

## MEDIAN ARCUATE LIGAMENT SYNDROME IN A PATIENT WITH CHRONIC POSTPRANDIAL PAIN: CASE REPORT

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**Abstract:** **INTRODUCTION:** A Median arcuate ligament syndrome, or Dunbar syndrome, is a rare differential diagnosis for chronic abdominal pain, which is caused by compression of the celiac trunk and adjacent nerve fibers by the median arcuate ligament. Given the few cases described in the literature, this study aims to report a case seen at a referral medical center in Montes Claros, Minas Gerais, to better clarify its findings and challenges. **CASE REPORT:** This is a patient named B.S.R., a 17-year-old male, with chronic epigastric pain that worsens after eating. Findings on angiotomography showed that the celiac trunk had ostial luminal stenosis of subocclusive appearance, due to the compressive effect exerted by the median arcuate ligament. Treatment was performed via videolaparoscopy, to release the affected vessel, with section of the ligament. **DISCUSSION:** Abdominal pain is a recurrent complaint in emergency rooms, with a range of possible differential diagnoses. Thus, identifying vascular causes can be a challenge, given that extensive diagnostic workup may be necessary, along with imaging tests and investigation of clinical findings. Therefore, it is important to take a critical look at imaging findings, especially vascular elements, in order to correlate them with the symptoms in question, for an assertive clinical diagnosis and effective treatment.

**Keywords:** Dunbar, median ligament, celiac trunk, abdominal pain.

## INTRODUCTION

Median arcuate ligament syndrome, also known as Dunbar syndrome, is a rare differential diagnosis for chronic abdominal pain, which is caused by extrinsic compression of the celiac trunk and adjacent nerve fibers by the median arcuate ligament.<sup>2,9</sup>

The clinical picture presented by affected patients includes postprandial abdominal pain, weight loss, malaise and vomiting. Due to this generic syndromic picture, it becomes chronic, due to a late diagnosis.<sup>9,11</sup>

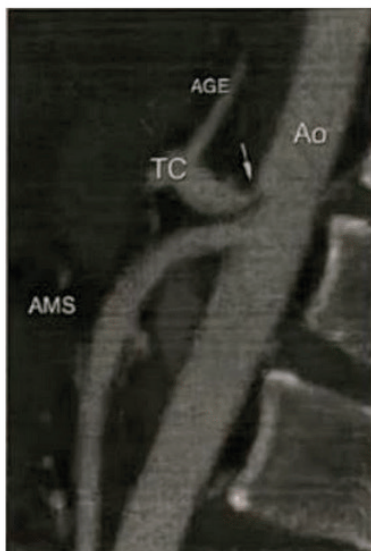
This study aims to report a clinical case that occurred in a young patient, in a reference medical center in the city of Montes Claros - Minas Gerais, its diagnosis and treatment. Since this is an uncommon condition in clinical practice and also in the literature, it is extremely important to study and clarify this diagnosis, which is sometimes challenging.

## CASE REPORT

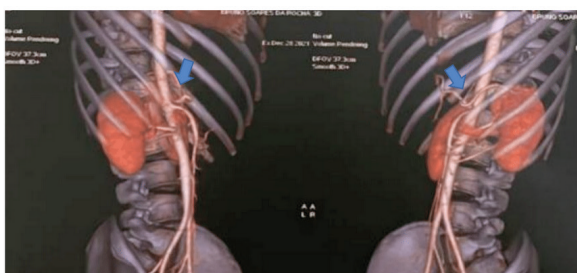
This is a patient named B.S.R., a 19-year-old male who was admitted to the emergency room in Montes Claros with long-standing epigastric pain that worsened after eating. He was accompanied by nausea, vomiting, and non-significant weight loss. According to the patient's report, he had been to emergency services before, without accurate diagnoses being made, and he was released after analgesia.

After ruling out urgent surgical causes, it was decided to hospitalize the patient in order to elucidate the case through other diagnostic tests. The abdominal tomography (CT) report showed subocclusive ostial luminal stenosis in the celiac trunk, with no other relevant findings.

By knowing the hypothesis of compression by the median arcuate ligament, angiotomography was performed. The exam showed the same ostial stenosis of the celiac trunk seen on the CT, with post-stenotic dilation of the same; this being related to the compressive effect exerted by the middle arcuate ligament (image 1).



