

ULTRASOUND EXAMINATION OF «LIVE» KIDNEY'S SIZE AND RENAL HAEMODYNAMICS IN THE NORM

Dgebuadze M. A.

Tbilisi State Medical University, Georgia
Department of Human Normal Anatomy

One of the urgent problems of modern theoretical and clinical medicine is the question of asymmetry of organs. To organs with pronounced asymmetry belong human kidneys: in the literature there are evidences of an asymmetry in the size of the right and left kidneys, about asymmetry of renal vessels as well, etc. Functional asymmetry of the kidneys was noted both in norm and in pathology. The morphofunctional parameters of right and left «live» renal vasculature in norm is less frequently studied at sonography [4, 5], whereas there is a huge amount of literature about size of autopsic kidneys; the presented data are contradictory: according to most authors, the size of the left kidneys is greater than the right; some authors did not observe any differences between the size of the right and left kidneys, etc.

The aim of research was to study the effect of side on normal «live» kidney dimensions and on its haemodynamics at sonography.

Material and methods. In Research Institute of Clinical Medicine of Georgia vital study of 50 kidneys of patients without renal diseases at the age of II period of maturity (women – 36-55, men 36-60 years of age) were conducted. In this paper we present the results of the performed retrospective analysis of obtained data.

In this retrospective study all CT examinations were conducted on the 16-slice CT scanner (Somatom Sensation Cardiac 16, «Siemens»). The following parameters were used for scanning: table rotation time – 0,42 seconds; slice collimation – 12x0,75 mm, increment - 0,5; tube voltage of 120 kv and an tube current of 500 mAs. For multislice computed tomographic angiography 75-100 ml of contrast agent «Ultravist» («Schering», 300-370 mg/ml) was injected into the median cubital vein of patients at a rate of 2.5-3.5 ml/sec. The axial sections were reconstructed with a thickness of 2 mm with intervals of 1 mm. Three-dimensional reconstructions were performed on the workstation using the following methods: Maximal Intensity Projection (MIP), Surface Shaded Display (SSD), Multiplanar Reconstruction (MPR), 3D reconstruction by volume rendering technique (VRT). Doppler investigation of renal arteries in color duplex scan mode was carried out according to the generally accepted technique on the Acuson CV 70 with a 3.5 MHz sensor. The length (pole to pole) and width of the kidney, as well as the size of its parenchyma were measured. The peak systolic velocity of the blood flow (Vps), the end diastolic velocity of the blood flow (Ved), the resistive index (RI) and the acceleration time (AT) were determined. Statistical analyses of the obtained results were performed by computer program package «Biostatistics». Differences were considered significant at *p* values less than 0.05.

Results and Discussion. There were no statistically significant differences in kidney width, as well as in the size of its parenchyma between right and left side not in women, nor in men; but kidney length in both sexes on right was statistically significantly greater than on left (Table 1).

Table 1. – The length and width of the kidney, and the size of its parenchyma according to the side of the kidney, and gender (mm)

Measurements	Women		Men	
	Right side	Left side	Right side	Left side
Length of kidney	107.8±7.2	106.2±6.7, p<0.001	110±2.7	111,4±2.5 p<0.05
Width of kidney	56.0±3.6	54.6±3.3 p>0.1	57.2±1.2	58.1±1.2 p>0.1
Parenchymal width	18.3±1.3	18.8±1.0 p>0.1	18.2±0.7	18.5±0.5 p>0.1

By comparison of hemodynamic parameters of right and left renal arteries no statistically significant differences were detected (Figure 1).

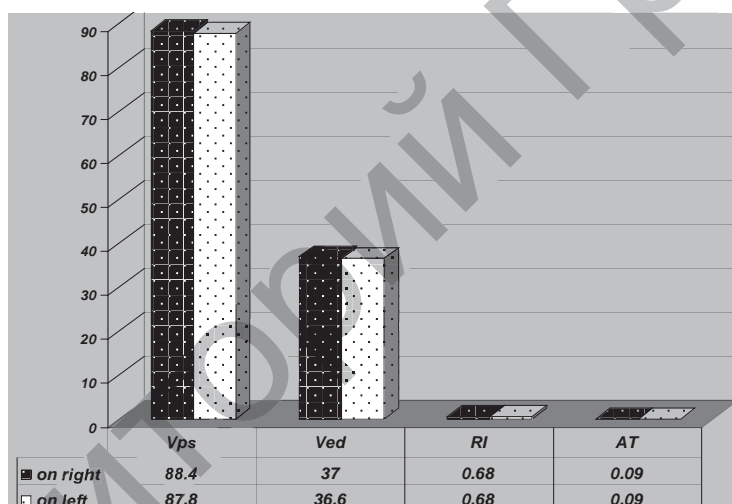


Figure 1. – Results of Doppler investigation of right and left renal arteries

It is generally assumed that renal blood flow is symmetric in the absence of renal artery stenosis and twin organs such as the kidneys have similar functions, but the question whether asymmetry is an inborn phenomenon or a consequence of hypertension remains unanswered. Many authors highlight the importance of studying the function of both kidneys separately [3]; inequality of renal blood flow between the kidneys, therefore, is likely to originate from structural or functional differences, or both. The asymmetry of kidney's vasculature is described in many morphological works, especially - the asymmetry of extraorganic renal vessels and their large branches [1]. However, according to our previous data of morphometric study of autopsic right and left kidneys no significant differences were found in number of glomeruli on right and on left [2].

Conclusions.

1. In our study the effect of side on normal kidney dimensions (kidney width and size of its parenchyma) and on its haemodynamics at sonography was not

revealed; length of kidney in both sexes on right was statistically significantly greater than on left.

2. For determining of the standard quantitative indicators of kidney, in our opinion, taking into the account the results of different investigations and literature data including results from our previous works, when evaluating the obtained results about renal size, it is first and foremost necessary to delineate from each other the results of the study of «live» and autopsic kidneys. It is also necessary to take into account the age and gender of the studied people and to create age-and-sex groups according to the generally accepted age classification.

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