

VARIATION OF THE BRANCHING PATTERN OF THE COELIAC TRUNK- A CASE REPORT

Vishal M. Salve¹, Rashmi Narayan Rao Gitte²

¹Professor and HOD, Department of Anatomy, Navodaya Medical College, Raichur.

²Associate Professor, Department of Physiology, Navodaya Medical College, Raichur.

ABSTRACT

BACKGROUND

The hepatic, splenic and left gastric arteries are the main branches of the coeliac trunk. We reported two cases of coeliac trunk. Left inferior phrenic artery arose directly from coeliac trunk and accessory hepatic artery arose from common hepatic artery. In our opinion, arterial variations should not be ignored during abdominal operative procedures. Complications in abdominal surgeries could be avoided with the accurate knowledge of the anatomical variations of coeliac trunk.

KEYWORDS

Coeliac Trunk; Accessory Hepatic Artery; Left Phrenic Artery.

HOW TO CITE THIS ARTICLE: Salve VM, Gitte RNR. Variation of the branching pattern of the coeliac trunk- a case report. Journal of Research in Human Anatomy and Embryology 2017; Vol. 3, Issue 1, Jan-June 2017; Page: 5-6.

BACKGROUND

The hepatic, splenic and left gastric arteries are the main branches of the coeliac trunk. During the normal development, both dorsal aortas give rise to many ventral segmental (omphalomesenteric) arteries. Both dorsal aortas fuse together in about four weeks. The ventral segmental arteries regress shortly after fusion of dorsal aortas. The dorsal aorta gives off segmental branches to the digestive tube (ventral splanchnic arteries), to the mesonephric ridge (lateral splanchnic arteries) and intersegmental branches to the body wall (somatic arteries).^[1] Anatomic variations involving the visceral arteries are common.^[1,2] Also variations of branches of the coeliac trunk were reported by many authors.^[3]

The inferior phrenic arteries are two small arteries, which help to supply the diaphragm. These arteries usually arise from the aorta just above the coeliac trunk. They may arise by a common aortic stem or from the coeliac trunk.^[4]

The vascular anomalies are usually asymptomatic. But knowledge of these vascular anomalies is important in handling patients undergoing diagnostic angiography for gastrointestinal bleeding, coeliac axis compression syndrome, or prior to an operative procedure or transcatheter therapy.^[5]

CASE REPORT

During the dissection of the posterior abdominal wall of a middle-aged male cadaver for MBBS batch 2015/16 at Navodaya Medical College, Raichur (India), following variations of the coeliac trunk was found.

The coeliac trunk arose from the ventral surface of the abdominal aorta at the level of the intervertebral disc between T12 and L1 vertebrae. The coeliac trunk gives off four branches (Figure 1 and 2). Beside three regular branches splenic, common hepatic and left gastric, additional branch left inferior phrenic artery arose directly from coeliac trunk.

The common hepatic gives off hepatic artery as well as accessory hepatic artery. Length of coeliac trunk from its origin to the point where it gives off main branches was 7 mm. The diameter of left inferior phrenic artery was 3 mm and diameter of splenic artery was 9 mm. The diameter of left gastric artery was 2 mm and diameter of common hepatic artery was 9 mm. The diameter of accessory hepatic artery for left lobe of liver was 3 mm.

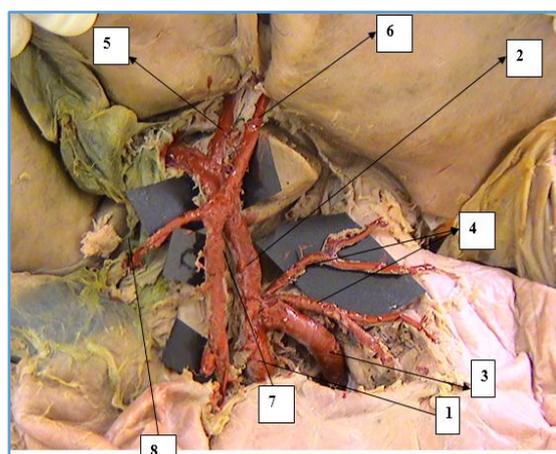


Figure 1. Dissection of Abdomen showing the Anomalous Branching Pattern of Coeliac Trunk. (1. Coeliac Trunk, 2. Common Hepatic Artery, 3. Splenic Artery, 4. Left Gastric Arteries, 5. Hepatic Artery, 6. Accessory Hepatic Artery and 7. Gastroduodenal Artery)