**Figure 1:** Abdominal angiotomography, showing compression of the celiac trunk by the median arcuate ligament (arrow).

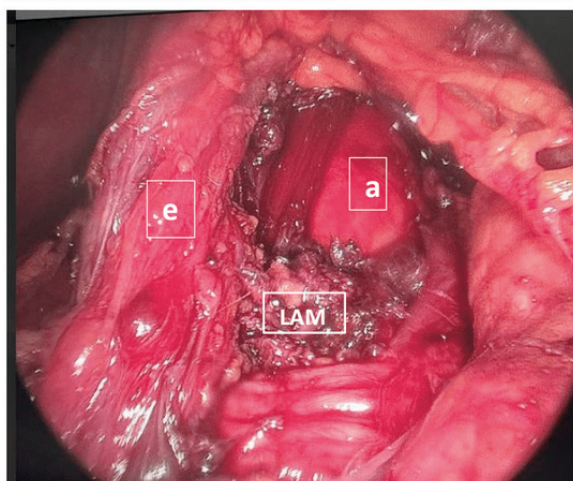
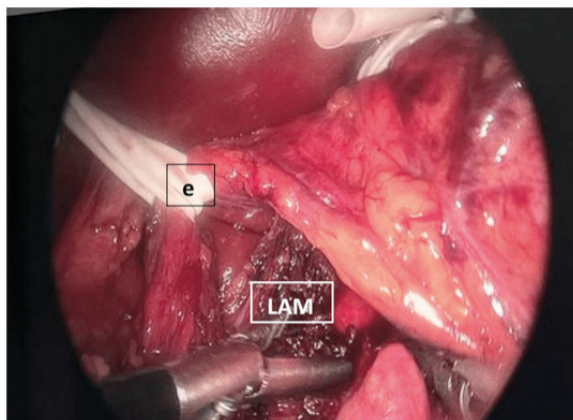


**Figure 2:** A 3D reconstruction, with evidence of extrinsic compression (arrow).

The patient then underwent laparoscopy to treat the diagnosed condition. During the procedure, an incision was made using videolaparoscopic trocars, according to the technique, and an inventory of the cavity was performed. Access was made towards the celiac trunk by means of lateral dissection of the esophagus, with repair of the same. Afterwards, the left gastric artery was identified and repaired (figure 3.A). With direct visualization of the fibers of the median arcuate ligament, it was sectioned and then the celiac trunk was released.

(Figure 3.B). There was no significant bleeding during the procedure and, before completing the surgery, a new review of the

cavity and local hemostasis was performed. Incisions were closed. The procedure was uneventful.



**Figure 3:** Intraoperative. (A) Left gastric artery repair (e) for access. (B) Laparoscopic view after resection, with release of celiac trunk. - aorta (a), post resection fibers (LAM)

The patient had a good postoperative evolution, and early hospital discharge was possible. He did not present any related surgical complications. Outpatient follow-up was maintained, and no further surgical interventions were necessary.

## DISCUSSION

The syndrome was first described by Harjola in 1963, and was later further studied by Dunbar et al. in 1965, who clinically described the effects of extrinsic compression of the median arcuate ligament on the celiac trunk. The condition was then named Dunbar's syndrome and has been studied for its clinical findings, pathophysiology and radiological findings, and is an important differential diagnosis in cases of chronic abdominal pain.<sup>1,2</sup>

The median arcuate ligament is a fibrous arch that joins the right and left diaphragmatic pillars, forming the aortic hiatus. Anatomically, it is usually found at the level of the T12 and L1 vertebrae, as well as the celiac trunk, a branch of the abdominal aorta. Thus, given this close relationship between the structures, a more distal insertion of the ligament or cranial insertion of the artery may end up compressing the vascular trunk.<sup>9,13</sup>

This compression justifies the clinical features found in the syndrome, whether by hemodynamic or neuropathic mechanisms. The predominance of these two mechanisms is still controversial in the literature, and they are presented in different ways in studies. The first is explained by inadequate blood flow, compromised with each aortic pulsation, which causes a reduction in the lumen of the celiac trunk, due to external compression of the ligament. This would lead to transient ischemia of the organs supplied by it, such as the stomach, spleen, liver and other parts of the gastrointestinal tract, causing pain. Furthermore, the clinical findings can be explained by the compression of nerve fibers present there, originating from the celiac plexus.<sup>5,9</sup>

