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Median Arcuate Ligament Compression Syndrome: Case Report

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Celiac artery compression syndrome was first described in 1965. Dunbar introduced the first surgically treated serial. There were several hypothesis about this syndrome. One of them is the proximal localization of the celiac artery, the other one is external compression of anatomically normal celiac artery by median arcuate ligament. A 36-years old female patient with a body mass index of 1.63 with episodes of postprandial abdominal pain, vomiting, nausea and with a weight loss of 6 kg. in the last year was presented. In the light of this datas, CT angiography was performed. CT results confirmed the diagnosis of Dunbar's syndrome. Laparascopic MAL division was performed to this patient by general surgery–with an assisting cardiovascular surgeon.The patient was ambulated in the 8. postoperative hour and started oral feeding. The patient did not develop any clinical complications and was discharged from hospital on the 3rd postoperative day. Control CT angiography was performed at the 9th day follow up visit. Comparison of preoperative and postoperative CT angiography results revealed a significant calibration increase in the celiac trunk and it's branches.Multislice CT angiography should be performed when establishing diagnosis due to the advantages of 3D imaging at MAL syndrome. After the diagnosis, best results and short postoperative process can be achieved in experienced laparoscopic surgery centers by cutting median arcuate ligament and removing tissue surrounding the celiac artery. We believe that the presence of a cardiovascular surgeon in the operation may be useful for repairing possible vascuar injuries.

***Key Words*:** *Median arcuate ligament compression, Celiac, vascuar injury*

Median Arkuat Ligaman Bası Sendromu: Olgu Sunumu

Çölyak arter kompresyon sendromu ilk olarak 1965 yılında tanımlanmıştır. Dumbar cerrahi olarak tedavi edilmiş ilk seriyi sunmuştur. Bu sendromla ilgili farklı hipotezler geliştirilmiş olup; bunların ilki çölyak arterin anormal bir şekilde proksimalden çıkması, diğeride anatomik olarak normal olan median arkuat ligaman tarafından basıya uğruyor olmasıdır. Vücut kitle indeksi 1,63 olan son bir yılda 6 kilo kaybı görülen postprandial abdominal ağrı şikayetleri ile bulantı ve kusma atakları olan 36 yaşında kadın hasta sunuldu. Bu bulgular nedeniyle BT angiografi uygulandı. BT sonuçları Dunbar's sendromu tanısını doğrular nitelikteydi. Laparoskopik MAL divizyonu Genel Cerrahi kliniği tarafından bu hastaya uygulandı. Ameliyat kardiyovasküler cerrahi uzmanı ile birlikte gerçekleştirildi. Hasta postoperatif 8. saatte extübe edildi ve oral beslenme başlandı. Herhangi bir klinik komplikasyon görülmemesi üzerine postoperatif 3. günde taburcu edildi. Postoperatif 9. günkü takibinde kontrol BT anjiyografi uygulandı. Postoperatif ve preoperatif BT anjiografi sonuçları çölyak trunk ve dallarında anlamlı kalibrasyon artışı olduğunu gösterdi. Multislice BT anjiografi MAL sendromu için 3 boyutlu görüntüleme imkanı sunduğundan tanısında uygulanmalıdır. Tanı sonrası en iyi sonuçlar ve postoperatif iyileşme laparoskopik cerrahi için tecrübesi olan kliniklerde çölyak arter etrafındaki dokunun ve MAL'ın kesilmesi ile sağlanabilmektedir. Operasyonda kardiyovasküler cerrahın bulunmasının olası vasküler yaralanmalara müdahalede faydalı olacağı kanaatindeyiz.

Anahtar Kelimeler: *Median arkuat ligaman bası, Çölyak, vasküler hasar*

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Introduction

Celiac artery compression syndrome was first described in 1965 (1). Dunbar introduced the first surgically treated serial (2). Several hypotheses were developed about this syndrome and the first of them suggested that the origin of celiac artery were located abnormally in the proximal, therefore it was compressed by an anatomically normal median arcuate ligament. Another hypothesis suggests that an exceedingly long median arcuate ligament compresses an abnormally located celiac artery. The blood steal hypothesis suggests that large collateral vessels acquire a greater percentage of total blood flow therefore depriving smaller vessels of the flow they require (3). The last hypothesis stems on a neurogenic cause. This may be caused by wide range of variation regarding the location, morphology, and neural interconnections of the plexus (4). Reports in the literature have shown that this plexus, when fibrotic, can restrict blood flow to the celiac artery (5-6). The pathology is more common in young women with low BMI, with a clinical history of chronic postprandial abdominal pain, diarrhea, vomiting, epigastric bruit and weight loss. Diagnosis of this syndrome can be performed by angiogram, computed tomogram scan, MRI and doppler ultrasonography (7). Computed tomography (CT) angiography

allows visualization not only of the compressed celiac artery but also the underlying median arcuate ligament and adherent tissue using 3D imaging.

Case Report

A 36-year old, female patient with a body mass index of 1.63 complained of 6-kg weight loss in a year was presented to General Surgery Clinics of Fırat University Hospital with the complaints of post-prandial abdominal pain, nausea and vomiting. The pain was predominantly localized to the middle-upper quadrant; there was no evidence of a pathology involving organs in the overall workups. Doppler ultrasonography showed a reduction in the blood flow of celiac artery for more than 300 cm/s, especially in expiration. There was also evidence of an increase of the systolic-peak in the superior mesenteric artery (200 cm/s). These datas were consistent with a significant stenosis. In the light of these datas, CT angiography was performed. CT results confirmed the diagnosis of Dunbar's syndrome (Figure 1 a–b). The patient was discussed in a commitee meeting organized with Cardiovascular Surgery and was offered laparoscopic MAL division in the light of these datas.

