
CASE REPORT**An Anomalous Branching of Coeliac Trunk***Jadhav Surekha D¹*, Zambare Balbhim R¹, Gosavi Shilpa N¹**¹Department of Anatomy, Padamashree Dr. Vithalrao Vikhe Patil Foundation Medical College, Ahmednagar- 414001, (Maharashtra), India***Abstract:**

Anatomical variations of the coeliac trunk are very common. A variation of coeliac trunk occurs due to the developmental abnormalities in the ventral splanchnic arteries. Present paper highlights a rare variation of branching pattern of coeliac trunk which was observed during routine dissection. In a 63 year old male cadaver, we observed a bifurcation of coeliac trunk into short hepato-splenic and longer hepato-gastric trunks. The hepato-splenic trunk divided into common hepatic artery and splenic artery. Cystic artery originated from proper hepatic artery and then proper hepatic artery divided into right and left hepatic arteries. Hepato-gastric trunk ran laterally and upward, and then it divided into two branches: a left gastric artery and left accessory hepatic artery. Knowledge of this rare variation is clinically very important for surgeons, especially while performing liver transplantation, gastric, gallbladder surgeries and transarterial chemoembolization for hepatic tumor and during invasive procedures like angiography and also other radiological studies.

Key words: Coeliac trunk, hepato-splenic, hepato-gastric, proper hepatic artery, cystic artery.

Introduction:

The coeliac trunk (CT) is the short ventral branch of the abdominal aorta which arises at the level of T12- L1 vertebra. It gives 3 “main

classic branches” and they are the common hepatic, splenic and left gastric arteries [1]. Chitra quoted in her paper that, this most common classical trifurcation of CT was first observed by Haller as “Tripos Halleri” and considered to be the normal appearance of it [2]. Anomalous branching pattern of coeliac trunk have been reported by many researchers [2, 3, 4, 5]. The normal pattern of trifurcation of coeliac trunk was observed in 87.6%, bifurcation and incomplete division in 12.2% and very rarely absence of it in 0.2% of cases [7, 8].

Each dorsal aorta gives ventral splanchnic arteries which supply the gut and its derivatives. Initially, these ventral branches are paired but with the fusion of the dorsal aorta, they also fuse to form a series of unpaired segmental vessels which run in the dorsal mesentery of gut. They gradually fuse to form the arteries of foregut, midgut and hindgut. The persistence or unusual development of ventral splanchnic arteries may result in variations of coeliac trunk [9]. Variations in the branching pattern of coeliac trunk and different branches arising from it may predispose to iatrogenic injury during various surgeries and or procedures of upper abdomen and percutaneous interventions [4, 10, 11].

A precise knowledge of anomalous branching pattern of coeliac trunk is important for surgeons, and radiologist due to development of

new techniques for vascular investigation, surgery on the stomach, pancreas, but most importantly during liver transplantation. The aim of the present short report is to describe anomalous branching pattern of coeliac trunk.

Case Report:

During routine dissection for under graduate students, we observed the bifurcation of the coeliac trunk which was arising from abdominal aorta in a 63 year old male cadaver. The coeliac trunk was divided into short hepato-splenic and long hepato-gastric trunks. The hepato-splenic trunk initially ran towards right and immediately divided into common hepatic artery and splenic artery (Fig.1). The splenic artery ran downward and towards left side, retroperitoneally along superior border of pancreas to enter the spleen. The common hepatic artery was running to the right and continued upwards within right free margin of lesser omentum as proper hepatic artery after giving the gastroduodenal artery. Before dividing into right and left hepatic arteries, the proper hepatic artery gave a cystic artery. Right gastric artery was given by common hepatic artery. Hepato-gastric trunk (Fig.1) ran upward and toward the left, and then it divided into two branches: an accessory left hepatic artery and left gastric artery. An accessory left hepatic artery before entering into the liver, gave a branch which divided into two branches: one was running toward the esophageal end of stomach and another was running along the upper part of lesser curvature.