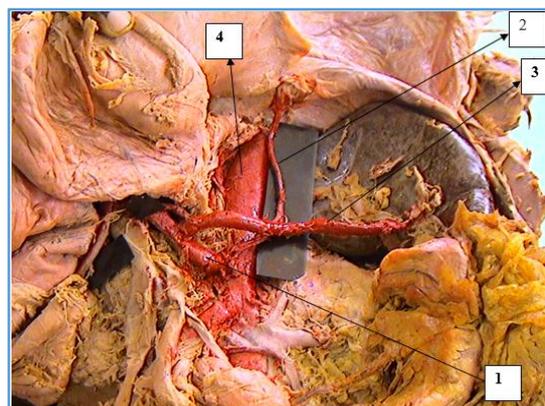


Figure 2. Dissection of Abdomen showing the Anomalous Branching Pattern of Coeliac Trunk. (1. Coeliac Trunk, 2. Left Inferior Phrenic Artery, 3. Splenic Artery and 4. Abdominal Aorta)

Financial or Other, Competing Interest: None.

Submission 05-08-2016, Peer Review 19-03-2017,

Acceptance 27-03-2017, Published 27-05-2017.

Corresponding Author:

Dr. Vishal M. Salve,

Department of Anatomy,

Navodaya Medical College,

Navodayanagar, Raichur-584103,

Karnataka.

E-mail: vishalsalve2000@gmail.com



DISCUSSION

The coeliac trunk is the superior most ventral branch of abdominal aorta. It is the chief artery of the foregut. It supplies all derivatives of the foregut that lie in the abdominal cavity. It arises from the ventral portion of the abdominal aorta opposite the thoracolumbar junction as a single trunk. It is about 1.25 cm in length and 6 - 8 mm in diameter. It gives three main branches as left gastric, hepatic and splenic arteries.^[1-6] An extremely long coeliac trunk was found in the study of Yuksel et al in 1998. They also found an inferior phrenic artery arising from coeliac trunk and an aberrant right hepatic artery derived from the superior mesenteric artery.^[7]

Pulkanta T had observed the origin of inferior phrenic arteries in 4 (12.5%) out of 32 cases.^[8] Piano et al stated that the right and left inferior phrenic arteries occasionally originated as a common trunk from the aorta, coeliacomesenteric system or adrenorenal system. He observed that inferior phrenic arteries were usually paired (left and right) and their origins were summarised as follows; a) The aorta itself (61.6%), b) Vento-visceral arteries (coeliacomesenteric system of aorta) including the coeliac trunk (28.2%) and left gastric artery (2.9%), c) The latero-visceral arteries (adreno-renal system of the aorta) including the middle adrenal artery (2.9%) and renal artery (4.3%).^[9] Cavder et al reported a case, in which the left inferior phrenic artery and the left gastric artery arose from the long coeliac trunk (4.3 cm) via a common trunk.^[10]

405 patients were studied angiographically by Kuo-Hsein Chiang et al (2005) for evaluation of hepatic artery variations. Single accessory hepatic artery was found in 28.1% (114) of cases. More than two hepatic arteries were found in 2.0% cases. Seventeen patterns were identified in this study. Some of the important patterns were accessory hepatic artery direct branch from coeliac trunk, branch from common hepatic, left gastric, etc.^[11] Peterella S et al studied 89 (72 males and 17 females) cadavers from five centres in Brazil. In 31 (26 males and 05 females) cadavers, the inferior phrenic arteries had their origin in the coeliac trunk. The inferior phrenic artery origin in the left contour of the coeliac trunk was observed in 19 (21.35%) of the 89 cases. The inferior phrenic artery origin in the right contour of the coeliac trunk was observed in 05 of the 89 cases.^[12]

