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Case Report

Low Insertion of the Median Arcuate Ligament: Regarding a Case

Sogan Ananivi[1*], James YE[1], Amouzou EG[2], Adjenou V[3], James K[1]

[1]Human Anatomy Laboratory, Faculty of Health Sciences of Lomé, P.O. Box: 1515, Lomé, Togo
[2]General Surgery Department, Teaching Hospital of Kara, Togo
[3]Department of Radiology, Teaching Hospital, Lomé, Togo

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***Corresponding author:** Sogan Ananivi
Human Anatomy Laboratory, Faculty of Health Sciences of Lomé, P.O. Box: 1515, Lomé, Togo

Abstract

The low insertion of the medial arcuate ligament is a rare topographical form which is the cause of an extrinsic compression of the coeliac trunk. In its asymptomatic form, its research is necessary if interventional radiology or above-meso-colonic surgery is required at the risk of compromising the evolution of vascular and/or pancreatico-bilio-digestive therapeutic gestures. The authors report a case of inserted and compressive low medial arcuate ligament of the coeliac trunk.

Keywords: Median arcuate ligament, insertion, low, coeliac trunk, Togo, Africa.

INTRODUCTION

The medial arcuate ligament (MAL) is a fibrous arch uniting the two median pillars of the diaphragm and constitutes the anterior wall of the aortic hiatus (Duran *et al.*, 2017; Watanabe *et al.*, 2012). It is classically located in front of the 12th thoracic vertebra (T12) or the intervertebral disc between T12 and first lumbar vertebra (L1). Its low insertion in certain anatomical variations can lead to the compression of the coeliac trunk (CT) and the coeliac ganglion, the prevalence of which is between 5 and 10% (Dembinski *et al.*, 2021; Al-Hawary *et al.*, 2014). The search for the existence of this anatomical variation is then an integral part of the morphological checkup as a prelude to interventional radiology or surgery of the organs of the above-meso-colonic stage (Dembinski *et al.*, 2021). A case of low insertion of the MAL complicated by the compression of the coeliac trunk has been reported on a patient.

PATIENT AND OBSERVATION

A 61-year-old female patient presenting abdominal pains, flatulence and nauseas was referred from the general and oncology surgery department to the imaging department for exploration. The abdominal computed tomography scan was completed by magnetic resonance imaging and endoscopy-ultrasonography which found a tumor (of 48 millimeters) of the cephalic pancreas associated with a double distension of the main pancreatic duct and the common bile duct.

A biliary prosthesis was put in place waiting for the results of the biopsy performed and the extension checkup. The thoracic-abdomino-pelvic computed tomography scan (TAP CT-S) with injection of contrast product, carried out as part of the extension checkup, enabled the discovery, on the coronal sections, of a distension of the pancreatico-duodenal vascular arches and the "hook-like sign", so many indirect signs of extrinsic compression of the CT (Figure 1).

