



## Anomalous branching pattern of celiac trunk

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Narendra PAMIDI <sup>[1]</sup>✉  
Sreedher VARMA <sup>[2]</sup>  
Venkata Ramana VOLLALA <sup>[1]</sup>

Department of Anatomy, Melaka Manipal Medical College (Manipal Campus),  
International Centre for Health Sciences, Manipal <sup>[1]</sup> and Department of Anatomy,  
M.R. Medical College, Gulbarga <sup>[2]</sup>, Karnataka, INDIA.



✉ Narendra Pamidi  
Lecturer  
Department of Anatomy  
Melaka Manipal Medical College (Manipal Campus)  
International Centre for Health Sciences  
Manipal, 576104  
Karnataka, INDIA.  
☎ +91 820 2922642  
✉ +91 820 2571905  
✉ [pommidi\\_narendra@yahoo.co.in](mailto:pommidi_narendra@yahoo.co.in)

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### ABSTRACT

Variations in the origin and branches of the celiac trunk are well established. We are reporting a rare case of celiac trunk with two main branches, hepato-splenic trunk and left gastric artery in the place of the three classic branches. The left gastric was giving left inferior phrenic, left suprarenal superior suprarenal and left gastroepiploic arteries. The presence of this type of variation is clinically important in laparoscopic surgery. It is important to know the variations of hepato-splenic trunk for the success of surgical operations to the liver and radiological investigations of those regions. © *IJAV*. 2008; 1: 8–9.

**Key words** [celiac trunk] [hepato-splenic trunk] [left gastric artery] [left inferior phrenic artery] [left superior suprarenal artery]

### Introduction

The hepatic, splenic and left gastric arteries are considered as the “main classic branches” of the celiac trunk (CT). In the embryonic life, yolk sac is supplied by vitelline arteries. Later they gradually fuse and help in formation of the arteries dorsal to the mesentery of the gut. In the adult, they are developed as CT, superior mesenteric and inferior mesenteric arteries. These vessels supply the derivatives of foregut, midgut, and hindgut, respectively [1]. CT supplies the parts of the foregut like liver, stomach, pancreas and superior part of duodenum. Variations of the CT and its branches, their relationship to surrounding structures are, therefore of particular importance from a surgical perspective [2,3].

### Case Report

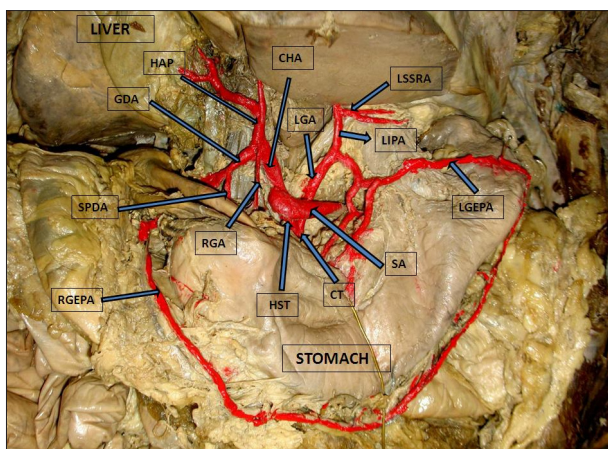
The present anomaly was observed during the abdomen dissection classes for the medical undergraduates, in the Department of Anatomy at Melaka Manipal Medical College, Manipal, and a 45-year-old male cadaver showed the following variations in the origin and branches of the CT. In the present case CT emerged from the abdominal aorta as 2 roots named as left gastric artery (LGA) and hepato-splenic trunk (HST). Left gastric artery was seen posterior to the hepato-splenic trunk at its origin and gave origin to two rare branches called, left gastroepiploic artery which is normally from splenic artery and left inferior phrenic artery which is a direct and first branch of abdominal aorta generally. The inferior phrenic artery was giving a branch called left superior suprarenal artery.