Discussion:

Coeliac trunk supplies all derivatives of foregut. Its branches show several anomalous pattern

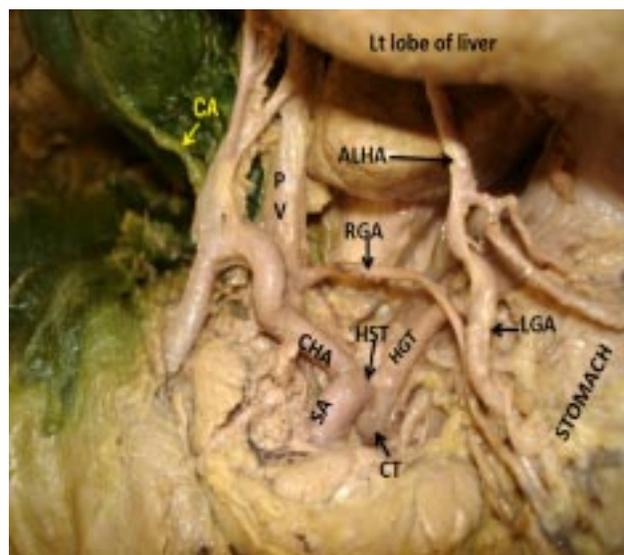


Fig.1: Dissection of Abdomen Showing the Anomalous Pattern of Bifurcation of Coeliac Trunk into Hepato-Splenic and Hepato-Gastric Trunks

Legends: CA- Cystic artery, PV- Portal vein, ALHA- Accessory left hepatic artery, RGA- Right gastric artery, CHA- Common hepatic artery, SA- Splenic artery, HGT- Hepato-gastric trunk, HST- Hepato-splenic trunk, CT-Coeliac trunk, LGA- Left gastric artery

which include, absence of trunk [10], bifurcation of the trunk [7], presence of anomalous and collateral branches [5, 8, 12]. Knowledge of anomalous vascular anatomy of coeliac trunk is very important in liver transplants, radiological abdominal interventions, laparoscopic surgery and penetrating injuries to the abdomen [13]. Yamaki et al. (1995) [14] have reported absence of coeliac trunk and all branches of coeliac trunk arising from abdominal aorta. In 1953, Michels has classified the variations of coeliac trunk into six different types: type 1- normal branching; type 2- hepato-splenic trunk and left gastric artery from aorta; type 3- hepato-spleno-mesenteric trunk and left gastric

artery from aorta; type 4- hepatogastric trunk and splenic artery from superior mesenteric artery; type 5- splenogastric type (splenic and left gastric from the coeliac trunk and common hepatic artery from superior mesenteric artery) and type 6- coeliacomesenteric trunk (splenic, left gastric, common hepatic and superior mesenteric arteries arise from a common trunk) [15]. However, he has not reported bifurcation of coeliac trunk into hepato- gastric trunk and hepato-splenic trunk. Chitra (2010) [2] has studied variations of the coeliac trunk in fifty Indian cadavers and reported bifurcation in 3 cases. She has reported hepato-splenic trunk from coeliac trunk and left gastric artery from aorta but she has not observed hepato-gastric trunk.

Devi Sankar et al. (2011) [16] has reported bifurcation of coeliac trunk which divided into hepato-gastric and hepato-splenic trunks. Hepato-gastric trunk has been seen to be divided into accessory left hepatic artery and left gastric artery. We have also reported similar type of bifurcation of coeliac trunk with rather additional complicated branching pattern. In our case report, the hepato-gastric trunk has been seen to be divided into a left gastric artery and accessory left hepatic artery, but before entering into the liver accessory left hepatic artery gave a branch which divided into two branches supplying the upper part of lesser curvature of stomach (Fig.1). We have also observed that cystic artery is arising from proper hepatic artery before dividing into right and left hepatic branches. Identification of anomalous arterial pattern with precision at the time of liver, gall bladder, stomach surgery, interventional angiography is essential to avoid injury.

