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# МОРФОЛОГІЧНІ АСПЕКТИ АНГІОЛОГІЇ

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The analysis of the topographic localization of the human renal pyramids at mature and elderly ages in relation to the renal topographic sectors and parallels with the position of the individual anatomical variability.

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## VASCULAR ARCHITECTURE OF THE HUMAN ADRENAL GLANDS

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Introduction. Vascular anatomy of the adrenal gland plays an important part in surgical treatment of adrenal disorders. Furthermore, usage of anatomical terms related to the adrenal arteries and veins such as v. centralis and v. suprarenalis is still ambiguous.

Material and methods. Present study is based on 90 cadaveric adrenal glands and their surroundings that also included inferior vena cava, inferior phrenic, hepatic and renal veins. Specimens were subjected to corrosion casting by silicone resin, formalin fixation and routine dissection. Finally, histological examination and light microscopy were performed. Linear parameters, topography and arising points of adrenal arteries and opening points of adrenal veins were investigated.

Results. Superior suprarenal artery (SSA) was identified in all cases and classified into two types of architecture: solitary and supernumerary, that predestines absence of the accessory SSA. Middle suprarenal artery was identified in 41,1% of cases and presented by single or duplicated trunk with all types of ramification. Inferior suprarenal artery was identified in 91,1% of cases and presented by single or duplicated trunk with the biggest average diameter (1,94±0,26 mm).

Adrenal veins were identified in all cases. Some of them arise at the hilum while other ones penetrated adrenal capsule and arise over its surface. The first one is known as a central vein. Central veins were presented by single or duplicated trunk that opened separately from each other to inferior vena cava (IVC).

Anatomy of the central adrenal vein (CAV) is presented on the right. The average length was 11,9±2,16 mm, average diameter was 4,1±0,34 mm. The direction of CAV was ascending. The duplicated trunk was seen in

4 cases that drained separately into IVC. The adrenal hilum was predominantly located on the anterior surface closer to the superior margin. Aberrant drainage of CAV was classified into 2 groups. The first variation was seen in 3 cases that included CAV joined with accessory hepatic vein. The second variation was detected in one case when CAV was inserted into right renal vein.

Anatomy of the CAV is presented on the left. The average length was 19,4±3,41 mm, the average diameter was 3,8±0,37 mm. The adrenal hilum was predominantly located on the anterior surface closer to the inferior (renal) margin. The duplicated trunk was seen in 8 cases that drained separately into the left renal vein (LRV). In 32 cases (71,1%) CAV joined with left inferior phrenic vein (IPV) to form a common adrenal-phrenic trunk that opened into LRV.

A number of smaller peripheral adrenal veins (PAV) that were detected over the adrenal surface varied in a wide range (2-9). Peripheral adrenal veins arise at the level between medulla and cortex by the intramural tributaries. The most frequent collector of PAV was the external part (first 7mm) of CAV and were seen in 65 cases (72,2%). PAV that opened to IPV have an incidence 51,1% (3 cases on the right, 43 cases on the left). PAV of the medial sector that opened to IVC were detected just on the right in 39 cases, PAV of inferior sector that drained to the renal vein were detected just on the left side. Diameter of PAV varies from 0,6 to 1,3mm.

Discussion. This study shows blood supplying of the adrenal gland performed by several highly variable arterial sources. Suprarenal arteries were classified into superior, middle and inferior ones. According to the arising point they were subdivided into main, accessory and aberrant suprarenal arteries. The number of trunks defines solitary, doubled and supernumerary vessels. We also used a type of ramification as a criterion to classify arteries into monopodial, dichotomous and terminal.

Adrenal venous drainage is performed by the central and peripheral veins. The variations in CAV architecture were reported in 17,8%. The most frequent architecture of right CAV was presented by the single ascending vein arisen on anterior surface, closer to superior margin. On the left CAV was presented by the single descending vein arisen on anterior surface closer to renal margin and form a common adrenal-phrenic trunk which opened to LRV. According to its drainage PAV classified into

paraportal, superior, medial and inferior sectors. PAV of the paraportal sectors can be considered as external tributaries of CAV. PAV of superior, medial and inferior sectors more frequent on the left side.

Conclusion. Present study shows detailed anatomic classification of the adrenal vasculature based on 90 cadaveric specimens. Suprarenal arteries classified into -superior, middle, inferior; -main, accessory, aberrant; -solitary, supernumerary; - monopodial, dichotomous, terminal; -precapsular, capsular, cortical and medullary. The adrenal venous drainage is provided by central and peripheral veins. PAV classified into paraportal, superior, medial and inferior sectors according to their venous collector. CAV variations predict intraoperative bleeding during laparoscopic adrenalectomy and its conversion to open surgery. High incidence of PAV on the left can lead to revival of the adrenal gland after CAV embolization and spontaneous CAV thrombosis. The vascular adrenal architecture depends on adrenal gland topography and its relation to the main arterial sources and venous collectors.

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## ANATOMO-MORPHOMETRIC FEATURES OF HUMAN RENAL PYRAMIDS

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Morphological material for study of individual variability renal pyramids of the lower end of 89 kidneys were isolated from cadavers of mature and elderly people of both sexes ages (52 – male and 37 – female), 45 of which were right and 44 – left. For research next methods were used: macroscopic dissection of kidney, injection of radiographic masses in calicopelvic complex, isolated kidneys Рц-graphy, perform plane-parallel sections of the lower renal end, makrofotography of received cuts, morphometry of renal pyramids of kidney lower end. Study of pyramids of the lower end of kidney was made in 2164 and calculated planar slices.

During study the human pyramids were found between 3 and 7 renal pyramids arranged singly or in groups and distributed more evenly, so that in some cases there are more renal pyramids on front and back surfaces of the of kidney lower end. Often tops of the pyramids on our sections are

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