

DIAGNOSTIC ROLE OF CELIAC PLEXUS BLOCK IN ASSESSING ELIGIBILITY FOR CORRECTIVE SURGERY IN A CASE OF MEDIAN ARCUATE LIGAMENT SYNDROME

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Background: Median arcuate ligament syndrome (MALS) is an uncommon cause of postprandial abdominal pain that can be difficult to diagnose, especially in children.

Case Report: We report a 14-year-old male patient with 2 months of severe, stabbing periumbilical pain resistant to medical therapy. Mesenteric duplex ultrasound showed aliasing with a peak systolic velocity of 234 cm/s at the celiac origin, and computed tomography angiography demonstrated mild kinking with poststenotic dilatation, consistent with celiac trunk compression. Diagnostic fluoroscopy-guided bilateral posterior retrocrural celiac plexus block (CPB) produced rapid pain reduction, enabling a full meal within 6 hours. Analgesia persisted for about 48 hours. The patient subsequently underwent open MAL decompression and remained symptom free at 18-month follow-up.

Conclusions: Our case illustrates that temporary CPB may be a useful diagnostic adjunct to identify a sympathetically mediated pain component and help guide surgical candidacy in MALS.

Key words: Adolescent, celiac artery, celiac plexus, median arcuate ligament syndrome, nerve block

BACKGROUND

Median arcuate ligament syndrome (MALS) is an uncommon condition in which the MAL's fibers compress the proximal celiac trunk, producing chronic postmeal upper abdominal pain. Clinical features commonly include episodic postprandial epigastric or periumbilical pain, nausea, vomiting, and, in some patients, reduced oral intake. It is a diagnosis of exclusion and requires correlation of a compatible clinical history with vascular imaging, which classically demonstrates focal superior narrowing of the proximal celiac trunk with a convex ("hooked") contour and possible poststenotic dilatation

(1). Symptomatic MALS is uncommon in children, and careful selection of patients for definitive decompression is essential. Celiac plexus block (CPB) has been described as a diagnostic adjunct in suspected neurogenic MALS, where a positive temporary block supports a sympathetically mediated pain component and may suggest surgical candidacy (2,3).

CASE PRESENTATION

A 14-year-old male patient presented to us with a 2-month history of severe, stabbing periumbilical pain that consistently occurred after he took his meals, and

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Patient consent for publication: Written informed consent for publication was obtained from the patient's parent, and assent was obtained from the patient.

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rated the pain as 7/10 on the Numeric Rating Scale (NRS-11). The pain was refractory to paracetamol, proton pump inhibitors, antispasmodics, nonsteroidal anti-inflammatory drugs, gabapentinoids, and short opioid trials. He had no documented weight loss and no abdominal bruit on examination. Extensive evaluation, including complete blood picture, erythrocyte sedimentation rate, kidney and liver function tests, serum amylase and lipase, chest and abdominal radiography, abdominal ultrasound, urinalysis, and stool studies, was normal. Upper gastrointestinal endoscopy and colonoscopy were unremarkable.

Mesenteric duplex ultrasound showed aliasing at the origin of the celiac artery with a peak systolic velocity (PSV) of 234 cm/s. Computed tomography (CT) angiography demonstrated mild kinking of the celiac artery distal to its origin with poststenotic dilatation. These imaging findings, together with the clinical picture, led to a provisional diagnosis of MALS.

Explicit written parental consent and patient assent were obtained for the procedure and anonymized reporting. The diagnostic CPB was performed using a posterior retrocrural fluoroscopic approach with the patient in the prone position. Needles were advanced toward the anterolateral borders of the T12 vertebral body, and contrast confirmed retrocrural/anterolateral spread adjacent to the vertebral contour and sympathetic chain (Figs. 1 and 2). After negative aspiration for blood and

cerebrospinal fluid, 20 mL of 0.75% ropivacaine was injected on the left side only, as contrast spread was markedly cephalad on that side. After local anesthetic injection, the patient was observed for approximately 6 minutes and showed rapid, significant pain relief (NRS-11 3/10); therefore, a right-sided injection was not performed. This cephalad spread will facilitate blocking of all relevant greater, lesser, and least splanchnic nerves, which are the major contributors to the celiac plexus. The injection was performed as a diagnostic test to evaluate sympathetically mediated pain rather than for long-term analgesia.

