

## Agensis of Celiac Axis – A Rare Clinical Entity

Rajul Rastogi<sup>1\*</sup>, GL Meena<sup>2</sup>, Yuktika Gupta<sup>1</sup>, Asif Majid Wani<sup>1</sup> and Pawan Joon<sup>1</sup>

<sup>1</sup>Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India

<sup>2</sup>Department of Radiodiagnosis, Sardar Patel Medical College & PBM Hospital, Bikaner, Rajasthan, India

\*Corresponding author: Rajul Rastogi, Assistant Professor, Department of Radiodiagnosis, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India, E-mail: eesharastogi@gmail.com

Received date: Jan 26, 2016; Accepted date: Feb10, 2016; Published date: Feb 15, 2016

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### Abstract

Agensis of celiac axis (AGCA) is one of the rare anomalies of abdominal aorta. Very few cases have been reported in the medical literature in the past mainly on angiographic studies performed for various indications. With the advent of multidetector computed tomography (MDCT), it is now possible to detect anomalies of abdominal aorta on routine abdominal MDCT scans performed for indications other than angiography. Detection of these anomalies has assumed significant importance due to increasing number of interventional procedures; minimally-invasive and transplantation surgeries and also in understanding the morbidity and mortality related to diseases involving the anomalous arteries. Hence, we are presenting a rare case of agenetic celiac axis that was diagnosed incidentally on routine MDCT abdominal examination.

**Keywords:** Agensis; Celiac axis; MDCT

### Introduction

AGCA is a rare anomaly of abdominal aorta with an estimated incidence of 0.1 to 2.5% according to one morphometric study of celiac trunk performed on adult human Caucasian cadavers [1]. According to one study, only 31 cases have been reported in the world medical literature, out of which only one-third cases have been reported on imaging studies mainly on angiography with rest of them reported on anatomical dissection [2,3]. With the advent of variety of interventional, transplantation and minimally-invasive surgical procedures, knowledge of these anatomical variations have become very significant to avoid inadvertent complications. Advent of MDCT has made detection of these abdominal aortic anomalies possible on routine as well as angiographic scans. Prior knowledge of these variations also aid in early institution of therapy / interventional procedure (vascular grafts) in suspected occlusion of these anomalous arteries.

### Case Report

A 26-years old female with history of vague abdominal pain came for contrast-enhanced MDCT scan of whole abdomen as previous hematological, biochemical, radiographic and ultrasonographic investigations were unremarkable.

The abdominal scan revealed horse-shoe kidney without obvious calculus or hydronephrosis. No evidence of any other obvious visceral pathology was noted to explain the cause of vague abdominal pain. However, careful examination of abdominal aorta revealed absence of celiac axis as an incidental finding. Common hepatic, splenic and left gastric arteries had anomalous origin from a vascular trunk that was arising from the proximal part of superior mesenteric artery. These findings established the diagnosis of agenetic celiac axis.

### Discussion

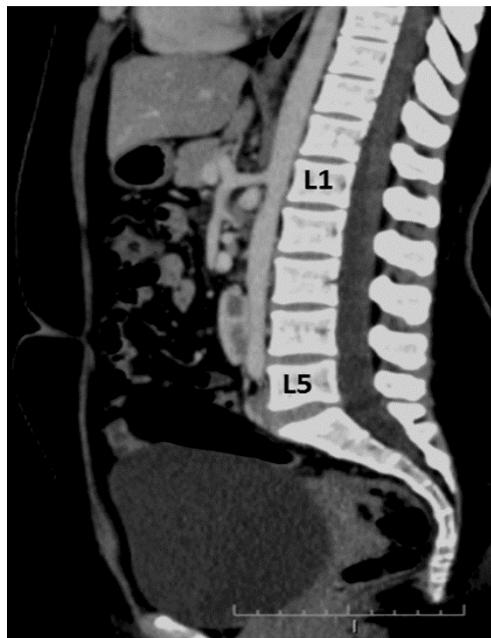
Celiac axis or trunk is the first branch of abdominal aorta arising from the ventral aspect at the level of D12 vertebral body. The classical trifurcation of celiac artery in to common hepatic, splenic and left gastric arteries is known as Tripus Halleri. Superior mesenteric artery is the second ventral branch arising at the level of L1 vertebral body.

Several variations of celiac artery are known to occur including:

- Absence of one of its branches (bifurcation or incomplete celiac trunk);
- Additional branches;
- Common origin with superior mesenteric artery (celiacomesenteric trunk);
- Common origin with superior and inferior mesenteric arteries (celiac-bimesenteric trunk) and
- Total absence or agensis [1,2].

Agensis of celiac artery (AGCA) is a rare entity [1,2]. Very few cases have been described in medical literature in the past that were detected on imaging studies primarily on angiography [3-6]. With the advent of multidetector CT, incidental detection of these congenital anomalies along with other abnormalities is now possible even on routine abdominal examinations.

AGCA is diagnosed by lack of a major vascular trunk arising from abdominal aorta at the level of D12 vertebral body. It is also associated with other vascular anomalies, for example common hepatic, splenic and left gastric arteries may arise separately from aorta [7,8] or from a vascular trunk arising from superior mesenteric artery at the level of L1 vertebral body as seen in our case as well as in few cases described previously in medical literature [5]. In addition, horse-shoe kidney was also noted in our case that has not been described previously in medical literature as association with AGCA (Figure 1).



**Figure 1:** Sagittal CECT MPR images shows absence of celiac axis at D12 vertebral body level with common hepatic artery arising from superior mesenteric artery at L1 vertebral level.

With the advent of various interventional procedures (for example: arterial embolisation, transarterial chemoembolisation, arterial grafts); minimally-invasive surgical procedures (for example: laparoscopic & robotic procedures) and organ transplantation, knowledge of these anatomic variations have become exceedingly important to avoid various complications. Also prior knowledge of these variations may aid in early institution of treatment when occlusions of these anomalous arteries is suspected as a cause of ischemia to abdominal viscera.

The above-described variations can be detected noninvasively by contrast-enhanced MDCT abdominal angiography as well as routine contrast-enhanced MDCT abdominal scans performed for other indications as in our case (Figure 2).



**Figure 2:** Oblique SSD image shows absence of celiac axis at D12 vertebral body level with common hepatic artery arising from superior mesenteric artery at L1 vertebral level and part of horse-shoe kidney (black arrow).

## Conclusion

Variations in branching pattern of abdominal aorta can be easily detected on routine contrast-enhanced MDCT abdominal scans. Knowledge of these variations especially the rare anomaly of celiac axis agenesis with associated findings not only help in determining the extent of abnormality with superior mesenteric artery disease but this knowledge may also be helpful while performing various transplantation, laparoscopic, interventional and arterial graft procedures.

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