SPECTRUM OF VARIATIONS IN BRANCHING OF COELIAC TRUNK- A CADAVERIC STUDYSujatha Bangalore Bayer¹¹Assistant Professor, Department of Anatomy, College of Medicine, Imam Abdulrahman Bin Faisal University, Dammam, Kingdom of Saudi Arabia.**ABSTRACT****BACKGROUND**

Knowledge of variations in the branching pattern of Coeliac Trunk (CT) is important for surgeries for abdominal aortic aneurysm, for the liver transplant and chemoembolisation of hepatic tumours.

MATERIALS AND METHODS

In this descriptive study design, we observed the course of coeliac trunk spectrum of variations in its branching pattern in 50 embalmed cadavers during the routine dissection for educational purposes.

RESULTS

We found that the most common pattern of branching of the coeliac trunk was the hepatolienogastric type in 71% (39/50) of cadavers and variants in another 22% (12/50) cadavers. The inferior phrenic artery arising from the coeliac trunk was observed more on left side, 12% (6/50). Both the inferior phrenic arteries originating from the coeliac trunk was in 4% (2/50). The other observed variants are the left gastric artery arising from the abdominal aorta, a small common hepatic artery bifurcating immediately into the hepatic proper and the gastroduodenal artery and common coeliac-mesenteric trunk in 1% each.

CONCLUSION

Thorough knowledge of these vascular variations will prevent any inadvertent complications during surgical, oncological and interventional procedures

KEYWORDS

Coeliac Trunk, Anomalies, Common Hepatic Artery, Phrenic Arteries, Variants.

HOW TO CITE THIS ARTICLE: Bayer SB. Spectrum of variations in branching of coeliac trunk- A cadaveric study. J. Evolution Med. Dent. Sci. 2017;6(65):4704-4706, DOI: 10.14260/Jemds/2017/1018

BACKGROUND

Coeliac trunk initially originates from the dorsal aorta at the seventh cervical level and drifts caudally to the twelfth thoracic level due to the descent of viscera supplied in the abdomen.⁽¹⁾ The coeliac trunk supplies the stomach, duodenum, liver, gallbladder, spleen and the pancreas. The arterial variations of the coeliac trunk cannot often be ignored in particular to the operative procedures as it is a surgically significant artery. The rotation of the midgut, physiological herniation, leftward migration of the spleen and haemodynamic changes in the abdominal viscera, the persistence of some parts of the longitudinal channels or due to the disappearance of parts that commonly persist can be some of the possible explanations for such a variations in the coeliac trunk.⁽²⁾ Previous reports on the anatomy of the coeliac trunk display significant differences from the typical branching pattern.⁽³⁻¹⁰⁾ A study of the pattern of branching of the coeliac trunk gives an insight into the probable variations that might occur. Knowledge of these variations is

indispensable for surgical and diagnostic procedures within the abdomen. Considering the points as mentioned earlier, we decided to study the branching pattern of the coeliac trunk.

MATERIALS AND METHODS

In this descriptive study design, we observed the course of coeliac trunk spectrum of variations in its branching pattern in 50 embalmed cadavers during the routine dissection for educational purposes in the Department of Anatomy at Gandhi Medical College and Osmania Medical College between the years 2004 to 2006. A long midline incision was given from xiphisternum to the pubic symphysis extending across the thoracic cage and a second Incision was given along the inguinal ligament extending from pubic symphysis to the anterior superior iliac spine. All the abdominal viscera were identified and removed according to the instruction given in Cunningham's Practical Manual.

Statistical Analysis

Data was collected in the preformed template, and then it was transferred to Microsoft spread sheet 2007. Observations were presented as actual numbers and percentages.

RESULTS

The present study evaluated the occurrence of the branching pattern of the coeliac trunk and found that the most common pattern of branching of the coeliac trunk was the hepatolienogastric type in 71% (39/50) of cadavers and variants in another 22% (12/50) cadavers. The inferior phrenic artery arising from the coeliac trunk was observed

Financial or Other, Competing Interest: None.

Submission 24-07-2017, Peer Review 05-08-2017,

Acceptance 08-08-2017, Published 14-08-2017.

