

Preoperative Determinants of Symptom Resolution After Robotic Release of Media Arcuate Ligament

Jamie Benson MD; Tanuja Damani, MD

Department of Surgery, NYU-Langone Health, New York, NY, USA

Background:

Median arcuate ligament syndrome (MALS) results from extrinsic compression of the celiac axis by the median arcuate ligament, leading to foregut ischemia and postprandial abdominal pain. While surgical release offers definitive therapy, outcomes vary, and not all patients experience lasting benefit. Identifying patient factors that predict symptom resolution could guide selection and counseling. We present a case series of 11 patients undergoing MAL release with emphasis on characteristics associated with clinical improvement.

Methods:

A retrospective review was performed of 11 patients with MALS who underwent surgical release between 2021 and 2025. Diagnosis was established via computed tomography angiography and/or duplex ultrasonography demonstrating dynamic celiac artery compression with correlating symptoms. All patients underwent robotic MAL release. Demographics, symptom profiles, comorbidities, imaging findings, operative details, and postoperative outcomes were analyzed. Clinical response was defined as complete, partial, or absent symptom resolution post-operatively.

Results:

The cohort included 7 females and 4 males, mean age 42 years (range: 22-78). All patients reported postprandial or episodic abdominal pain, with weight loss in 5 (45%), nausea in 4 (36%), and early satiety in 4 (36%). Robotic release was completed in all 11 patients. Over a follow-up of 6-24 months, 7 patients (64%) had complete or near-complete symptom resolution, and 4 (36%) had persistent symptoms. The average celiac artery expiration velocity seen on duplex for our non-responders was 380.7 cm/s (range 207-580) and responders was 542.2 cm/s (range 424-651). All of our complete responders had an expiration velocity greater than 400 cm/s. Complete responders were more likely to present with preoperative weight loss, shorter duration of symptoms (<2 years), and have a preoperative duplex with expiration velocities greater than 400 cm/s. Patients with partial or absent response tended to have longer symptom duration and nonspecific pain not consistently related to meals. Age and sex did not appear to correlate with outcome.

Conclusion:

In this series, the majority of patients experienced durable symptom relief after MAL release. In addition to a pre-operative celiac artery expiration velocity greater than 400 cm/s, predictors of a favorable outcome included shorter symptom duration and the presence of weight loss, suggesting early diagnosis and intervention may improve success rates. Patients with long-standing, nonspecific pain had less predictable benefit, highlighting the importance of thorough preoperative evaluation and careful patient selection. Larger prospective studies are warranted to validate predictive factors and optimize outcomes for MALS.