Symptoms are associated with this change in the vascularization of organs in the upper abdomen, with pain in the upper quadrant of the abdomen being the most prevalent. In cases

of cramping, it can radiate to the back, and is strongly associated with the postprandial period. Pain is often accompanied by nausea, loss of appetite, vomiting and even diarrhea.<sup>5,2,9</sup>

Because it is a generic, non-specific clinic, diagnosis can be difficult and may be made late. Thus, patients often have long-standing symptoms and a history of frequent visits to the emergency room, without a precise diagnosis. When the condition becomes chronic, it can progress to weight loss due to changes in eating habits and even more serious vascular complications.<sup>16</sup>

Once the syndrome is suspected and other causes of acute abdomen – surgical or otherwise – have been ruled out, the diagnosis will be made by imaging. Improvements in radiological studies and the accuracy of imaging tests have enabled better studies of Dunbar Syndrome. Previously, this was done using angiography, but now the gold standard is CT angiography (Angiotomography).<sup>9,14</sup>

With this, it was possible, in a minimally invasive, highly specific and sensitive examination, to obtain images with more precise cuts and 3D reconstructions. It was also possible to better visualize the compression at the level of the median arcuate ligament, especially in the lateral projection, with a typical finding being the hook appearance visualized in the celiac trunk, where compression by the ligament causes a deformity proximal to the artery.<sup>8</sup>

The assessment by means of CT angiography was also important in correlating clinical symptoms with the anatomical presentation in question. Analyzed, for example, in different respiratory phases, it was possible to visualize a different compression on the celiac trunk, according to the movement of the diaphragm, being more accentuated during expiration.<sup>8,15</sup>

Furthermore, the study allows the analysis of the degree of stenosis of the celiac trunk, which can determine the severity of the

compression. Although the relationship between the degree of stenosis and the patient's clinical condition has not been shown to be linear in the literature, a reduction in arterial blood flow of approximately 60% is usually sufficient to initiate symptoms.<sup>8,14</sup>

Treatment for median arcuate ligament syndrome involves relieving the compression of the celiac trunk and, therefore, its symptoms. Conservative management is possible, with dietary changes, use of symptomatic medications and monitoring with imaging tests; however, these do not actually treat the underlying cause.

Therefore, the main line of treatment is surgery, which is preferable in cases of severe symptoms. It consists of sectioning the fibers of the median arcuate ligament to release vascular compression. The method of choice may be videolaparoscopy, open or robotic.<sup>11,12,13</sup>

Videolaparoscopy has been a widespread method, given that it is less invasive and provides better postoperative recovery. Even so, it is necessary to consider the need for conversion to laparotomy, approximately 9% in Jimenez, et al, in cases of vascular bleeding of the upstream aorta and its branches.<sup>11</sup> However, these high rates may be associated with a learning curve, which can be improved throughout the surgeon's practice and a possible joint approach between general and vascular surgery.<sup>11,4</sup>

In cases of associated complications, such as more severe damage to the artery, or where blood flow has not been reestablished after release of the ligament, revascularizations by

angioplasty or stenting may be considered.<sup>7</sup> Endovascular treatment alone is not considered, given the persistent extrinsic compression.<sup>7,10</sup>

Studies that take into consideration, the neuropathic aspect of the condition also propose a multidisciplinary treatment, in which a celiac plexus block is performed concomitantly, with generally satisfactory results.<sup>4,5</sup>

In the present study, the videolaparoscopic technique was performed, taking into consideration, the experience of the surgical team, the patient's age and the service's resources, which were described in the Case report topic.

## CONCLUSION

Abdominal pain is a recurring complaint in emergency rooms, with a range of possible differential diagnoses. Thus, identifying less frequent and still under study causes, such as Dunbar Syndrome, can be a challenge. With advances in the field of medicine and especially radiology, it has been possible to better study the anatomical aspects of this condition, in addition to allowing the differential diagnosis with other possible causes of celiac trunk stenosis. Treatment by surgery is the method of choice, and may be associated with endovascular techniques when necessary. Therefore, it is important to take a critical look at the imaging findings, especially the vascular elements, in order to correlate them with the symptoms in question, for an assertive clinical diagnosis and for effective treatment.

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