

Anatomical Variation of the Coeliac Trunk: A Case Report

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ABSTRACT

The coeliac trunk is an artery of the foregut. It is about 1.5 cm long, present below the aortic hiatus and originates from ventral aspect of abdominal aorta. It runs horizontally forwards and slightly right above the pancreas and splenic vein. It further trifurcates into left gastric artery, common hepatic artery and splenic artery. During dissection various authors have reported the anatomical variation of coeliac trunk and its branching pattern. The most common classical type of branching pattern of coeliac trunk is the trifurcation but, in this case, it has been noticed that, there is early origin of left gastric artery. This condition usually being asymptomatic becomes importance during certain operative procedures and while performing major surgeries, knowledge of such variation plays a very significant role.

KEYWORDS: *Coeliac Trunk, Splenic artery, common hepatic artery, left gastric artery*

INTRODUCTION

The coeliac artery, also known as the coeliac trunk or coeliac axis is the first ventral branch of abdominal aorta. It arises from the front of the abdominal aorta just below the aortic opening of the diaphragm, opposite the lower border of the T₁₂ vertebra. The origin the coeliac trunk lies behind the omentabursa, is surrounded by the coeliac plexus of nerves and sandwiched between the tuber omental of the pancreas from below and the papillary process of the liver from above. The trunk of the artery proceeds forwards and somewhat to the right, and divides into three branches mainly Left gastric, common hepatic and splenic arteries.^[1]

“Tripushallerit”, first described by Haller in 1756 as the trifurcation of coeliac trunk, the most classical type of its branching. It is considered as normal branching of coeliac trunk. About 15% of the population displays significant variation in the typical branching pattern of the coeliac Trunk. Due to the relationship, it shares with the surrounding structures, identifying variations of Coeliac Trunk and its

branches are important. The knowledge of variations in origin and course of branching pattern of coeliac trunk plays a significant role in diagnostic purpose as these variations can be the source of pathological conditions.

Coeliac trunk is classified based on branching pattern by various author. In 1917 for the first-time variation of coeliac trunk were classified into 4 types by Lipshutz based on origin and distribution of gastric, splenic and hepatic arteries. In 1928 Adachi classified anatomical variation of the coeliac trunk into six types.

Type	Coeliac trunk branching pattern
1	Normal trifurcation
2	Hepatosplenic trunk
3	Hepatogastric trunk
4	Gastrosplenic trunk

Table 1: Classification of coeliac trunk by Lipshutz^[2]

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Type	Coeliac trunk branching pattern
1	Normal trifurcation
2	Hepatosplenic trunk
3	Hepatogastric trunk
4	Splenogastric trunk
5	Hepatosplenomesentric Trunk
6	Coeliacomesentric Trunk

Table 2: Classification of coeliac trunk by Adachi [3]

MATERIALS AND METHODS

During a routine practical class for the under graduate students on formalin fixed cadaver, we noticed a variation in the coeliac trunk, in the Department of Rachana Sharira (Anatomy), Sri Dharmasthala college of Ayurveda, Hassan.

Following the Cunningham’s Manual of Dissection, the abdomen was opened and the anterior abdominal

wall was reflected. The Stomach, Right Gastric and the Right Gastroepiploic Vessels were cut through and the Peritoneum was removed to reveal the Coeliac Trunk [4]. Photograph of the same was taken.

CASE REPORT

In the present case, a usual trifurcation of coeliac trunk was appreciated just below aortic hiatus at the level of T12 vertebra, but an early branching of left gastric artery was seen. The coeliac trunk after taking origin from abdominal aorta, gives its first branch, that is left gastric artery which was 0.8 centimeter away from the abdominal aorta. It is a smallest branch of the coeliac, but provides largest contribution to the stomach. It passes upwards and to the left towards the cardiac end of stomach.

The common hepatic artery and splenic artery are the other two branches of coeliac trunk which are bifurcated 1.2 cm away from the left gastric artery and 2 cm away from the abdominal aorta.

