



**ORIGINAL RESEARCH PAPER**

**General Surgery**

**MEDIAN ARCuate LIGAMENT SYNDROME : LAPAROSCOPIC MANAGEMENT**

**KEY WORDS:** Celiac artery compression syndrome, median arcuate ligament syndrome, celiac axis syndrome, Dunbar syndrome

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**ABSTRACT**

We report a case of a 22-year-old male who presented to the outpatient department with post-prandial abdominal pain associated with nausea, vomiting and bloating sensation since the last three years. Medial arcuate ligament syndrome (MALS) is a rare condition which is caused by extrinsic compression of the celiac axis by the median arcuate ligament. It presents as postprandial epigastric pain, nausea, vomiting, and weight loss, often mimicking mesenteric ischemia.

**INTRODUCTION**

MALS is also known as celiac axis compression syndrome, celiac artery syndrome or Dunbar syndrome. It classically presents as a triad of post-prandial abdominal pain, weight-loss and epigastric bruit. Diagnosis of this condition is made by magnetic resonance angiography [MRA] or CT angiography [CTA]. The symptomatic patients usually need to undergo surgery. Surgical management can either be achieved by the traditional open exploration of the abdomen or by minimal invasive techniques.

**Case Report**

A 22-year old male presented to the outpatient department with symptoms of intermittent epigastric pain associated with nausea, vomiting and bloating which worsened after consumption of fatty foods. He also complained of weight loss of about ten(10) kilograms over the course of the past three years.

The physical examination was unremarkable. The routine blood investigations were within normal limits.

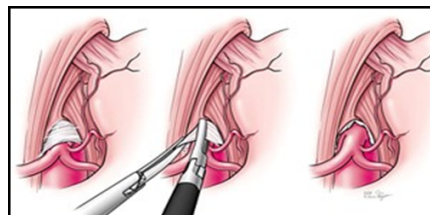
The abdominal ultrasound was normal. He was then empirically prescribed proton pump inhibitors. But he did not show any symptomatic improvement over a fifteen day period. Thereafter a contrast enhanced computed tomography of the abdomen was done and was grossly normal. The patient was then subjected to a CT angiography of the abdomen and showed severe stenosis of the celiac axis and post-stenotic dilatation. A mesenteric doppler ultrasound showed elevated celiac artery systolic and diastolic velocities of 155/68 cm/s that augmented with inspiration to 370/185 cm/s and 350/160 cm/s with expiration suggesting stenosis. Superior mesenteric artery velocities matched those of the aorta and indicated no abnormalities.

The patient underwent laparoscopic surgery to release the median arcuate ligament impinging on the celiac axis. The aorta was identified under the diaphragmatic crura and dissection was carried caudad on the aorta until the origin of the celiac artery was identified. The horizontally traversing fibres of the median arcuate ligament along with the nerve fibres were divided using ultrasonic shears, releasing any external compression of the celiac artery.

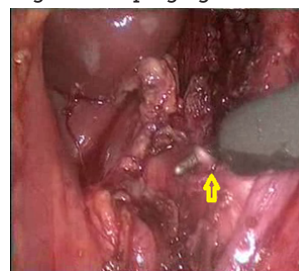
He had an uneventful post-operative course following the surgery and was discharged on post-operative day three. Over a three monthly follow-up period, the patient was symptom free and had a weight gain of three(3) kilograms. Beyond this the patient was lost to follow up.



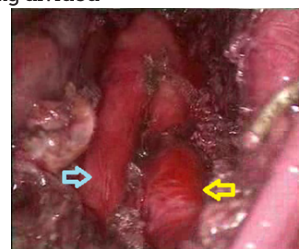
**Figure 1:**  
**Left figure :** Doppler ultrasound image of celiac axis showing narrowing & turbulent blood flow  
**Right figure :** CT Angiogram of abdomen depicting severe narrowing and characteristic “hook” appearance of the celiac artery



**Figure 2:** Image depicting the laparoscopic release of median arcuate ligament impinging on the celiac trunk



**Figure 3:**Horizontally traversing celiac ganglion nerve fibres & muscle being divided



**Figure 4:** Median arcuate ligament divided thereby releasing external compression on celiac trunk  
 :Blue arrow depicts “Aorta”  
 :Yellow arrow. depicts “Celiac trunk”

**DISCUSSION**

MALS was first described by Harjola in 1963 [1]. MALS occurs commonly in females between the age of 30-60 years with symptoms like nausea, vomiting , post prandial abdominal pain leading to aversion to food and resulting in significant weight loss. The physical examination may reveal epigastric tenderness and an epigastric bruit in as many as 83% of patients.

The pathophysiology of MALS is external compression of the celiac artery by an abnormally low lying ligament. This compression leads to visceral ischemia and postprandial abdominal pain. Some studies claim that this causes a “steal phenomenon”, blood flow being diverted away from the superior mesenteric artery via collaterals to the celiac axis, causing midgut ischemia [2].

**MALS is a diagnosis of exclusion. Hence, the following common causes of visceral pain should be excluded:-**

- 1) Hepato -biliary diseases
- 2) Acid peptic disease
- 3) GERD
- 4) Pancreatic disorders
- 5) Splenic and
- 6) Intestinal pathologies

Once these conditions are ruled out, a mesenteric duplex ultrasound has to be done to check blood flow through the celiac artery. Usually in supine position the systolic and diastolic velocities of celiac axis are markedly elevated during inspiration and expiration which returns to normal limits in erect decubitus [5].

CT or MRI angiogram is the gold standard for diagnosing MALS. A CT scan illustrates focal narrowing of the celiac axis, classically described as hook deformity of the celiac artery [4].

Surgical management has been the mainstay of treatment for MALS. The largest follow-up series of open surgical patients was done in 1984 by Reilly et al [3].

MALS was treated primarily by vascular surgeons. The trend has shifted towards lesser invasive procedures and hence general surgeons with training in minimal invasive surgery are operating on MALS patients more, now.

Current results using laparoscopic techniques show relief from symptoms in nearly 80% of patients undergoing this surgery [2].

**CONCLUSION**

Median arcuate ligament syndrome is a difficult condition to establish in a majority of patients since it is a diagnosis of exclusion.

MALS is a rare condition characterized by vague post-prandial abdominal pain, which should be considered as differential diagnosis after ruling out commoner conditions mimicking similar symptom complex.

After diagnostic confirmation of MALS, symptomatic patients should undergo surgical division of the celiac nerves and the impinging ligament which can be accomplished by either open or minimal access surgery. Recent studies, however, are suggesting that results following minimal access surgeries are at par with conventional techniques.

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