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Original Research Article

A Study on Anatomical variations of Coeliac Trunk and Its Branches

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Abstract: Thorough knowledge of normal and variant anatomy of major unpaired arteries originating from the abdominal aorta is necessary to accomplish successful abdominal operations and to avoid complications. The coeliac artery, commonly known as the coeliac trunk (CT), is a major visceral branch of the abdominal aorta originating at its anterior contour just below the aortic hiatus of diaphragm at the level of T12- L1 vertebral bodies. During routine dissection on adult cadavers in Anatomy department, we found some variations in the branching pattern of the coeliac trunk. Classical branching pattern observed in majority of the cases, trifurcation of coeliac trunk as common hepatic artery, splenic artery and left gastric artery seen in 45.7% cases. Bifurcation of Coeliac Trunk was seen in two specimens (6.6%). One female cadaver showed collateral branch from coeliac trunk. Knowledge of variations found in the current study will be very helpful in surgical, oncologic or interventional procedures and can be keep in mind to avoid complications.
Keywords: Coeliac trunk, branching pattern, common hepatic artery, variations

INTRODUCTION:

The vascular anomalies are quite frequent in renal arteries, in the vessels forming circle of Willis and the celiac trunk and its branches. The Celiac trunk is the 1stbranch of abdominal aorta at the level of the 12th thoracic vertebra. Celiac artery is the artery of foregut, supplied to lower part of oesophagus, stomach, upper half of duodenum, part of the pancreas liver and gallbladder [1].

Sometimes the coeliac trunk may be absent presenting collateral branches, and anomalous branches or even bifurcation of the trunk. Such variation in the pattern of branching of the celiac trunk may predispose to iatrogenic injury during surgical procedures such as total pancreotomy and resection of tumours of head of pancreas [2]. Knowledge of this variable anatomy may be useful in planning and executing are surgical procedures in the upper abdomen. The anatomical update of the celiac trunk and its three branches may be of useful in transplantations to surgeons as well as vascular radiologists in this area [3].

Many authors has been studied on branching pattern of Coeliac trunk and reported number of variations such as Bifurcation of Coeliac trunk as gastro splenic and common hepatic artery, trifurcation of coeliac trunk as left gastric, common hepatic and splenic arteries, variation in origin of common hepatic artery as a direct branch from abdominal aorta, origin of left hepatic artery from the gastro-duodenal artery and some rare variations like combined origin of coeliac trunk and superior mesenteric artery [4]. Present study is focused on branching pattern of coeliac trunk and its variations.

MATERIALS & METHODS:

Current study conducted in the Department of Anatomy, KFMS&R, and Coimbatore. A total of 30 adult cadavers dissected during routine undergraduate dissection. Out of thirty cadavers, there were 18 male and 12 female cadavers. The cadavers have been collected from various regions in Tamilnadu state. Cadavers were dissected according to the procedure described in the standard anatomical dissection manuals and thoroughly verified. All variations are photographed to illustrate the results of the present study.

OBSERVATIONS:

Thirty well preserved cadavers were dissected in the department of Anatomy during dissections of undergraduate students. The coeliac trunk and its branches were well exposed, traced and photographed where ever required, the variations were noted and analysed.

A). Classical type (Fig. 1) of branching pattern was observed in 12 specimens (40%) out of 30. in this type the Coeliac trunk gives the left gastric, Common hepatic and Splenic Artery in order of sequence.
B). Bifurcation (Fig. 2) of Coeliac Trunk was seen in two specimens (6.6%), Coeliac Trunk was bifurcating as Common Hepatic and Gastro splenic arteries later the Gastro splenic artery divided into Left Gastric Artery and Splenic artery.
C). Trifurcation (Fig. 3) of Coeliac trunk was seen in 18 cadavers (45.7%). In this the Left Gastric, common hepatic and splenic arteries are trifurcating at the same level forming Haller's tripod.
D). Coeliac Trunk showing collateral branch (Fig. No.4) was observed in 1 specimen other than the left gastric, common hepatic and splenic branches (3.3%).
E). Coeliaco-mesenteric trunk: Combined origin of Coeliac Trunk and superior mesenteric artery is referred as Coeliaco-mesenteric trunk. Unfortunately we could not found such kind of variation in present study.