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DOI: 10.14260/Jemds/2017/1018

more on left side, 12% (6/50) (figure-1). However, such an observation was not found on the right (Table-1). Both the inferior phrenic arteries arising from the coeliac trunk was in 4% (2/50) (Figure-2). The other observed variants are the left gastric artery arising from the abdominal aorta (Figure-3), a very small common hepatic artery bifurcating immediately into the hepatic proper and the gastroduodenal artery (Figure-4) and common coeliac-mesenteric trunk (Figure-5) in 1% each (Figure-5).

Arteries	Patterns of Branching	N= 50	(%)
Hepatolienogastric trunk	Normal	39	78%
Left inferior phrenic artery arising from the coeliac trunk	Variant	8	16%
Right inferior phrenic artery arising from the coeliac trunk	-	0	0%
Both the right and the left inferior phrenic arteries arising from the coeliac trunk	Variant	2	4%
Common coeliac mesenteric trunk	Anomaly	1	2%
Left gastric artery arising from the abdominal aorta	Variant	1	2%
Common hepatic artery bifurcating into the hepatic proper and the gastroduodenal artery	Variant	1	2%

Table 1. Shows the Patterns of Branching of Coeliac Trunk in Cadavers during Dissection in Anatomy Training

DISCUSSION

The coeliac trunk takes its origin from the abdominal aorta and supplies the stomach, duodenum, liver, gallbladder, spleen and pancreas through its three branches namely splenic artery, left gastric artery and common hepatic artery. Earlier studies have noted the significant variations from the typical branching pattern of the coeliac trunk.^(2-10,11-23) The hepatolienogastric pattern of branching is considered to be the most commonly occurring pattern of branching of the coeliac trunk. Its occurrence varied across the studies from 75% to 88%.^{(11),(8)} Similarly, we also found this pattern in 78% of cadavers.

Inferior phrenic artery arises from abdominal aorta as its one of the lateral branches. The knowledge of anomalous origin and course of the inferior phrenic artery is essential while dealing with the procedures like arterial chemoembolisation in patients with hepatic carcinoma and transarterial embolisation in patients with severe haemoptysis.⁽¹⁰⁾ A recent study using CT scan reports that the origin of IPA may widely differ in the presence of coeliac axis variation.⁽¹²⁾

In the present study, the variations in the origination of inferior phrenic artery were observed. The left side inferior phrenic artery was from the coeliac trunk in 12% of cadavers. However, we did not find the origin of only the right inferior phrenic artery from the coeliac trunk. Instead, it was observed that both the right and the left inferior phrenic arteries arose from the coeliac trunk in 4%. A similar observation was found by Cicekcibasi AE et al.⁽¹⁶⁾ Sajeed et al.⁽⁸⁾ found common inferior phrenic trunk originating from the coeliac trunk which further divided into the right and the left inferior phrenic arteries. Nakamura Y et al.⁽⁶⁾ observed left inferior phrenic artery arising from the gastrosplenic trunk. However, such a pattern was not seen in our study.

We found that the Left gastric artery originated from the abdominal aorta rather than from the coeliac trunk in 2% of our cadavers. Adachi⁽¹¹⁾ had observed this pattern in 6.3% of his samples and called it the hepatolienal pattern of branching.

Our study team noticed one variant, which has not been described earlier in the common hepatic artery from which the hepatic proper and the gastroduodenal arteries immediately after arising from the coeliac trunk. The length of the coeliac trunk was concise, or it can be considered as the hepatic proper and the left gastric artery bifurcating from the coeliac trunk.

We also observed the presence of common coeliacomesenteric trunk pattern in 2% of our cadavers. The coeliac trunk and the superior mesenteric artery, which are the separate branches of the abdominal aorta, arose as a common trunk from the abdominal aorta. Such a similar observation was also noted by many reports.^{(15),(3)} Matsumoto K et al.⁽¹⁹⁾ and Kalra M et al.⁽⁵⁾ reported an anomalous common coeliacomesenteric trunk with a concurrent aneurysm. Cicekcibasi et al.⁽¹⁶⁾ observed a case of the coeliacomesenteric trunk with both the right and the left inferior phrenic arteries arising from it. The presence of coeliacomesenteric trunk may occasionally be recognised during clinical examination, particularly when using medical imaging techniques. Commonly it is involved in several pathological processes such as an aneurysm, occlusion, thrombosis, etc.

CONCLUSION

In the present study, we found a spectrum of branching patterns of the coeliac trunk and such a wealth of information could be of value to the radiologist and the surgeons as provides information on occurrence of the variations in this geographical region.

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