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VARIANT ANATOMY OF THE HUMAN CELIAC TRUNK

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Resume. Due to the study, an analysis of 35 literary sources devoted to the variant anatomy of the celiac trunk was carried out. Classifications of variants of division of the celiac trunk in humans have been established, the most common types of division of the celiac trunk into its branches have been determined.

Keywords: celiac trunk, anatomy, human.

Relevance. Knowledge of the variant anatomy of the celiac trunk in modern clinical medicine is due to the high frequency of surgical and diagnostic interventions on abdominal organs.

Target: Study the classifications describing the variants of the structure of the celiac trunk of a person and most frequent variations in its structure.

Tasks:

1. To establish variants of classifications describing the variants of the structure of the celiac trunk of a human.

2. To establish variants of the structure of the human celiac trunk .

Materials and methods. The material for the study was the datas of 35 literary sources from the electronic scientific database of Pubmed.

Results and discussion. The celiac trunk is a major part of arterial blood supply to the organs of the abdominal cavity. The celiac trunk has three main branches, the splenic artery (SA), the common hepatic artery (CHA), and left gastric artery (LGA). Other arteries such as the left and right phrenic arteries, (LPA, RPA respectively) which work closely with the celiac trunk can also be affected by the celiac trunk's variational patterns.

Anatomical variations of the celiac trunk are usually asymptomatic [26], but they must be known by anatomists, surgeons and radiologists performing surgical procedures such as liver transplantations, laparoscopic surgeries, traumatic injury repair, pancreaticoduodenectomy, gastrojejunostomy and others in order to prevent iatrogenic injuries such as ischaemia, anastomotic leaks and any other unnecessary difficulties [2, 4, 8, 10].

The classic celiac trunk originates from the 10th and 13th vitelline arteries during embryogenesis. These arteries become the celiac trunk and superior mesenteric artery. Initially, the 10th and 13th vitelline arteries are connected by a ventral longitudinal anastomosis. The 11th and 12th vitelline arteries disappear, while the 10th vitelline artery becomes celiac artery and its three branches, the CHA, LGA, and SA [9]. However, anatomical variations, such as the celiacomesenteric trunk, originate when the 10th vitelline artery root regresses and the ventral anastomosis between 12th and 13th roots stays [9]. In essence, anatomical variations of the celiac trunk originate during embryogenesis.

Celiac trunk variation classifications have been created by many authors throughout the years such as Tandler (1907), Lipshutz (1917), Adachi (1928), Michels (1955), Uflacker

(1997), Shoumora (1991), and many more [7, 25]. Brasil IRC et al. [6] used Michels classification, Torres et. al [26] used Uflacker's classification.

Different classifications are used for different studies and reasons. In 1966, the Michels classification was proposed as an international classification to encompass as many variants as possible [6]. However, not everyone uses this classification. Authors can pick and choose classifications that fit the purpose of the study in question, using newer or older classifications. On top of that, some classifications can end up conflicting, or overlapping, or classifying the same variation.

Şelaru et. al [25], partly used Michels classification when discussing a case involving a patient with both a hepatomesenteric trunk, combined with a gastrosplenic trunk. Şelaru et. al discussed how the hepatomesenteric trunk partly fell into type 9 of Michels classification, but the difference being that according to Michels classification, the gastroduodenal artery (GDA), originated from gastrosplenic trunk (GST), however Şelaru et. al found that the gastroduodenal artery (GDA), stemmed from the left gastric artery (GDA), which coincided with Tandler's classification. Therefore Şelaru et. al. concluded that Tandler's classification and Michels' classification are reciprocally exclusive [25].

Hemamalini (2018) reported finding two very rare variations not classified, he identified a Hepatomesenteric trunk with the LGA and SA originating from the abdominal aorta, and the LPA and RPA stemming from the LGA and SA respectively [12]. This anomalous variation does not fit into any official classification, since it is so rare, and specific.

Rusu et Manta [23] used Dilli Babu and Khrab's (2013) [22] classification for their study on heptafurcation of the celiac trunk. The heptafurcation of the celiac trunk is an extremely rare, and specific variation [23]. Anatomical variations are constantly reported in literature, and Rusu et. Manta discussed how there are many possible combinations of anatomical variations that are individual specific and cannot be referred into one simple pattern of classification.

Brasil et. al [6] used the Michels classification as it allowed general organization and mass classification of patients. Brasil et. al studied 100 patients, with the normal anatomical pattern – the classic celiac trunk and superior mesenteric artery stemming from the abdominal aorta being seen in 43% of the cases, with anatomical variations being 57% of the cases. The purpose of Brasil et. al's study was to classify the anatomical patterns of the population of Brazil as well as compare the results of other authors' works and encourage more of these types of studies to better understand the population. Understanding the anatomical patterns of the populations will lead physicians to better plan and conduct interventional operations with fewer risks and better outcomes.

Torres et. al [27] also used Uflacker's classification as it allowed mass classification of the Polish population. Torres et. al present 1569 patients, with 92.7% of patients having the normal anatomical variation – the classic celiac trunk, with 7.3% of the Polish population having different anatomical variations. Like Brasil et. al [6], Torres et. al conducted this study to better understand the population of their respective country so as to improve outcomes of interventional operations and surgeries.

Conclusion: the anatomical variations of the celiac trunk and its major branches (CHA, SA, LGA) must be known by specialists and researchers for better understanding of both embryonic development of the vessels, understanding the vascular beds of the body, studying the population and what variants they may have, and better understanding of vascular anatomy for better outcomes regarding various surgical operations. There exist many variations and many classifications, and the origins of variations are not uniform, so the specialist must be acquainted with the general anatomy and choose the most fitting classification for their respective purpose.

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