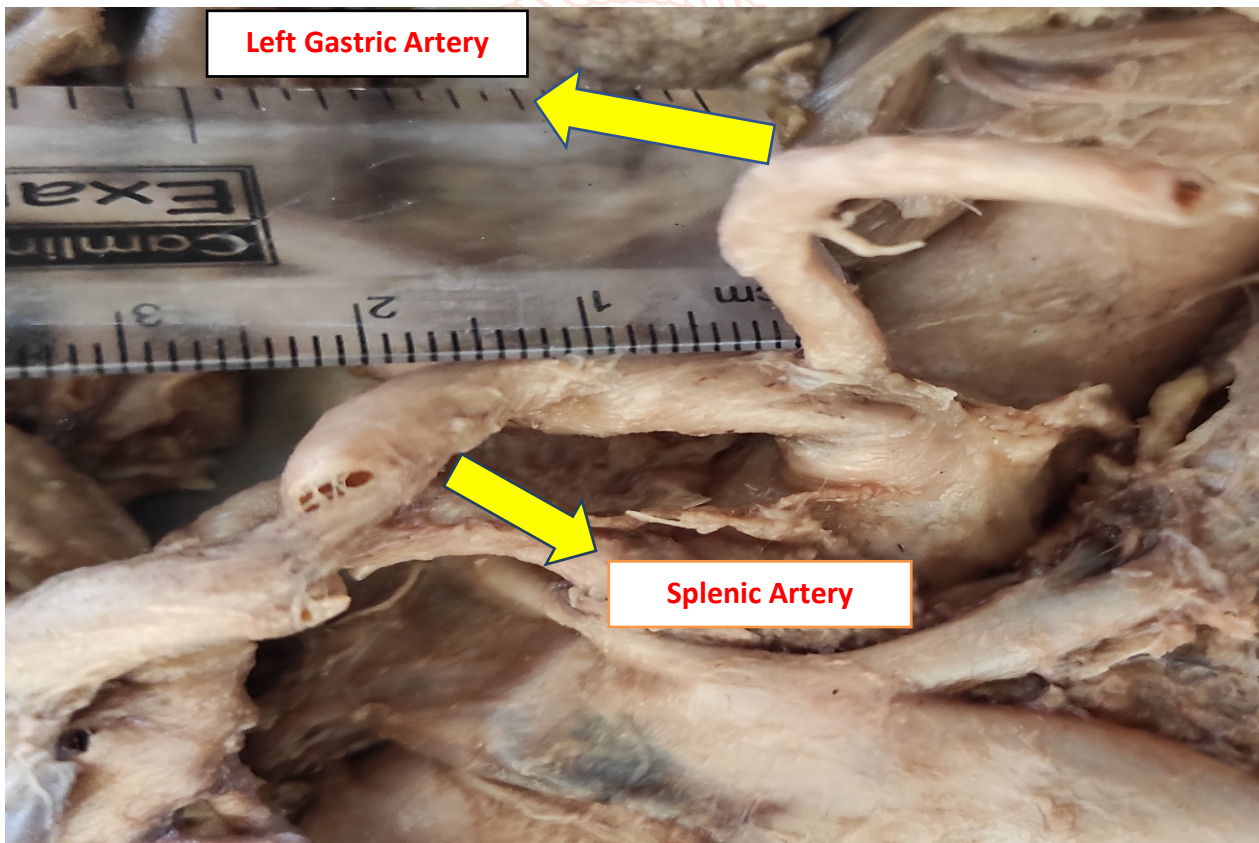


Figure 1: Showing distance between common hepatic artery and splenic artery from the Left gastric artery