The patient reported substantial pain relief (NRS-11 2/10) within 30 minutes. Six hours after the procedure, he tolerated a full meal without developing postprandial pain. The pain relief persisted, and his reported NRS-11 was 2/10 during the first 48 hours. No hypotension, diarrhea, or other immediate adverse events were recorded. Given the constellation of symptoms, imaging, and the positive response to CPB, the patient underwent open MAL decompression without arterial reconstruction (Fig. 3). The surgery was uneventful. At 18-month follow-up, the patient remained symptom free and had returned to normal oral intake and activity.

DISCUSSION

The pathophysiology of MALS is not yet fully understood. External pressure on the celiac artery by the

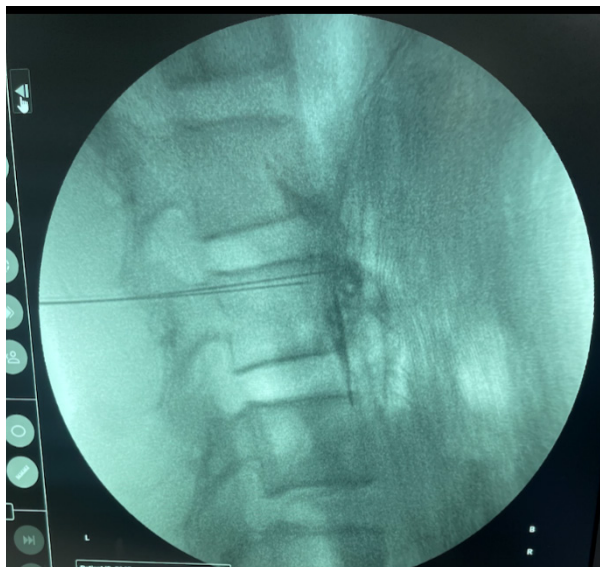


Fig. 1. Lateral view showing contrast spread at the anterolateral border of thoracic spine.

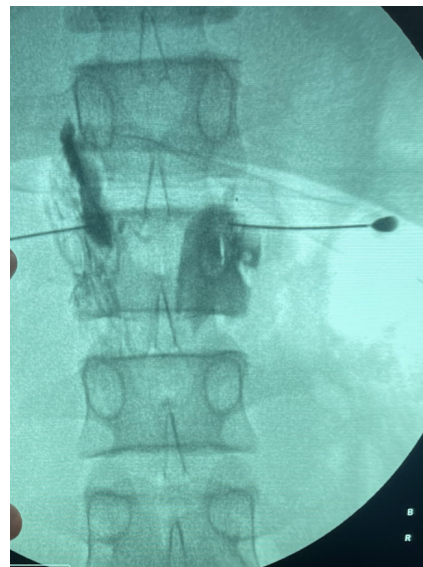


Fig. 2. AP view showing contrast delineating the sympathetic chain on the left side. AP, anteroposterior.

MAL can lead to hemodynamic compromise, but many individuals with imaging evidence of compression remain asymptomatic. This disagreement supports an important theory that there exists contribution from a neuropathic/sympathetic mechanism in a subset of patients. Thus, symptoms are likely multifactorial, involving both ischemic/hemodynamic and neurogenic (sympathetically mediated) mechanisms (4).

Doppler ultrasound and CT angiography are commonly used to demonstrate celiac axis compression. A PSV threshold of > 200 cm/s is widely referenced as suggesting hemodynamically significant stenosis (1). Elevated end-diastolic velocities (EDV) have also been reported in supporting assessments, but EDV cutoffs vary between studies and should therefore be considered supportive rather than an absolute diagnostic criterion. Similarly, a MAL thickness exceeding about 4 mm has been proposed as abnormal by some authors, but more recent radioanatomical work demonstrates wide normal variation and suggests thickness should be interpreted cautiously (5).

Temporary CPB with local anesthetic has been used as a diagnostic adjunct in MALS to demonstrate a sympathetically mediated component of pain and to help predict benefit from surgical decompression. Several case reports and institutional series (6), including recent reports in pediatric populations, describe rapid symptomatic improvement following diagnostic CPB

and subsequent durable symptom relief after ligament release in many patients who had a positive block. Shnayder-Adams et al (7) reported that 96% of CPB responders went on to develop adequate pain relief with ligament release surgery. However, available data remain observational and heterogeneous; a positive block supports, but does not absolutely guarantee, long-term benefit from decompression. Multidisciplinary as-

