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CASE REPORT

Median arcuate ligament syndrome without weight loss: A challenging diagnosis

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Summary
Median arcuate ligament syndrome (MALS) is a rare vascular compression disorder of the celiac artery, typically presenting with postprandial abdominal pain and weight loss. We report a 44-year-old woman with chronic postprandial epigastric pain and nausea, but without weight loss. Her medical history included hypothyroidism, which may have masked this classical feature. Duplex ultrasonography revealed hemodynamically significant celiac artery compression with elevated peak systolic velocities. The patient underwent successful laparoscopic decompression of the median arcuate ligament, with sustained resolution of symptoms. This case highlights the diagnostic challenges of atypical MALS presentations and emphasises duplex ultrasonography as a valuable tool.
Keywords: median arcuate ligament syndrome, celiac artery compression, hypothyroidism, laparoscopy, duplex ultrasound.

Case presentation

A 44-year-old woman presented with chronic epigastric pain for two years. She described this pain as postprandial colicky pain, which gradually worsened with feeding, while she got comfort with fasting. She reported experiencing nausea but did not have any episodes of vomiting, diarrhoea, bloating, or weight loss, and there was no family history of the same condition. Her medical history included hypertension and hypothyroidism for which she was taking 100 µg of levothyroxine. She was prescribed omeprazole which did not improve her symptoms. Additionally, she underwent prior surgeries for a colonic polyp and a uterine fibroid.

Physical examination revealed mild tenderness over the epigastric region, without any organomegaly. She had normal bowel sounds. Her vital signs were within the normal range (BP 125/80 mmHg, HR 78 bpm, temperature 36.8 °C, RR 18 breaths/min). She did not have pallor or jaundice.

Regarding the complete blood count (CBC), normal levels of haemoglobin, haematocrit, mean corpuscular haemoglobin (MCH), and platelets were detected. However, mild leukopenia was found, with a white blood cell (WBC) count of 3.56 $\times 10^3/\mu L$ (normal range: 4–10 $\times 10^3/\mu L$). Laboratory investigations revealed elevated fasting blood glucose (123 mg/dL; normal: 74–109 mg/dL) and a mildly reduced sodium level (133 mmol/L; normal: 135–150 mmol/L). Other investigations, like creatinine, urea, and potassium levels, were within normal limits.

The patient underwent duplex imaging. Duplex ultrasonography (US) demonstrated compression of the celiac artery proximal to the origin of the left gastric artery, common hepatic artery, and splenic artery. It also revealed an elevated peak systolic velocity (PSV) of about 204 cm/s during inspiration and prominent collateral vessels. During expiration, PSV increased to about 355 cm/s. A PSV exceeding 200 cm/s is highly suggestive of significant celiac artery stenosis (> 70%). No superior mesenteric artery (SMA) abnormality was detected by the duplex US.

Computed tomography (CT) revealed mild focal smooth narrowing at the origin of the celiac trunk from its superior aspect with mild post-stenotic dilatation. There was also an asymmetric circumferential gastric wall thickening (15–20 mm) at the greater curvature of the stomach, without evidence of a discrete mass or regional lymphadenopathy (Figure 1A, 1B). Other solid organs and bowel appeared normal.

The patient underwent a laparoscopic procedure involving the division of the median arcuate ligament (MAL) with extensive dissection around the celiac plexus to ensure decompression. A prominent celiac ganglion was excised, and lymph nodes near the celiac axis were dissected. The operation was well tolerated, and the patient had a smooth postoperative recovery without complications. The post-prandial pain had completely resolved after the operation. Unfortunately, the circumferential gastric wall thickness was not further investigated.

After two weeks of follow-up, the patient reported no post-prandial pain, and follow-up duplex ultrasonography demonstrated a significant reduction in PSV (186 cm/s).

Discussion

Median arcuate ligament syndrome (MALS) is a rare vascular compression disorder, similar to May-Thurner, nutcracker, and thoracic outlet syndromes, in which the MAL compresses the celiac axis and/or perivascular neural