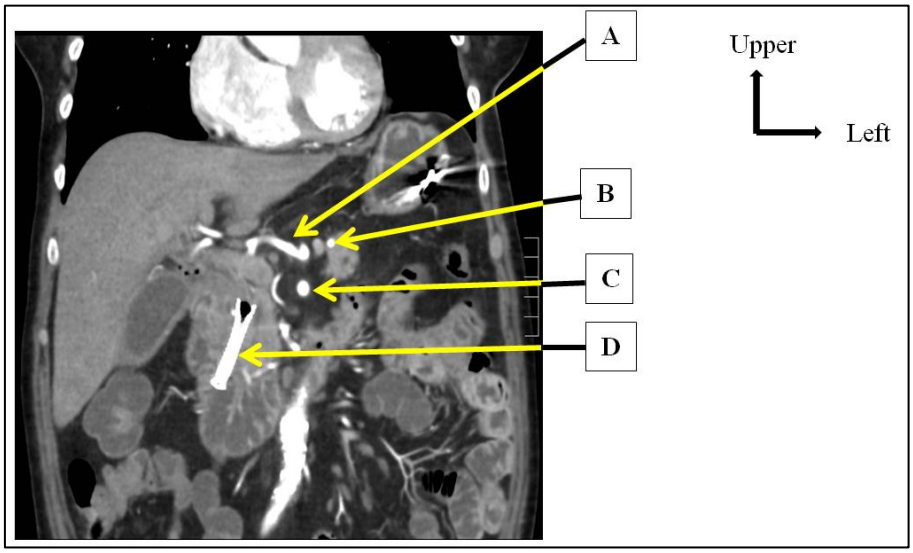

Figure 1: **Thoracic-abdominal-pelvic CT scan: coronal section at the arterial time. A: hook-like sign; B: celiac trunk C: superior mesenteric artery; D: biliary prosthesis**

A low medial arcuate ligament inserted in L1-L2 was objectified on the sagittal slice reflected by a characteristic hypodense notch on the proximal segment of the CT (Figure 2). This diagnosis of low inserted MAL was confirmed during the laparotomy.

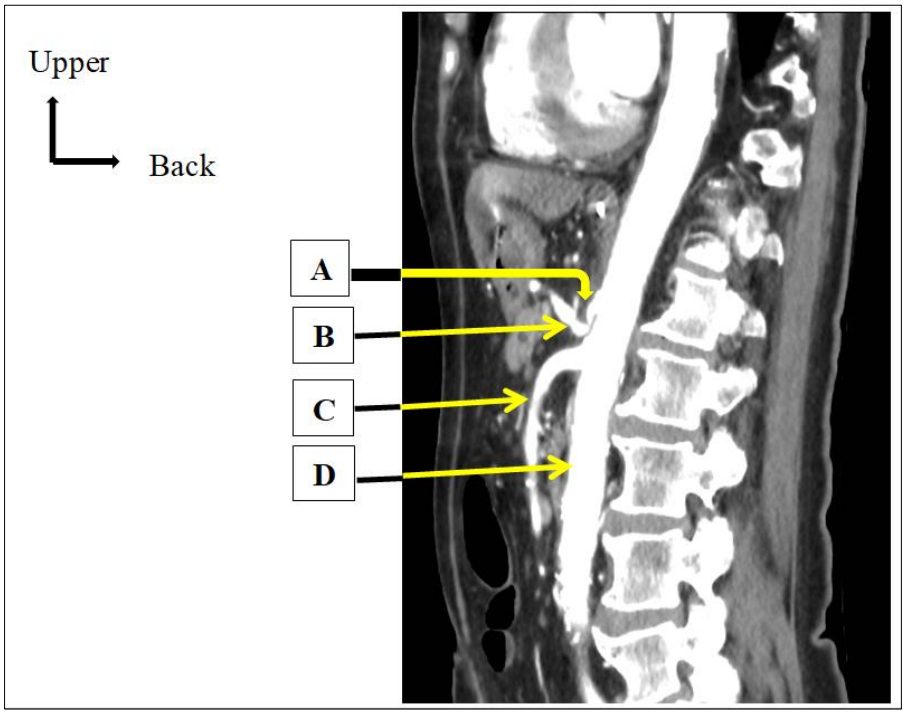

Figure 2: Thoracic-abdominal-pelvic scan: sagittal section at the arterial time. A: image of a compressive median arcuate ligament; B celiac trunk; C: superior mesenteric artery; D: abdominal aorta

Definitive nursing consisted of an excision of the arcuate ligament and cephalic duodeno-pancreatectomy (CDP) with restoration of bilio-digestive continuities. The check scan performed on the third postoperative day found good arterial flow at the level of the CT (Figure 3). The postoperative issues were good.

