



## Anatomical Variation in the Branching Pattern of Coeliac Trunk-A Case Report

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**ABSTRACT**

Though anatomical variation of the coeliac trunk is very common, the present case describes a combination of variations. During routine dissection of a 60 year old male cadaver, we found the coeliac trunk giving rise to 5 branches left gastric, common hepatic, splenic, left inferior phrenic and left superior supra renal. Also we found a highly coiled splenic artery dividing into two just before the hilum, the upper one giving rise to short gastric branches and the lower one to left gastro epiploic branch. An accessory left hepatic artery was observed to originate from left gastric artery. Knowledge of this variation is 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.

### KEYWORDS

accessory hepatic artery, coeliac trunk, inferior phrenic artery, supra renal artery, splenic 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]. It is the chief source of arterial supply for the foregut and its derivatives. Variations in the vascular pattern of the coeliac trunk and its branches should be considered while planning surgical interventions on the abdominal part of the oesophagus, stomach, duodenum, liver, pancreas, gallbladder and spleen. Anatomical variations of the coeliac trunk are important for surgeons undertaking different

surgeries on the abdominal region, including liver transplantation. Clinicians should also be aware of the variations in the vascular pattern of the coeliac trunk before performing angiographic examinations.

### Case report:

During routine dissection of the abdominal region of a 60 year old formalin-fixed cadaver we found many variations in the branching pattern of coeliac trunk. After careful resection, we found from the ventral part of abdominal aorta coeliac trunk of 1.5cm length was originating at the level of T12. It then divided into five branches-left gastric, splenic, inferior phrenic, left superior supra renal and common hepatic. We observed 5cm from its origin the left gastric artery was giving a branch (accessory hepatic artery) to the left lobe of liver. The left inferior phrenic artery originated after the origin of splenic artery and it was overlapped by the origin of left superior supra renal artery. The splenic artery was highly tortuous and divided before hilum into upper polar and lower polar branch. The short gastric arteries originated from upper polar branch and left gastro epiploic from lower polar branch. The hepatic artery proper after giving right gastric artery divided into two branches and both are entering into left lobe one above the other.

### Discussion:

A variation in the branching pattern of coeliac trunk occurs very commonly due to the developmental abnormalities in the ventral splanchnic arteries.

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 [2]. 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 [3, 4, 5]

In 1995 Borley et al observed that the splenic artery has tortuous appearance throughout its course [6]. In 1995 Sylvester et al found that tortuosity increases with age [7]. In 2006, Daisy Sahni A et al found that splenic artery tortuosity was seen only in 10% adults, this characteristic tortuosity of splenic artery appear to develop with age [8].

In medical imaging of spleen book by AMA de Schepper, Filip vahhoenache, it is given that the splenic artery tortuosity is unique among normal arteries. Often arteries become tortuous due to atherosclerotic disease or as a result of acting as a collateral vessels but a normal splenic artery can be very tortuous and may be characterized by loops and spiral. The artery becomes tortuous with age [9]. In our study, the splenic artery showed numerous loops.

There are very limited studies and study materials focusing on the origin of inferior phrenic and suprarenal arteries and also very few classifications regarding their origin are available. However, variation in IPA origin is a rule, rather than an exception. In a study of 74 cadavers, the artery arose from the abdominal aorta and the coeliac trunk in 31 and 34 cadavers, respectively [10]. A study of 383 computed tomography (CT) images showed that the site of IPA origin was the coeliac trunk and aorta in 152 and 148 cases, respectively [11]. The IPA has also been found to originate from the renal (n = 59), left gastric (n = 14), hepatic (n = 8), superior mesenteric (n = 1) and contralateral IPA (n = 1) arteries [12].

Arjhansiri et al observed a typical pattern of hepatic artery in 80.5% of the 200 patients in their angiographic study, and an accessory left hepatic artery initiating from the left gastric artery in 5.5% of patients [13].

Hiatt et al. (1994) have reported that, an accessory left hepatic artery has been seen to be arising from left gastric artery which has arisen from abdominal aorta [14] but in the present case, it originated from left gastric artery which is a branch from coeliac trunk.

Vascular variations are found during the clinical diagnostic evaluations or during cadaveric dissection as an accidental finding. Abnormal branching of coeliac trunk which has been reported by us is rare and it will provide additional knowledge to surgeons, radiologists and to the clinicians during procedures such as diagnostic angiography, chemoembolization.

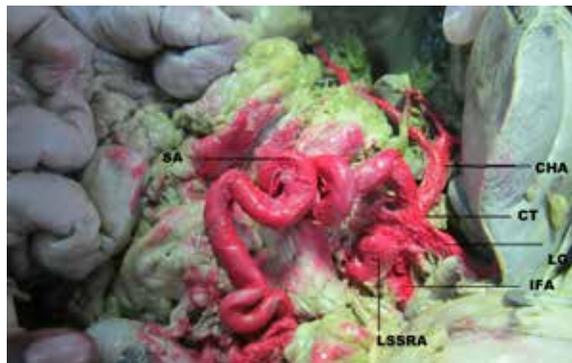


Figure 1:- shows coeliac trunk giving 5 branches namely left gastric, inferior phrenic, left superior supra renal, splenic and common hepatic. (CT- coeliac trunk, CHA- common hepatic artery, LG-left gastric, IFA-inferior phrenic artery, LSSRA-left superior supra renal artery, SA-splenic artery)



Figure 2: shows highly tortuous splenic artery dividing into upper polar artery and lower polar artery.(S-spleen, UPA-upper polar artery, LPA-lower polar artery, SA-splenic artery, P-pancreas, CHA-common hepatic artery,LGA-left gastric artery, S-stomach, L-liver)



Figure 3: shows accessory left hepatic artery originating from left gastric artery.(ALHA- accessory left hepatic artery, LGA- left gastric artery, CHA- common hepatic artery, HA-hepatic artery proper)



Figure 4: shows hepatic artery proper dividing into two and both are entering into the left lobe of the liver.(SA-splenic artery, CHA-common hepatic artery, HA-hepatic artery, RGA-right gastric artery, GDA-gastro duodenal artery)

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