УДК 61:615.1(06)
ББК 52.82
А 43
ISBN 978-985-21-1398-4

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ОСОБЕННОСТИ ВЕТВЛЕНИЯ И МОРФОМЕТРИЧЕСКИЕ ПАРАМЕТРЫ ВЕТВЕЙ ЧРЕВНОГО СТВОЛА

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FEATURES OF DIVISION AND MORPHOMETRIC PARAMETER'S OF CELIAC TRUNK'S BRANCHES

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Резюме. Варианты деления и морфометрические параметры ветвей чревного ствола были исследованы по данным компьютерной томографии брюшной полости у 76 человек (51 мужчина и 25 женщин) в возрасте от 36 до 86 лет. Классический вариант чревного ствола установлен в 63,3% случаев, неклассические варианты – в 36,7 % случаев ($p \leq 0,05$). Увеличение диаметра общей печеночной артерии коррелирует с увеличением диаметра левой желудочной артерии ($p \leq 0,05$).

Ключевые слова: человек, чревный ствол, морфометрия.

Resume. Variants of division and morphometric parameters of celiac trunk's branches were investigated on the dates of abdominal cavity computed tomography scans of 76 people (51 males and 25 females) from 36 y.o to 86 y.o. The classical variant of the celiac trunk was found in 63.3% of cases, non-classical variants - in 36.7% of cases ($p \leq 0.05$). An increase in the diameter of the common hepatic artery correlates with an increase in the diameter of the left gastric artery ($p \leq 0.05$).

Keywords: human, celiac trunk, morphometry.

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: To study and establish morphometric features of dates of celiac trunks of adult humans as well as describe the variants of the structure of the celiac trunk of a person and most frequent variations in its structure.

Tasks: To establish morphometric features of dates of celiac trunk of adult humans.

Materials and methods: The materials used in this study were dates of abdominal cavity computed tomography scans of 76 people (51 males and 25 females) from 36 y.o to 86 y.o. (3 age groups according to classification 1965, which is used in medicine and biology: 36-55 - second adult age period, 56-74 - elderly age period, 75 and up - senior age period) (figure 1).

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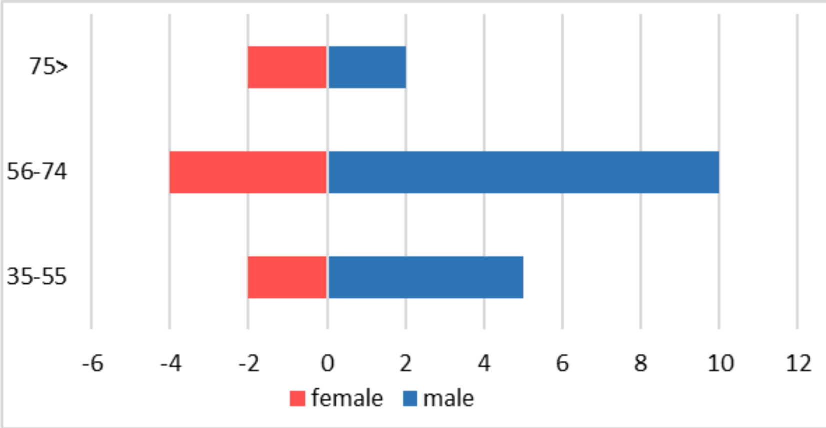

Fig. 1 – Gender and age pyramid

Statistical data was processed using “Microsoft Excel 2013” and “Statistica 10.0 for Windows” programs.

The sagittal, frontal, oblique, and 3-D reconstructions were created on the base of the axial scans. Our investigations were based on the celiac trunk’s variational divisions according to Uflacker’s classification, which consists of 8 main variational types: classic trunk, hepatosplenic trunk, hepatogastric trunk, hepatosplenomesenteric trunk, gastrosplenic trunk, celiaco-mesenteric trunk, absent celiac trunk.