General anesthesia was administered. A mini incision below umbilicus was made and abdomen was insufflated by veress needle. By the help of camera scope and standard tools, stomach was liberated at the level of right hiatus crus. Stomach was retracted to gain better posterior exposure. Aorta was explored through the crusas of hiatus. It was exposed until celiac trunk. Fibrous attachments over the celiac trunk were opened with blunt and sharp incisions. The operation was performed by a general surgeon and a cardiovascular surgeon. After bleeding control the fascia and skin were closed. No complication occured during the operation.

The patient was ambulated in the 8. postoperative hour and started oral feeding. The patient was discharged on postoperative 3rd day without any complication. Control CT angiography was performed at the 9th day follow up visit. Comparison of preoperative and postoperative CT angiography results revealed a significant calibration increase in the celiac trunk and it's branches (Figure 2 a–b). The patient seemed to be relieved of abdominal pain, nausea and vomiting at the postoperative 1 week clinical follow up.

Figure 1. (a) Significantly narrowed celiac artery orifice and loss of calibration distally at axial CT angiography (white arrow). (b) The compression of median arcuate ligament (arrowheads) to the celiac artery (long arrow) at sagittally reconstructed image. (Ao: Aorta)

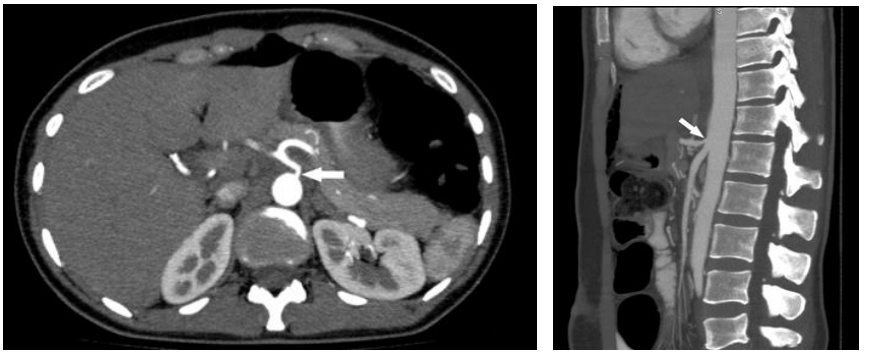

Figure 2. Corrected compression of the celiac artery orifice (white arrows) and elevated calibration distally at postoperative CT angiography. (a) Axially, (b) sagittally reconstructed image.

Discussion

Median arcuate ligament syndrome can be treated with endovascular surgery, open or laparoscopic surgery of median arcuate ligament liberation and vascular surgery (7). In a study, provided vascular reparation by performing bypass between aorta and celiac artery with dacron graft or by patching saphenous vein on celiac artery (7). The most commonly accepted treatment method is open or laparoscopical liberation of median arcuate ligament compressing celiac trunk and dividing surrounding lymphatic and nerve tissue (8). In this case fibers of median arcuate ligament which compressed celiac trunk were laparoscopically cut and liberated.

After the diagnosis of median arcuate ligament syndrome, patients with mild symptoms may be treated with vasodilator agents. Luminal dilatation via percutaneous route is another treatment method. In general, percutane transluminal angioplasty provides short time relief of symptoms however surgery is the actual treatment of this syndrome. When these 3 methods were analyzed, smyptoms were disappeared in 53 % and 79 % of the patients (7-9).

According to datas, post operative recurrence rate was 12.5 % and symptomatic relief has been succeeded in all cases. Reseborough et al. determined the recurrence rate as 27% and symptomatic relief rate as 95% in a case series of 15 patients (11). Similarly, our patient was symptom free on the 9. postoperative day and preoperative complaints of the patient totally disappeared.

Anatomic location of celiac artery is between 11. Thoracic vertebrae and 1. lumbar vertebrae (3). Loukas et al. underlined the variability of *celiac* trunk's origin based on *diaphragmatic crura* morphology (12). General observations show that celiac artery is exposed to greater pressure of median arcuate ligament when it originates above the 11. thoracic vertebrae. More proximal localisation of celiac artery is observed more commonly in females than in males; consequently median arcuate ligament syndrome is more commonly seen in females. In this patient, no anatomic abnormality of celiac artery origin could be detected in CT angiography images.

Six anatomical and morphologic variations of aortic and esophageal hiatus are described. The most common type (Type 1, 45%) comprises an esophageal hiatus formed by muscular contributions arising solely from the right crus. In Type 2 (20%) the esophageal hiatus is formed by muscular contributions from the right and left crura. In Type 3 (15%), the right and left muscular contributions arise from the right crus with an additional band from the left crus. In Type 4 (10%) the right and left muscular contributions arise from the right crus, with two additional (anterior and posterior) bands arising from the left crus. Type 5 (5%) arises solely from the left crus. In Type 6 (5%) the right and left contributions originate from the left crus with two additional bands, one from the right crus and one from the left crus. Our patient has been categorized as Type 1 in a meeting held with radiologists

As a result; MALcompression sydrome should be considered when a young, middleaged, thin women complains of nausia, vomiting and postprandial epigastric pain aggravated by expiration and having the history of weight loss in a short time. Multislice CT angiography should be performed when establishing diagnosis due to the advantages of 3D imaging. After the diagnosis, best results and short postoperative process can be achieved in experienced laparoscopic surgery centers by cutting median arcuate ligament and removing tissue surrounding the celiac artery. We believe that the presense of a cardiovascular surgeon in the operation may be useful for repairing possible vascular injuries.

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