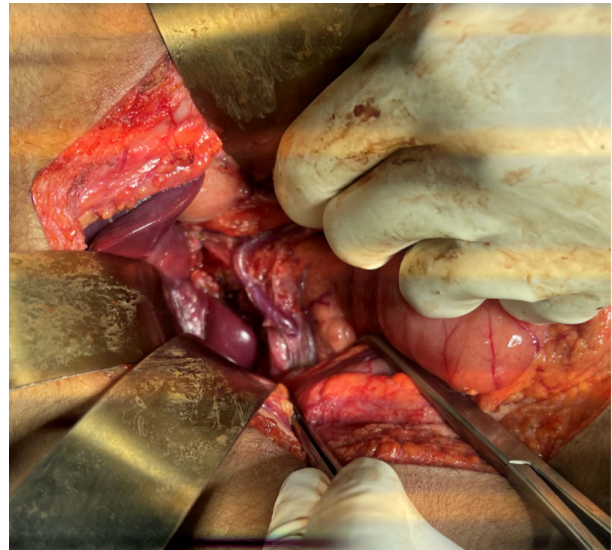


Fig. 3. Intraoperative picture of celiac artery during decompression surgery.

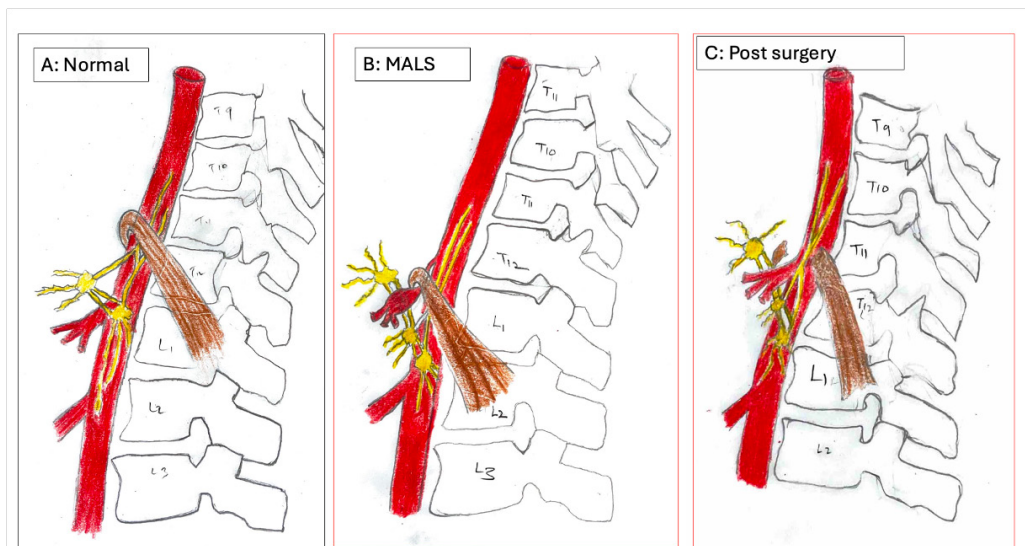


Fig. 4. Illustration of the celiac plexus and MAL showing (A) normal anatomy, (B) MALS with celiac trunk compression, and (C) the postoperative anatomy following MAL decompression. MALS, median arcuate ligament syndrome.

assessment and careful patient selection remain essential.

Surgical release of the MAL, open or minimally invasive (Fig. 4), commonly results in substantial symptomatic improvement in selected patients, but reported success rates vary (8). The present case demonstrates that in a carefully selected adolescent with corroborative imaging and a positive diagnostic CPB, open decompression can provide durable symptomatic remission. CPB is generally well tolerated under image guidance, with expected transient effects, such as back pain, hypotension, or diarrhea. Serious neurologic complications, such as paralysis and sensory deficits, are uncommon but possible, and the procedure should be performed with meticulous monitoring and readiness to manage complications (9).

CONCLUSIONS

In adolescents with unexplained severe postprandial abdominal pain and imaging evidence of celiac axis compression, a diagnostic CPB may be a useful adjunct to determine whether a sympathetically mediated pain component is present. This helps us to guide candidacy for surgical decompression. Our case demonstrated rapid symptomatic improvement after CPB and durable remission 18 months after open MAL release surgery, supporting the selective use of CPB in appropriately chosen pediatric patients. Larger evidence is required to define optimal selection criteria and to quantify how well CPB predicts surgical outcomes.

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