Morphometry of the celiac trunk was then measured using “Centricity DICOM viewer program”. The parameters investigated were the angle of origins for the celiac trunk (CT), followed by the longitudinal and transverse diameters of the aorta, common hepatic (CHA), splenic (SA), left gastric (LGA) arteries.

Results and discussion: In our analysis, we have found that 63,7% of investigated cases fell into a “classic celiac trunk variant” (Type I). This meant that the CT is moving away anteriorly from the surface of the aorta, while giving off three branches: CHA, SA and LGA. The CHA goes to the entrance of the liver, the LGA goes to the lesser curvature stomach, and the SA travels to the spleen (figure 2).

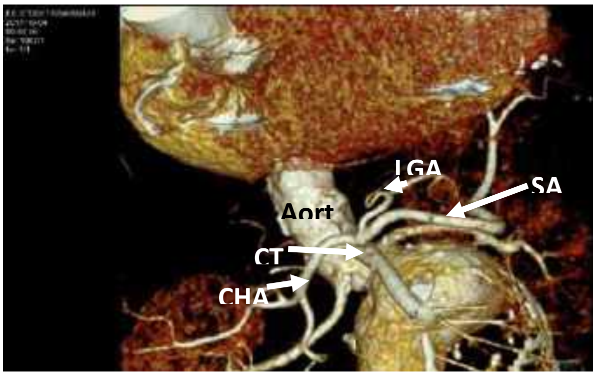

Fig. 2 – Classic celiac trunk (3D reconstruction)

The other 36,7% of cases were “non-classical cases”, such as the “hepatosplenic” variant, in which the LGA originates off the aorta instead of the CT, thus allowing the SA and CHA to be joined together (figure 3).

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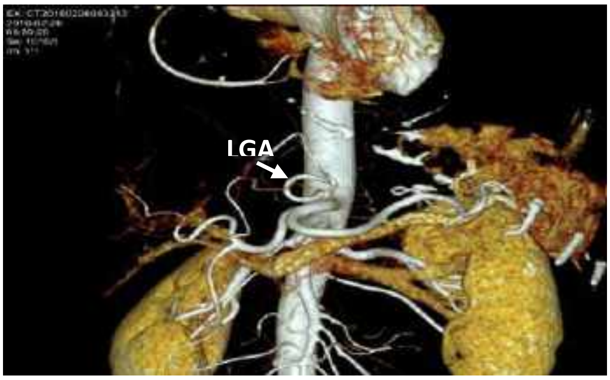

Fig. 3 – Hepatosplenic variant (3D reconstruction)

The functions of the arteries remained unchanged, in which the LGA still travels to the lesser curvature of the stomach, and the SA goes to the spleen, and the CHA travels to the liver.

The parameters of the celiac trunk and its branches were also studied and revealed that the smallest indicators belonged to the vessel diameters of the left gastric artery vessel diameter (2.2 – 4.8 mm) Meanwhile, the largest indicators were seen in the vessel diameter of the splenic arteriesc (8.9 – 9.0 mm). The largest artery by vessel diameter in all age groups (not counting the aorta), would be splenic artery, while the smallest artery would be the left gastric artery.

Our analysis showed that as the person gets older, all of their vessel diameter decreases ($p \leq 0{,}05$) (figure 4).

