Gastroduodenal-splenic trunk: an anatomical vascular variant

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Abstract
The main classical branches of celiac trunk (CT) are the common hepatic artery (CHA), the left gastric artery (LGA) and the splenic artery (SA). During the educational dissections in a 62-year-old male cadaver a rare variation, the gastroduodenal-splenic trunk (GDST), was observed. GDST divided into SA and gastroduodenal artery (GDA). LGA and accessory left hepatic artery (ALHA) arose directly from the abdominal aorta (AA). Therefore, variations of CT are important for the clinical diagnosis and therapy.

Keywords: gastroduodenal-splenic trunk, celiac trunk, left gastric artery, clinical significance.

Abbreviations:

Introduction
The celiac trunk (CT) is the first anterior branch of the AA. CT is divided into the following branches classically: the left gastric, splenic and common hepatic arteries. CHA often originates from the CT and runs across the head of pancreas, where it divides into the hepatic artery proper (HAP) and gastroduodenal artery (GDA). Usually, the right gastric artery (RGA) is one of the branches of HAP. The GDA often divides into the right gastroepiploic artery (RGEA) and the superior pancreatico-duodenal artery (SPDA), which supplies head of pancreas, common bile duct (CBD) and duodeno-jejunal flexure. However, CT and its branches variations including their numbers, sources, and courses are very common [1]. One of CT branches sometimes originated directly from the AA [2]. Few cases show all the three components originated independently from the aorta [3]. The CT may also have more than three branches [4]. In this case, the components of CT and their subsets are far more different to the classical branches.

Materials and Methods
The study involved dissection of a 62-year-old male cadaver at the level of abdominal cavity in the Department of Anatomy of Jining Medical University, Shandong, China. The dissection was carried out according to instructions by Cunningham’s Manual of Practical Anatomy [5]. The body was preserved by injection with based preservative (10% formalin) and stored at -4°C.

Results
In the presented specimen, the GDA and SA originated as a common trunk from the anterior surface of the AA as gastroduodenal-splenic trunk (GDST) at the level of L1, its length was 3.1 cm (Figure 1A). GDST ran down front and divided into GDA and SA. GDA gave rise to RGA (Figure 1B), 1.9 cm below the SA origin; its two terminal branches were RGEA and SPDA (Figure 1D).

Discussion
In human embryos, there are three paired arteries of trunk originated from the aorta, the anterior arteries (vitelline arteries) are intestinal, posterior arteries are parietal, and the lateral arteries are urogenital. The primitive intestinal arteries are connected by a Tandler’s anterior longitudinal anastomosis [6]. Variation of arterial anatomy is very common and occurs in nearly half of the population [7].
The CT supplies blood to the liver, stomach, spleen, superior part of duodenum and pancreas. The morphological anomalies of the CT can differ in origin, tract, diameter and terminal branches. After performing on 200 cadavers, Michels NA [7] reported 10 morphological types of anatomical variations of the CT according to their origin and number of terminal branches. According to a report on 5002 patients, who underwent spiral computed tomography and digital subtraction angiography, 13 types of CT variation were identified and seven CHAs originating from the normal CT had a retroportal course [8]. The patterns of abnormal branching of CT could be varied from bifurcation, quadrifurcation, pentafurcation, or even hexafurcation [9]. Sponza M et al. once reported that the right hepatic artery arising from the superior mesenteric artery was observed in 19% of 36 patients [10]. The retroportal proper hepatic artery may anastomosed with the superior mesenteric artery by an arc of Bühler [11]. Polguj M et al. found an accessory right hepatic artery arose from the common hepatic artery and ran behind the portal vein to the right lobe of the liver [12]. In a study on 60 specimens, a right hepatic artery coming from the superior mesenteric artery was encountered in 15 cases (25%) [13]. The incidence of LGA arising directly from the AA is 6.7% [14]. One of CT branches may be replaced by the inferior phrenic artery or the accessory hepatic arteries [15], seldom replaced by GDST. In the presented case, the ALHA originated from the AA and ran retroportal into the left lobe of the liver, while the ARHA arising from CHA had a preportal course. LGA had two branches and both of them supply the lesser curvature.

The knowledge of the vascular anatomy of the concerned region is an important prerequisite for surgical interventions. When performing subtotal gastrectomy or splenectomy, an awareness of variation is necessary in case vasculature reconstruction needs to be performed because of the anomalies. The variation of CT should be remembered during surgery and be carefully studied in order to make proper evaluation. Also, the arterial variations are of great importance to organ transplantations.

Conclusions

The awareness of the existing vascular anomalies enhances the insight regarding that region. The present variation of CT and GDST are very important in patients undergoing angiography or severe gastrointestinal bleeding. During diagnostic and surgical approaches at the levels of gastric and hepatic vessels, not only the anatomical variants must be considered, but also associations of those must be suspected.
References


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