Hiatt et al. (1994) [10] have reported that, an accessory left hepatic artery has been seen to be arising from left gastric artery which has arisen from abdominal aorta but in the present case both have had a common origin with long stem from coeliac trunk. Vascular variations are found during the clinical diagnostic evaluations or during cadaveric dissection as an accidental finding. Anomalous branching of coeliac trunk which has been reported by us is rare and it will provide additional knowledge to gastrointestinal surgeons and to the clinicians during procedures such as diagnostic angiography, chemoembolization.

References:

1. Standring S. Posterior abdominal wall and retroperitoneum. In: Gray's anatomy: The Anatomical basis of clinical practice, 40th ed. Elsevier Churchill Livingstone: New York, 2008: p1073-1074.
2. Chitra R. Clinically relevant variations of the coeliac trunk. *Singapore Med J* 2010; 51(3):216-219.
3. Adachi B. Anatomie der Japaner I. Das Arteriensystem der Japaner. Band II. Kaiserlich- Japanischen Universitat zu Kyoto, Kyoto, Maruzen, 1928: p20-70.
4. Vandamme JP, Bonte J. The branches of the celiac trunk. *Acta Anat (Basel)* 1985; 122(2): 110-114.
5. Nonent M, Larroche P, Forlodou P, Senecail B. Celiac-bimesentric trunk: anatomic and radiographic description-case report. *Radiology* 2001; 220(2):489-491.
6. Katagiri H, Ichimura K, Sakai T. A case of coeliacomesentric trunk with some other arterial anomalies in a Japanese woman. *Anat Sci Int* 2007; 82(1): 53-58.

7. Ucerler H, Asli Aktan Ikiz Z. Multiplicity of the variations in the ventral branches of abdominal aorta. *Ital J Anat Embryol* 2006; 111(1): 15-22.
8. Bergman RA, Afifi AK, Miyauchi R. Illustrated Encyclopedia of Human Anatomic Variation: Opus II: Cardiovascular System: Arteries: Head, Neck, and Thorax. Anterior Inferior Cerebellar and Posterior Inferior Cerebellar Arteries, November 2011, <http://www.anatomyatlases.org/AnatomicVariants/Cardiovascular/Text/Arteries/CerebellarAntPostInferior.shtml>.
9. Moor KL, Persaud TVN. The developing human (clinically oriented embryology). 7th. Edition. Saunder. Philadelphia. 2003: p335.
10. Hiatt JR, Gabby J, Busuttil RW. Surgical anatomy of the hepatic arteries in 1000 cases. *Ann Surg* 1994; 220(1): 50-52.
11. Gielecki J, Zurada A, Sonpal N, Jab³ońska B. The clinical relevance of coeliac trunk variations. *Folia Morphol (Warsz)* 2005; 64(3):123-129.
12. Cavdar S, Gurbuz J, Zeybek A, Sehirili U, Abik I, Ozdogmus O. A variation of celiac trunk. *Kaibogaku Zasshi* 1998; 3(5): 505-508.
13. Munshi IA, Fusco D, Tashjian D, Kirkwood JR, Polga J, Wait RB. Occlusion of an aberrant right hepatic artery, originating from the superior mesenteric artery, secondary to blunt trauma. *J Trauma* 2000; 48(2): 325-326.
14. Yamaki K, Tanaka N, Matsushima T, Miyazaki K, Yoshizuka M. A rare case of absence of the celiac trunk: The left gastric, the splenic, the common hepatic and the superior mesenteric arteries arising independently from abdominal aorta. *Ann Anat* 1995; 177(1): 97-100.
15. Michels NA. Variational anatomy of the hepatic, cystic, and retroduodenal arteries. *AMA Arch Surg* 1953; 66(1): 20-34.
16. Devi Sankar K, Bhanu SP, Susan PJ. Variant anatomy of the celiac trunk and its branches. *Int J Morphol* 2011; 29(2):581-584.

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