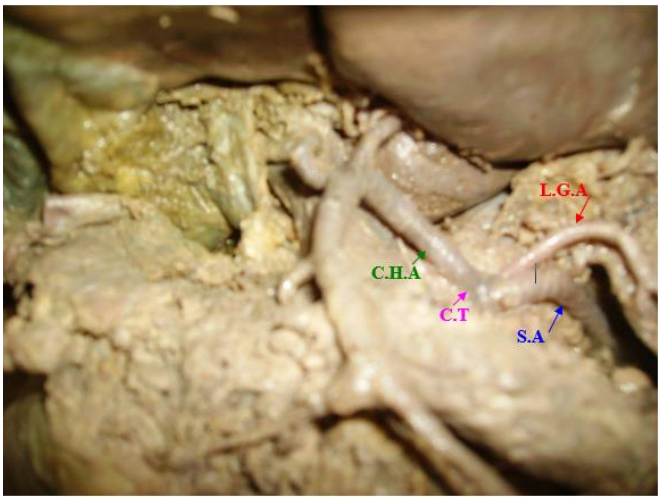

Fig 1: Classical type of Trifurcation of Coeliac trunk

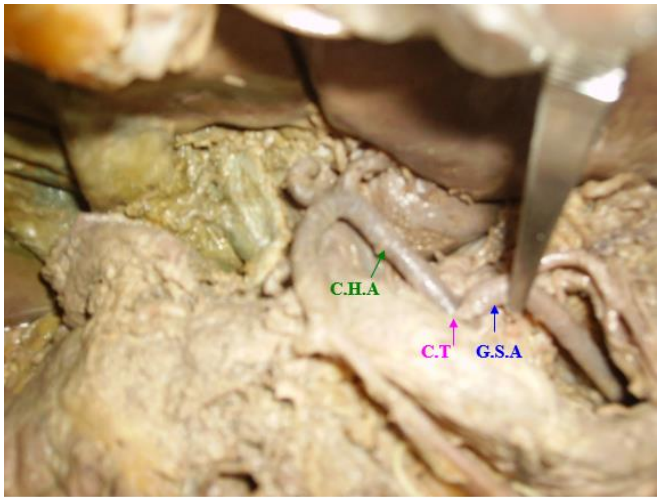

Fig 2: Bifurcation of Coeliac trunk showing Gastro Splenic and Common hepatic Branches

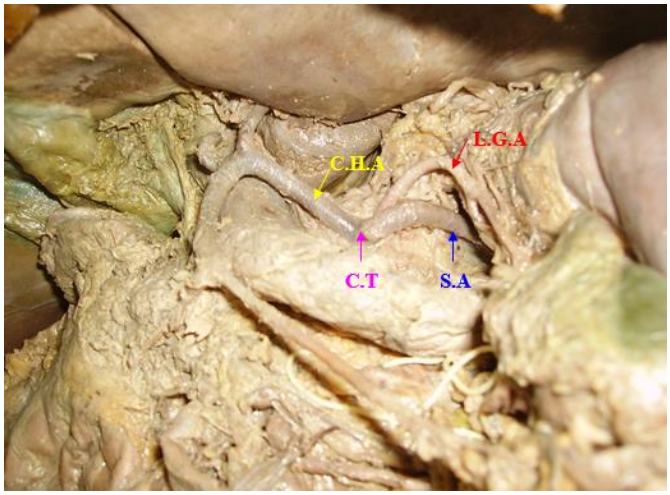

Fig 3: Trifurcation of Coeliac trunk showing Left gastric artery, Gastro Splenic and Common hepatic artery

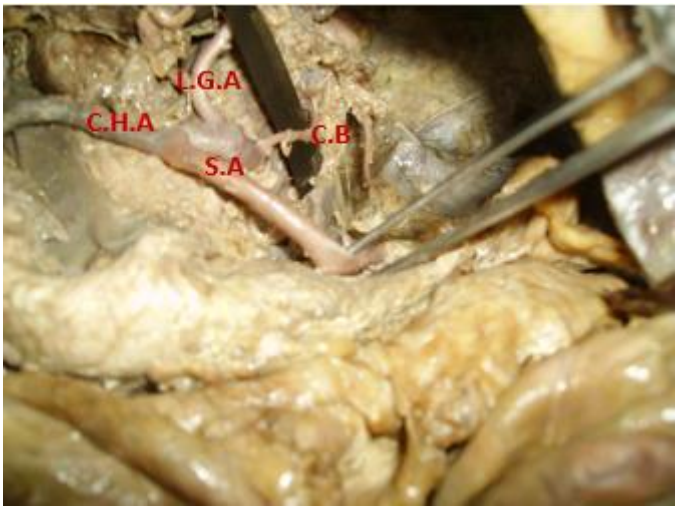

Fig 4: Celiac Trunk showing collateral branch (CB)

DISCUSSION:

Vascular variations are usually asymptomatic. They may become important in patients undergoing Coeliaco graphy for gastrointestinal bleeding, coeliac axis compression syndrome, prior to an operative procedure or transcatheter therapy; chemoembolization of pancreatic and liver tumors [5]. Michels [3] classic autopsy series of 200 dissections3, published in 1960, defined ten different types of anatomic variations of hepatic artery and has served as the benchmark for all subsequent contributions in this area.

Present study revealed bifurcation of coeliac trunk in 3 (8.6%) cases. Similar studies reported by Sridhar Varma K [6] in 5.5% cases and Sh Vedavchenko *et al.;* [7] reported in Russians population it was 5%. Present study also shows that the coeliac trunk was trifurcated in 45.7% of cases. Findings of current study were almost similar to the studies conducted by Shvedarchenko *et al.;* in Russian population it was 52.8%. Present study shows collateral branches arising from Coeliac Trunk in 2 (5.7%) cases. Van Damme J.P [8], Ucerler H [9], Rawat K.S [10] and Petrell S [11] reported almost similar variation in their literature.

Nayak SB *et al.;* [12] reported that the right gastric artery took its origin from the left hepatic artery within the porta hepatis and descended down in the lesser omentum. Silveira LA [13] observed the same. The current variation of the origin of the right gastric artery from the left hepatic artery might be of additional advantage to pass a catheter into left hepatic artery through it to embolize the left hepatic artery.

The hepatic artery variations can usually be explained by embryonic development. The liver is supplied during the foetal life by 3 arteries – right hepatic artery from the superior mesenteric artery, left hepatic artery from the left gastric artery and common hepatic artery from the coeliac trunk [14]. With further development, the blood supply assumes the adult pattern, with atrophy of both right and left hepatic arteries and the common hepatic artery gives the right

and left hepatic arteries supplying the whole liver [15]. This adult pattern occurs in around 67% of individuals. Anatomical variations correspond to the result of partial or complete persistence of the foetal pattern.

CONCLUSION:

Several authors have studied deeply all aspects of celiac trunk its braches celiac trunk its branches and variations even then it is not a closed track but to be updated from time to time. The variations of celiac trunk and its branching pattern need to update time to time with its percentages of incidences.

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