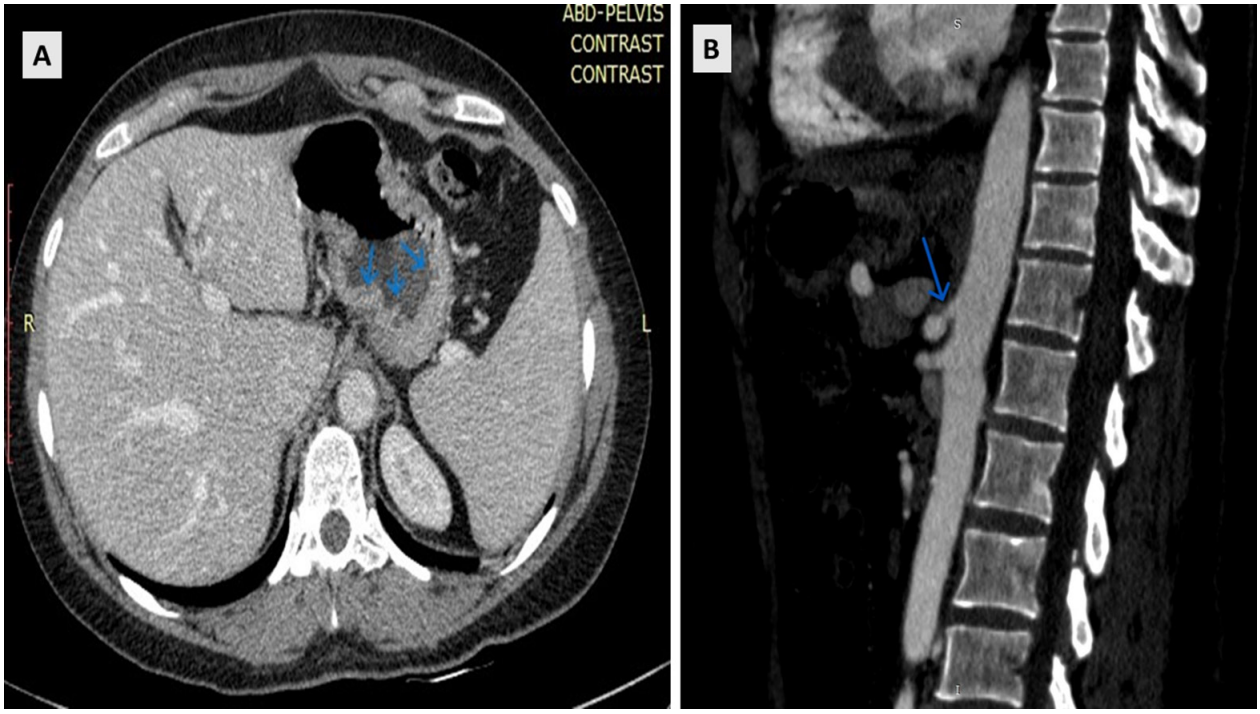

Figure 1: (A) Axial contrast-enhanced CT image demonstrates notable circumferential wall thickening of the gastric body (blue arrows). (B) Sagittal reformatted image shows narrowing of the celiac artery by extrinsic compression by the median arcuate ligament (blue arrow).

plexus.[1,2] Classically, patients with MALS complain of a long history of postprandial epigastric pain, nausea, vomiting, diarrhoea, bloating, and significant weight loss. Sometimes, this postprandial pain worsens after exercise or leaning forward. Our patient presented with postprandial pain and nausea, but unlike the typical presentation, she did not report weight loss.

Chronic pain associated with MALS can be explained by the compression of MAL on the nerve fibre plexus surrounding the celiac trunk, leading to neurogenic irritation and/or ischemia due to reduced celiac inflow, which results in decreased perfusion of the abdominal organs and produces pain through both mechanisms.[3] The condition most often occurs in females in their 3rd to 5th decades of life.[4] Weight loss is frequently observed in MALS patients, primarily due to food avoidance in response to postprandial pain, nausea, and vomiting; however, our case did not present with weight loss, which is notably different from previous cases.[3-5] Clinicians should be aware that endocrine comorbidities, particularly hypothyroidism, may blunt or obscure typical MALS features. In our patient, hypothyroidism was well-controlled on levothyroxine supplementation at presentation; however, it is possible that she had been inadequately treated in the past, contributing to her atypical presentation. Although a euthyroid state on supplementation generally normalises metabolism, the underlying pathophysiology of hypothyroidism can promote weight stability or modest gain, potentially masking a key diagnostic indicator and delaying recognition of MALS.[6]

The nonspecific symptom profile of MALS frequently overlaps with more common gastrointestinal conditions, leading to frequent misdiagnosis, as many physicians are unfamiliar with the condition, even after exclusion of other causes. Once common structural gastrointestinal (GI) pathologies like peptic ulcer disease or malignancy are ruled out via endoscopy and cross-sectional imaging, targeted vascular imaging becomes crucial. Duplex ultrasonography is especially useful because it is noninvasive, dynamic, and posture/respiration sensitive. Diagnostic criteria typically include increased PSV greater than 200 cm/s at the origin of the celiac trunk, suggesting ≥ 70% stenosis, which further rises during expiration and decreases when assuming an erect posture.[7] In our patient, PSV increased from approximately 204 cm/s during inspiration to 355 cm/s during expiration, with evidence of collateral formation—findings highly suggestive of haemodynamically significant, respiration-dependent celiac compression. Doppler imaging can also assist in ruling out atherosclerotic involvement at the origin of the celiac artery. While conventional catheter angiography was historically regarded as the gold standard, it has largely been replaced by multidetector CT angiography, which offers detailed multiplanar reconstructions and reliably identifies the pathognomonic hooked appearance of the celiac axis, as well as the associated collateral pathways.[7,8]

Laparoscopic division of the MAL with celiac plexus/ganglion release remains the cornerstone of treatment in appropriately selected symptomatic patients.[9] Our patient experienced immediate relief of symptoms following the laparoscopic approach, and sustained postoperative relief of postprandial pain, with improvement of duplex parameters (PSV decreased to ~186 cm/s) on short-term follow-up. These results align with previous studies reporting that up to 85% of MALS cases experience symptom relief in the immediate postoperative period.[9,10] In this case, surgical success was further confirmed by clinical follow-up and a repeat duplex US, which showed a marked improvement in both symptoms and PSV.

In conclusion, MALS should remain in the differential diagnosis of unexplained postprandial epigastric pain, even in the absence of classic features such as weight loss.

Endocrine comorbidities such as hypothyroidism may modify the clinical phenotype and obscure classical features. A structured diagnostic pathway that incorporates dynamic duplex criteria and confirmatory CTA can reduce delays. Early recognition and timely surgical referral can lead to rapid symptom resolution and objective haemodynamic improvement.

Conflict of interest

The authors declare no conflict of interest.

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Patient consent

Written informed consent was obtained from the patient in her native language for publication of this case report.

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