performed. Laparoscopic excision of the ligament of

treitz and also laparoscopic bypass have recently been successfully employed to treat SMAS(3,7,8).

### CASE REPORT

Ms. R. G. a fifteen year old female was airlifted from Tanzania on 30th July 2002 at 2.00am with a seven-day history of vomiting.

The patient was from the United States who had come to Tanzania on an expedition to climb Mount Kilimanjaro. She had undergone vigorous physical training and diet control for a month prior to the onset of the climb resulting into marked weight loss. While on the mountain, she had eaten poorly and started vomiting intermittently and the vomitus comprised undigested food with bile. As a result she was dehydrated by the third day, and had to be brought down the mountain following which she required inpatient care with nasogastric aspiration and intravenous infusions. She improved only to restart vomiting upon feeding and was then advised on exploratory laparotomy. At this point she was airlifted and seen in the emergency department.

She gave a history of intermittent bouts of vomiting in the past and admitted to marked weight loss, which she felt was secondary to the intensive training and dieting for the mountain climbing trip. She also gave a history of epigastric cramps, heartburn, anorexia and nausea. She did not have any dysphagia but complained of early fullness and bloating on deglutition. She was obstipated for three days when seen.

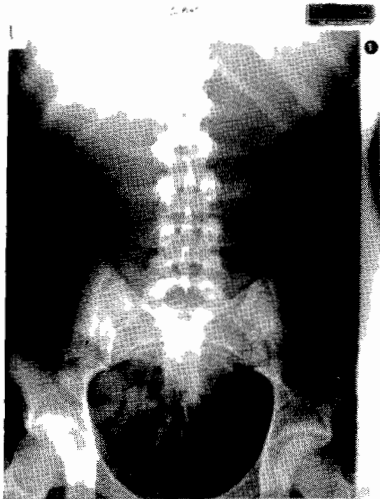
Her drug history comprised of anti-malarials, proton pump inhibitors, non-steroidal antiinflammatory analgesics, metronidazole for suspected giardiasis and ciprofloxacin for possible gastrointestinal infection, all prescribed by her accompanying physician.

Upon examination the patient was in fair general condition, not anaemic or jaundiced and with no palpable nodes. However she was wasted with notable bony prominences. The abdomen was scaphoid and showed epigastric fullness with no visible marks or veins. Upon palpation, there were no areas of tenderness or masses. Percussion revealed no ascites and upon auscultation there were no bowel sounds audible. Plain X-rays of the abdomen (Figure 1) revealed massive gastric dilatation and no dilated intestinal loops or fluids levels and for which a nasogastric

tube was inserted and it drained 1.5 litres of bilious fluid. An intra venous infusion (IVI) was commenced and bloods were taken for routine works. They showed a potassium of 3.3 mmol/l, sodium of 129 mmol/l and a WBC of 15.6 x 10<sup>9</sup>/l with polymorpho-leucocytosis of 82 %.

**Figure 1**

*Plain X-ray of abdomen showing gross gastric dilation*

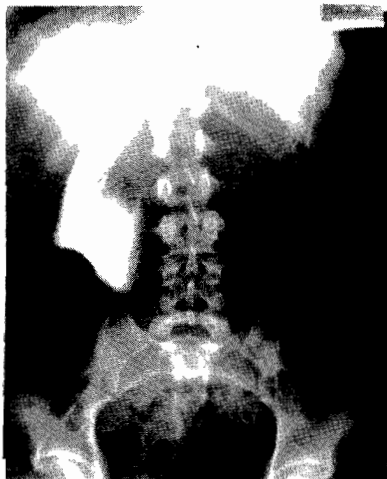


An impression of high gastrointestinal obstruction was formed and in view of the bile in the nasogastric aspirate the obstruction was thought to be most likely distal duodenal or proximal jejunal.

After resuscitation with IVI and nasogastric aspiration together with correction of the electrolytes, the patient had a gastrograffin meal the following morning and this revealed intestinal obstruction involving the third part of the duodenum and reported as most probably secondary to bands (Figure 2).

**Figure 2**

*Gastro grafin meal showing distal duodenal obstruction*



In view of the marked weight loss in a young female an impression of superior mesenteric artery syndrome with acute on chronic intestinal obstruction was formed, and a laparotomy planned. At laparotomy a large stomach with an oedematous and dilated bulb and second part of the duodenum

were noted, with collapsed jejunal loops. There were enlarged mesenteric lymph nodes of which one was biopsied.

The rest of the abdominal examination was normal. The duodenum was then Kocherised and the ligament of Treitz severed. No adhesion bands around the third or fourth part of the duodenum were noted and a diagnosis of SMAS formed. In view of the oedematous walls of the bulb and second part of the duodenum, a retrocolic isoperistaltic gastrojejunostomy was fashioned. The patient made an uneventful post operative recovery and was discharged on the third day post operatively following which she was noted to be progressing well when reviewed a week later. The histology of the lymph node revealed simple reactive changes.

## DISCUSSION

SMAS is a rare clinical condition that should be considered in patients with long standing abdominal complaints in whom endoscopic and conventional X-ray findings are often negative. Most often the patient in question is a thin nervous female who complains of dyspepsia and intermittent vomiting. Being rare, a high index of suspicion is necessary and leads to an early diagnosis and avoids unnecessary suffering for the patient.

The pathophysiology of SMAS is explained on trapping of the high horizontal part of the duodenum between the SMA and aorta due to a decrease in the angle and space between the two vessels as a result of decrease in the mesenteric fat pad due to acute weight loss. However the fact that numerous other patients who have acute weight loss especially following surgery and do not suffer from the SMAS points to possible other factors like congenital malrotation with bands or vascular anomalies causing the obstruction.

In addition to a barium meal, the diagnosis in equivocal cases may be aided by angiographic evaluation of the decrease in angle and space between the SMA and aorta. Surgical exploration in chronic cases with exclusion of other causes like bands and anomalous vessels confirms the diagnosis of SMAS.

Therapeutic measures in early cases include medical therapy in the form of aggressive nutritional support with small frequent feeds, postural adjustments and vitamin supplements(4). Chronic cases with marked weight loss and frequent episodes of vomiting benefit greatly from surgical relief of obstruction either via release of the suspensory ligament of Treitz or via a bypass procedure.

The most physiological bypass in duodenojejunostomy although in acute cases with a dilated and oedematous second part of duodenum, a gastrojejunostomy may also be fashioned(9). With the advent of laparoscopic surgery, laparoscopic management with severance of ligament of Treitz and a duodenojejunal bypass have both been reported with good results(3,7,8).

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