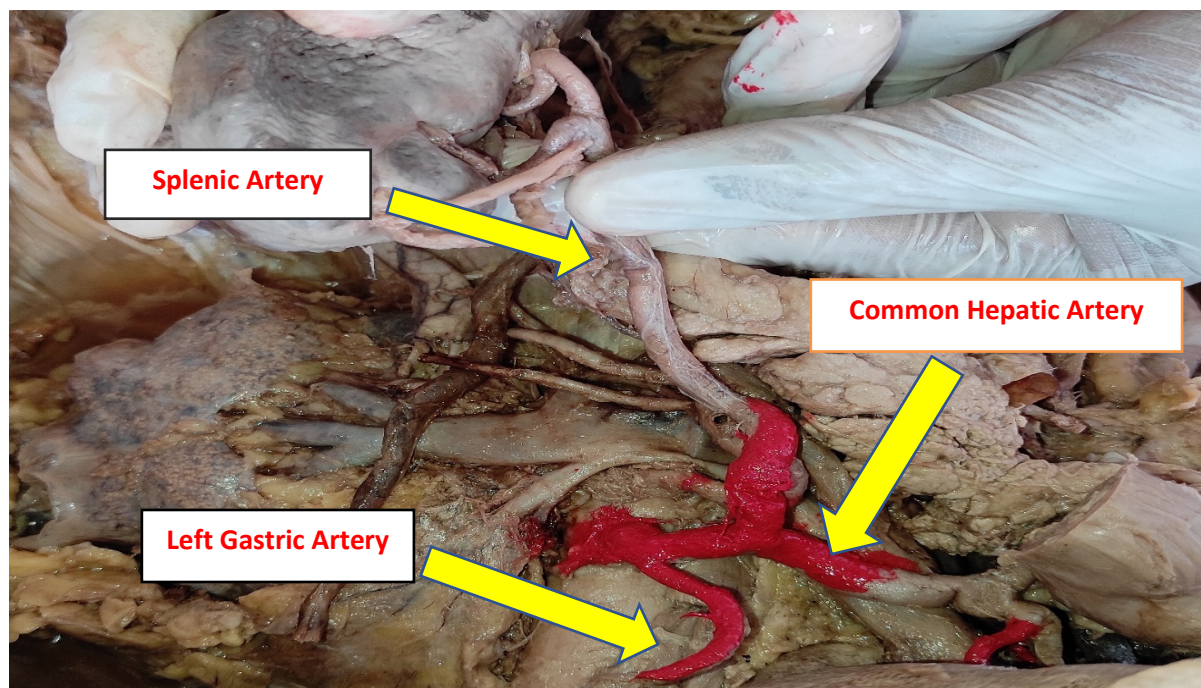


Figure 2: Showing variation of the Coeliac Trunk

DISCUSSION

The variation in the branching pattern of coeliac trunk is most frequently reported. Many authors have reported different variations. These variations, usually asymptomatic and become significant during operative procedures. Many investigators have shown that branching pattern of coeliac trunk is not symmetrical for every individual. Study as shown that 15% of population displays significant variation from the common type of branching pattern that is trifurcation.

Lipshutz (1917) observed four different types of branching pattern in 83 cadavers, normal trifurcation, hepatosplenic trunk, hepatogastric trunk, gastrosplenic trunk. Adachi (1928) observed six different types of variation in 252 cadavers including coeliamesentric trunk and hepatomesentric trunk. Michel (1951) observed 6 different types. Five of the six types of coeliac trunk reported by Adachi and Michel were same, the only exception was that Adachi observed hepatomesentric trunk as one of the variations whereas Michel observed hepatogastric type of coeliac trunk. Many Indian authors have also observed different types of variation like Wadwa and Sonia 2011 observed two types of variation in thirty cadaver, normal trifurcation and hepatosplenic trunk^[5] and Prasanna et al observed hepatosplenic kind of variation during cadaveric dissection^[6]

There are certain disorders that are specifically related to the Coeliac Trunk, such as- 'Coeliac Trunk Compression Syndrome' which is a rare condition characterized by compression of the Coeliac Trunk by the Median Arcuate Ligament and Coeliac Ganglion, and the symptoms include chronic, recurrent

abdominal pain and weight loss and obstruction of the Hepatic Artery proper may lead to necrosis of the liver depending on the site of the block.^[6]

In the present cadaveric dissection, the classical trifurcation of coeliac trunk was not observed, left gastric artery arose about 1.2cm earlier to the origin of hepatic and splenic artery.

Embryology

The anatomical variations in coeliac trunk related to its diameter, length or location are thought to have an embryological basis. Each dorsal aorta gives branches of coeliac trunk is displaced to the superior mesenteric artery. If the 10th or 13th root disappears, a coeliaco-mesenteric trunk is formed. The paired ventral splanchnic branches which supply yolk sac, the primitive gut and its derivatives. With the fusion of the dorsal aortae during 4th week of intrauterine life (IUL), the ventral branches fuse and form a series of several unpaired segmental vessels, which run in the dorsal mesentery of gut and are connected by ventral longitudinal anastomosing channel. With the formation of longitudinal anastomotic channel, numerous ventral splanchnic branches are withdrawn and ultimately only three trunks persist as coeliac artery for foregut, superior mesenteric artery to midgut, and inferior mesenteric artery to hindgut.^[5]

According to Tandler (1904) the 11th and 12th ventral segmental roots disappear, the 10th and 13th roots remain connected via the ventral anastomoses. The common hepatic, left gastric and splenic arteries usually originate from the longitudinal anastomosis. These branches are usually separated from the 13th root (the future superior mesenteric artery). If this separation takes place at the higher level, one of the

branches of coeliac trunk is displaced to the superior mesenteric artery. If the 10th or 13th root disappears, a coeliaco-mesenteric trunk is formed.^[5]

CONCLUSION

A comprehensive knowledge of the Coeliac Trunk and its variations will prove beneficial in planning various abdominal surgeries and image guided interventions. In recent times, trends in surgical procedures are to move minimal invasive surgery, therefore we would like to emphasize the importance of thorough knowledge of normal anatomy of coeliac trunk and its variation in clinical medicine. It will avoid the iatrogenic injuries and plays significant role in surgical management in the abdomen region.

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