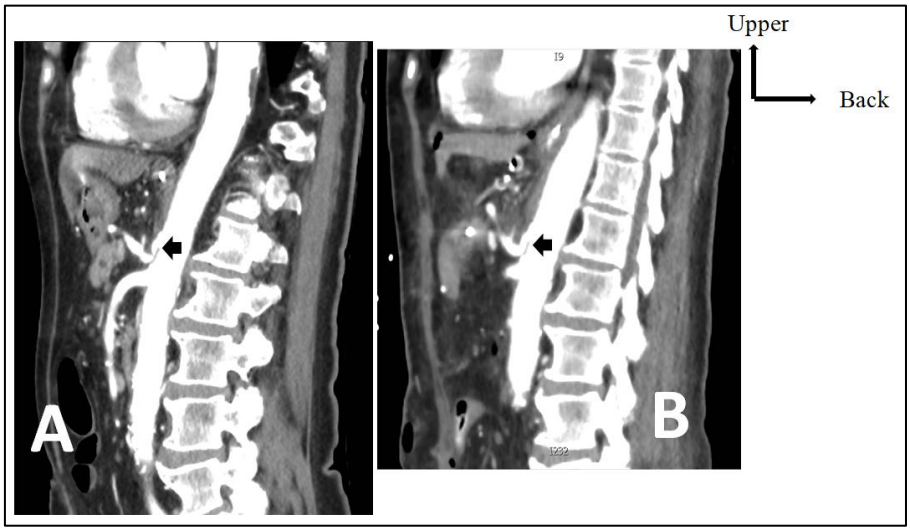

Figure 3: **Thoracic-abdominal-pelvic CT-scan: arterial time on the sagittal section A: pre-operative aspect; B: post-operative aspect; ⬅ ostium of the celiac trunk.**

COMMENTS

Taking part in the formation of the aortic hiatus of the diaphragm, the MAL is located, in modal anatomy, at the level of T12-L1. It passes in front of the aorta and generally above its first abdominal collateral branch, the CT. The topography of the MAL and the origin of the CT are subject to variations that depend on the individuals. A relatively cranial origin of the CT or a caudal insertion of the MAL may be responsible in either case for extrinsic compression of the proximal part of the CT (Goodall *et al.*, 2020).

The first description of this anatomical form had been made by Lipshutz (1917) through his cadaveric series. Lindner and Kemprud (1971) conducted a study on 75 fresh cadavers and noted a significant anatomical variability of the MAL. The variation in the ratio between the MAL and the origin of the CT was mainly due to the low insertion of the MAL rather than the high origin of the CT. In 10 to 24% of cases, the low insertion of the MAL remains asymptomatic (Kurivilla *et al.*, 2017). Its discovery is then made either in front of the distensions of the duodeno-pancreatic arterial arches during operating process (Nakama *et al.*, 2018), or fortuitously on a computed tomography scan performed as part of another checkup. In the clinical case described, the diagnosis was made opportunely on a TAP CT-S with injection of contrast product carried out in search of the extension of a tumor of the head of the pancreas.

Usually, the paraclinical diagnosis of a low inserted MAL can be made by Duplex ultrasound supplemented by abdominal angiography scan (Bjork *et al.*, 2017). When indicated, the nursing of low inserted MAL is surgical and based on the section of the ligament associated or not with a revascularization by stenting, or an aorto-coelic bypass (Dembinski *et al.*, 2021; Gaujoux & Sauvanet, 2008).

During CDP, the realization of a section of the low inserted MAL when it exists is imperative at the risk of compromising the pancreatico-bilio-digestive anastomoses (Dembinski *et al.*, 2021; Nakayama *et al.*, 2018). It is therefore important to identify, preoperatively by a quality vascular imaging, the existence of a low MAL inserted before any above-meso-colonic surgery. The low inserted MAL is in fact the main cause of extrinsic compression of the CT (Dembinski *et al.*, 2021).

CONCLUSION

The low location of the MAL is a rare anatomical form whose main risk is the compression of the CT. Its search should be systematic via a quality vascular checkup before any anastomotic surgery of above-meso-colonic level, in order to prevent possible morbid and/or lethal post-operative pitfalls.

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