The anatomical variations of the coeliac trunk are due to developmental changes in the ventral segmental (splanchnic) arteries. These ventral segmental arteries supply the yolk sac, allantois and chorion. Three ventral segmental arteries remain as coeliac trunk, superior mesenteric artery and inferior mesenteric artery. During embryological period, there are longitudinal anastomoses between roots of upper four ventral segmental arteries of abdominal region. The two central roots disappear and the longitudinal anastomosis joins first and fourth root. The hepatic, splenic and the left gastric arteries originate at this longitudinal anastomosis. These branches usually become separated from the fourth root (the future superior mesenteric artery) below their last end. If this separation takes place at the higher level, one of the branches is displaced to the superior mesenteric artery. If the first or fourth root disappears, a coeliacomesenteric trunk will be formed.^[13,14] Some of the other important factors that cause variability of coeliac trunk includes rotation of the mid-gut and its physiological herniation during development, left side migration of spleen and haemodynamic changes in abdominal

viscera.^[15,16] In our cases, the variations of the coeliac trunks are due to developmental changes in the longitudinal anastomosis between above-mentioned ventral segmental arteries.

In our opinion, any arterial variations should not be ignored during abdominal surgeries. Complications in abdominal surgeries could be avoided with the accurate knowledge of the anatomical variations of coeliac trunk.

REFERENCES

- [1] Sadler TW. Longman's medical embryology. 10th edn. Baltimore: Williams & Wilkins 2008: P. 183.
- [2] Naidich JB, Naidich TP, Sprayregen S. The origin of the left gastric artery. *Radiology* 1978;126(3):623-6.
- [3] Vandamme JP, Bonte J. The branches of a celiac trunk. *Acta Anat* 1985;122(2):110-4.
- [4] Williams PL. Gray's anatomy. The anatomical basis of medicine & surgery. 38th edn. Edinburgh: Churchill Livingstone 1995:1548-58.
- [5] Yalcin B, Kocabiyik N, Yazar F, et al. Variations of the branches of the celiac trunk. *Gulhane Tip Dergisi* 2004;46(2):163-5.
- [6] Guadagni S, Gola P, Marsili L. Arterial vasculature of the stomach oncologic gastrectomies. *Surg Radiol Anat* 1995;17(3):269-76.
- [7] Yuksel M, Yalin A, Weinfeld AB. Concurrent anomalies of the abdominal arteries: an extremely long coeliac trunk, an inferior phrenic trunk and an aberrant right hepatic artery. *Kaibogaku Zassh* 1998;73(5):497-503.
- [8] Pulkanta T, Potu BK, Gorantala VR. The origin of the inferior phrenic artery: a studying 32 south Indian cadavers with review of literature. *J Vasc Bras* 2007;6(3):225-30.
- [9] Piano DX, Ohtsuka A, Murakami T. Typology of abdominal arteries, with special references to inferior phrenic arteries and their esophageal branches. *Acta Med Okayama* 1988;52(4):189-96.
- [10] Cavder S, Gurbuz J, Zeybek A, et al. A variation of celiac trunk. *Acta Anat Nippon* 1998;73:505-8.
- [11] Chiang K, Chang P, Lee P, et al. Angiographic evaluation of hepatic artery variations in 405 cases. *Chin J Radiol* 2005;30:75-81.
- [12] Peterella S, Rodriguez CFS, Sgrott EA, et al. Origin of inferior phrenic arteries in the coeliac trunk. *Int J Morphol* 2006;24(3):275-8.
- [13] Cavder S, Sehirii U, Pekin B. Celiacomesenteric trunk. *Clin Anat* 1997;10(4):231-4.
- [14] Moore KL, Persaud TVN. The developing human. Clinically oriented embryology. 7th edn. Philadelphia: Saunders 2003: P. 335.
- [15] Tiwari S, Jeyanthi K. Study of coeliac trunk - length and its branching pattern. *IOSR Journal of Dental and Medical Sciences* 2013;8(6):60-5.
- [16] Mburu KS, Alexander OJ, Hassan S. Variation in the branching pattern of the coeliac trunk in Kenyan population. *Int J Morphol* 2010;28(1):199-204.