The hepato-splenic trunk was divided into common hepatic and splenic arteries at 1.5 cm from its origin. The splenic artery was arising from the right side of the hepato-splenic trunk and passed towards the left side of the abdomen underneath the stomach to supply the spleen. In the present case, the splenic artery was not giving origin to the left gastroepiploic artery. The common hepatic artery was passing over the portal vein and trifurcated into hepatic artery proper, gastroduodenal and right gastric arteries. The gastroduodenal artery was in turn dividing into superior pancreatico-duodenal and right gastro-epiploic arteries (Figure 1).

### Discussion

CT 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 3–4 cm in length and 6–8 mm in diameter. It gives rise to three main branches as left gastric, hepatic and splenic arteries.

Studies on arterial variations of the abdomen showed that only 87.7% of the CT exhibited the classical trifurcation. An incomplete CT, namely bifurcation, accounted for 5.8–24.1%. Besides these variations, the CT itself may be absent, its branches may arise directly from the aorta [4,5]. Piao et al. stated that the right and left inferior phrenic arteries occasionally originated as a common trunk from the aorta, celiaco-mesenteric system or adrenorenal system [6]. They observed that inferior



**Figure 1.** Dissection of the abdomen showing the anomalous branching pattern of the celiac trunk. (CT: Celiac trunk, HST: hepatosplenic trunk, SA: splenic artery, CHA: common hepatic artery, LGA: left gastric artery, LGPEPA: left gastroepiploic artery, LIPA: left inferior phrenic artery, LSSRA: left superior suprarenal artery, RGA: right gastric artery, GDA: gastroduodenal artery, SPDA: superior pancreaticoduodenal artery, RGEPA: right gastroepiploic artery, HAP: hepatic artery proper)

phrenic arteries were usually paired (left and right) and their origin was summarized as follows; a) the aorta itself (61.6%), b) ventro-visceral arteries (celiaco-mesenteric system of the aorta) including the celiac trunk (28.2%), and left gastric artery (2.9%), c) the laterovisceral arteries (adreno-renal system of the aorta) including the middle suprarenal artery (2.9%) and renal artery (4.3%). Cavdar et al. reported a case, in which the left inferior phrenic artery and the left gastric artery arose from the long celiac trunk (4.3 cm) via a common trunk [7].

Generally, additional branches of the celiac trunk other than its normal branches are referred to as

collaterals [2]. The trunk may have only two branches, usually the splenic and the common hepatic, more rarely the left gastric and splenic, or it may have more than three branches. The additional branch may be one of the inferior phrenic, a common trunk for the inferior phrenic or for a inferior phrenic and left gastric, a gastroduodenal (or an accessory gastroduodenal), a second left gastric or an accessory splenic artery, a superior mesenteric, a middle or accessory middle colic, a supreme pancreatic, or a dorsal pancreatic. One of the usual branches of the CT may be absent, and may be replaced by a stem common to the inferior phrenic, by the right middle suprarenal and the right gastroepiploic, or more rarely by some other branches. Adachi reported that the inferior phrenic artery originated (8.1%) from the celiac trunk [8].

Knowledge of variations concerning the CT is of extreme clinical importance in the areas of the Appleby procedure [9], laparoscopic surgery, and radiological procedures in the upper abdomen, and should be kept in mind by clinicians to avoid complications. Anatomic variants of the celiac trunk is essential to successfully accomplish surgical, oncologic, or interventional procedures including lymphadenectomy around hepato-spleno-mesenteric trunk, aortic replacement with reimplantation of the trunk, or chemoembolization of liver malignancies, all of which can potentially create significant morbidity because of the large visceral territory supplied by a single vessel [10].

Arterial variations should be taken care during the abdominal operative procedures. Vascular anomalies are usually asymptomatic; they may become important in patients undergoing diagnostic angiography for gastrointestinal bleeding, celiac axis compression syndrome, or prior to an operative procedure or transcatheter therapy [11].

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