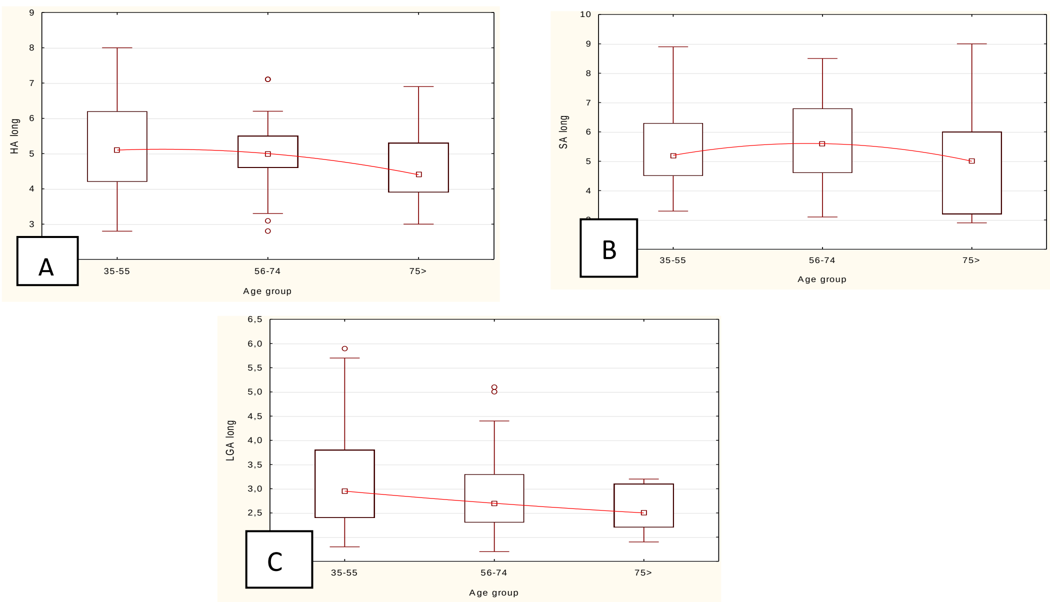

Fig. 4 – Diameter correlation of HA (A), SA (B) and LGA

Further analysis of these parameters revealed a correlation of high tightness with the indicators of the transverse and longitudinal diameter of the aorta, as well as the diameters of the splenic artery. Another correlation of middle tightness between the diameters of common hepatic artery and left gastric artery was also established (table 1).

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Tab. 1. Spearman coefficient for morphometric parameters of CT

	HA long	**HA transv**	**SA long**	**SA transv**	**LGA long**	**LGA transv**
HA long	1,000000	0,824608	0,523532	0,510367	0,397847	0,416233
HA transv	0,824608	1,000000	0,537753	0,541223	0,473291	0,441148
SA long	0,523532	0,537753	1,000000	0,954829	0,321997	0,305338
SA transv	0,510367	0,541223	0,954829	1,000000	0,290335	0,279530
LGA long	0,397847	0,473291	0,321997	0,290335	1,000000	0,959329
LGA transv	0,416233	0,441148	0,305338	0,279530	0,959329	1,000000

Analysis of dates revealed that diameter of aorta and diameter of splenic artery has high tightness correlation. Middle tightness correlation between the common hepatic artery diameter and the left gastric diameter are established ($p \leq 0{,}05$).

Lastly, an inverse correlation of middle tightness was established, regarding the diameters of the aorta and diameters of left gastric artery ($p \leq 0{,}05$).

To establish a statistically significant difference between the variables the rank-based nonparametric Kruskal-Wallis test was used. During the study, it was determined that there is no significant difference between the parameters of the diameters of the CT branches, due to an inadequate amount of cases ($H=7{,}26$ $p=0{,}57$).

Conclusion: in the course of the study, it was established that:

1. The diameter of the celiac trunk in adult human can varies from 6.5 to 7.9 mm, the left gastric artery - from 1.7 to 2.8 mm, the common hepatic artery - from 4.4 to 7.2 mm and the splenic artery - from 4.6 to 5.4 mm.

2. The classic type of branching of the celiac trunk into the common hepatic artery, left gastric artery and splenic artery presents in 63,3% of cases. Non-classical branching variants accounted about 36,7% of cases, which is consistent with the literature data.

3. An increase in the diameter of the aorta leads to decrease in the diameter the left gastric artery and increase the diameter of the splenic artery.

4. An increase in the diameter of the common hepatic artery leads to an increase in the diameter of left gastric artery.

5. Significant difference between the parameters of the diameters of the CT branches weren't established That indicate that it needs to increase the variables (dates of computed tomography) for statistical analysis.

Literature

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