ORIGINAL RESEARCH PAPER

Anatomy

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MORPHOMETRIC STUDY OF HUMAN CADAVERIC KIDNEY

Mr Shriniwas S Londhe Assistant lecturerDepartment of AnatomyBKLWR Medical CollegeTal-Chiplun, Dist-Ratnagiri Sawarde, Maharashtra-415606

Dr Pravin R Rathod* Assistant professorDepartment of AnatomyBKLWR Medical College *Corresponding Author

ABSTRACT

Kidneys are the excretory organs which secrete the end products of metabolism, excess water, maintain electrolyte and water balance (1). Developmentally they have excretory and collecting units, derived from metanephros and ureteric bud respectively (2). Due to development, morphological variation are present.

Material and method -Forty formalin fixed human cadaveric kidneys (23from right side and 17 from left side) were dissected at Bahrati Vidhypeeth Medical College ,Pune from 2015 to 2017.

Result: The average length of right kidney is 8.6 cm, breadth is 4.0 cm and width is 3.3 cm.The average length of left kidney is 8.9 cm, breadth is 3.9 cm and width is 3.6 cm.

Conclusion: Our morphometric findings match with Chitradurga and northwest population for right kidney .For Left side kidney we found similarity with Chitradurga population only. Our finding for both right and left kidney dimensions were less then Serbia population (central and eastern Europe) .Thus it showed geographical variations in morphometry of kidney with various state within India and Internationally.

Introduction

Kidneys are situated behind the peritoneum on each side of vertebral column. In fresh state kidneys are reddish brown and are surrounded by adipose tissue. Superiorly they are at level with the upper border of twelfth thoracic vertebra, inferiorly with third lumbar vertebra.

Right kidney is usually slightly inferior to the left due to its relation with liver. Left kidney is little longer and narrower than right and lies nearer the median plane.

Each kidney is typically 11cm in length, 6cm in breadth and 3cm in antero - posterior dimensions. [1]

Kidneys have a broad thick upper pole and a pointed, thin lower pole. The anterior surface is convex and posterior surface is flat. The lateral border is convex, medial border is concave with a hilum that consists of renal vein, renal artery and renal pelvis antero-posteriorly [3].

Material and Method

Place: Present study was carried out in the department of Anatomy, Bharati Vidhyapeeth Pune.

Period: 2015-2017

Methodology: Cunningham manual was followed for dissection of kidney. Forty human cadaveric kidneys was obtained from routine dissection and was fixed in 10 % formalin.

Twenty three right and seventeen left sided kidneys were dissected. Morphology of the kidneys was studied with the features like length, breadth and thickness in centimeter.

Photographs of the procedure was taken.
The measurements were taken by using Digital Vernier Caliper.

OBSERVATION AND RESULT:-

All 40 kidneys were bean shaped in appearance, all normal kidneys were considered in our study. The morphometric data obtained was tabulated analyzed and compared with previous studies.

Right Kidney: The Length of Right Kidney varied from 7 to 10.8 cm. with an average 8.6 cm. The Breadth of Right Kidney varied from 2.7 to 5.2 cm. with an average 4.0 cm. and the thickness of right kidney 2.4 to 4.9 cm with an average 3.3 cm. (shown in table no.1 and 2)

Left kidney: The Length of Left Kidney varied from 11.2 to 7.5 cm. with an average 8.9 cm. The Breadth of Left Kidney varied from 4.7 to 2.5 cm. with an average 3.9 cm. The Thickness of Left Kidney varied from 4.6 to 3 cm. with an average 3.6 cm. (shown in table no. 3 and 4)

TableNo.1 Showing Length, Breadth, Thickness, Right kidneys

Sr no	length	Breadth	Thickness
1	7.8	3.4	2.9
2	8.3	3.1	3.5
3	10.8	3.6	3.1
4	7	2.9	3.2
5	7.3	4	3.3
6	10.2	3.9	3.3
7	9.1	3.9	3.4
8	7.7	4.5	4
9	8.7	3.5	3.4
10	8.9	3.5	3.1
11	8.5	4.6	3.1
12	8.1	5	3.1
13	8.8	4.6	3.8
14	9.3	3.2	2.4
15	8.7	4.4	3.2
16	8.1	4.2	2.7
17	8.3	3.8	3.6
18	9.2	5.2	3.7
19	9.2	4.3	3.1
20	7.5	2.7	2.4
21	8.7	4.2	3.6
22	8.9	5.1	4.9
23	8.8	4.9	3.7

Table No.2 Showing length, breadth, thickness of Left Kidneys

Sr no	Length	Breadth	Thickness
1	8.2	3.4	3
2	8.5	3.9	3.5
3	7.5	3.4	3.2
4	7.9	4.1	3.5
5	8.1	3.9	3.8
6	11	2.5	3
7	10.5	3.5	3.8
8	10.2	3.6	3.4

9	8.2	4.1	3.3
10	9	4.5	3.8
11	7.7	4.7	3.9
12	7.8	4.3	3
13	8.3	4.3	3.8
14	11.2	4.1	4.6
15	10.3	4.6	4.5
16	8.3	3.6	3.1
17	9.4	4.7	4.2

Table No.3 Average and range ,of length, breadth, thickness of right and left Kidneys

Parameter(cm)	Right kidney		Left kidney	
	Range	Average	Range	Average
Length	7 to 10.8	8.6	11.2 to 7.5	8.9
Breadth	2.7 to 5.2	4.0	4.7 to 2.5	3.9
Thickness	2.4 to 4.9	3.3	4.6 to 3	3.6

The average length of right kidney is 8.6 cm, breadth is 4.0 cm. and width is 3.3 cm

The average length of left kidney is 8.9 cm, breadth is 3.9 cm. & width is 3.6 cm.

DISCUSSION:-

Kidney size is considered as an important aspect for many clinical conditions and hence it is worth studying. Previous studies showed that aging leads to aprogressive decrease in kidney size, especially after middle age [4,5] .

In our study right kidney showed an average length 8.6 cm, average breadth 4 cm and average width is 3.3 cm.

Left kidney showed an average length 8.9 cm, average breadth 3.9 and average width is 3.6 cm.

Our right kidney morphometric findings matched with Sateesh et al[6] and Sahni D[7] findings , but our right side thickness was higher than their finding.

Our left kidney findings match with Sateesh Naik . But our breadth was less and thickness was higher than Sateesh finding .

We got all findings less than that of Manisha et al[8] , Jovanovic D et al[9] , and Sivanageswara et al[10] for both right and left kidney , but our left side thickness was similar to Manish's[8] finding.

CONCLUSION:-

Our findings match for right kidney with Sateesh and Sahani's i.e from Chitradurga and northwest population. Our Left side kidney finding match with Sateesh finding i.e Chitradurga population but not with other population. Our finding were less then Serbia population finding .This shows geographical variations in morphometry of kidney with various state of India and abroad

Knowledge of these variation can be utilized in various fields of medical sciences i.e Anatomist, Radiologists and Surgeons for better clinical understanding and outcome.

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