

ORIGINAL RESEARCH

A study of morphometric pattern of cadaveric kidneys

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ABSTRACT

Kidney size is considered as an important indication for many clinical signs. The deviation of renal parameters from established normal values is an important criterion in diagnosing kidney disease. Morphometric studies of renal dimensions have gained much research attention as they are believed to possess significant clinical importance. The study consists of 30 cadaveric kidneys whose morphometric measurements were taken and their mean and standard deviation were calculated. These measurements were then compared to other earlier studies done. The normal dimensions calculated improve the knowledge needed for surgical and radiological procedures.

Key words: Cadaveric kidney, morphometric measurements

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INTRODUCTION

Kidneys are a pair of chief excretory organs which maintain the electrolyte and water balance and also serve as endocrine organs. They are retroperitoneal organs situated in the posterior abdominal wall beside the vertebral column and extend from T12 to L3 vertebra. Each kidney is bean shaped and has a length of 11 cms, breadth of 6 cms and width of 3 cms. The left kidney is 1.5 cm longer than the right. The average weight of a kidney is 150 grams in males and 135 grams females. 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 medial border is concave with a hilum that consists of renal vein, renal artery and renal pelvis posteriorly. Morphometric studies have gained much research attention as they are believed to possess significant clinical importance. Chronic diseases, urinary tract diseases, congenital anomalies, neoplasia, micro and macrovascular diseases were reported to significantly influence kidney sizes. Dimensions could possess significant clinical value. It is necessary to distinguish a pathological kidney from

a normal sized healthy kidney. Morphometric determination of renal hilum structures still appear limited and need to be strengthened with the additional findings. Therefore, the main objective of this study was to carry out morphometric study of human adult cadaveric kidney specimens and compare the finding with other studies. Determination of renal anatomical variants should be greatly encouraged to strengthen literature and improve the knowledge needed for surgical and radiological intervention.

Since the therapeutic decisions are often based on the results of measurements, accurate and reproducible normal parameters are of importance.

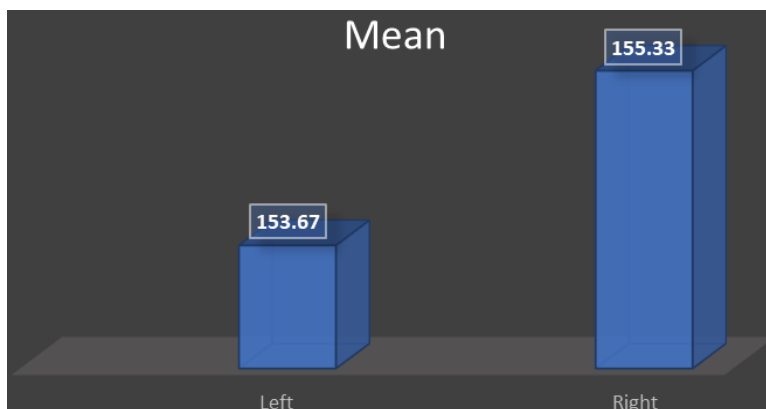
MATERIAL AND METHODS

The aim and objective of the present study was to determine weight, length, breadth and thickness in hilum of 30 formalin fixed cadaveric kidney obtained from the Department of Anatomy at Rama Medical College, Mandhana, Kanpur, U.P, India. Instruments to be used were Digital Vernier calliper and Digital weighing machine.

RESULT

Table 1: Showing mean weight difference in left and right side of kidney

Side	Mean	Std. Deviation	Std. ErrorMean
Left	153.67	18.78	4.8
Right	155.33	6.38	1.64

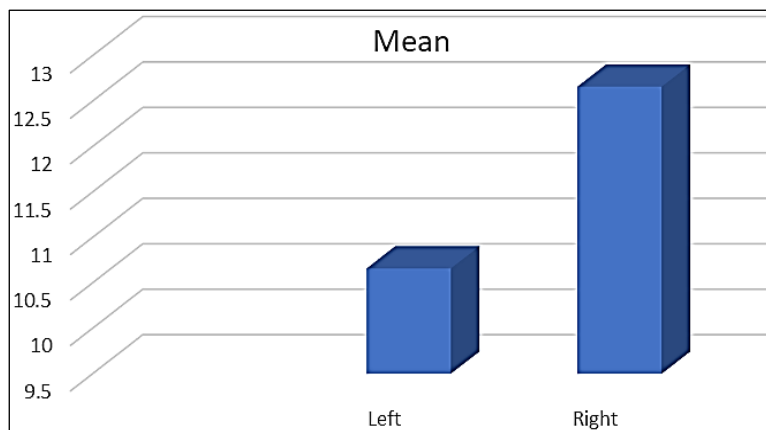


Bar Graph 1:Showing means weight difference between left and right kidney

In our current study we observed that the mean weight of left and right kidney is 153.67 & 155.33 gm. This was measured by weighing scales with proper accuracy. For measuring purpose, we put kidney for some hour without formalin for accurate weight.

Table 2: Showing mean length difference in left and right side of kidney

Side	Mean	Std. Deviation	Std. Error Mean
Left	10.66	1.71	0.44
Right	12.66	1.76	0.45

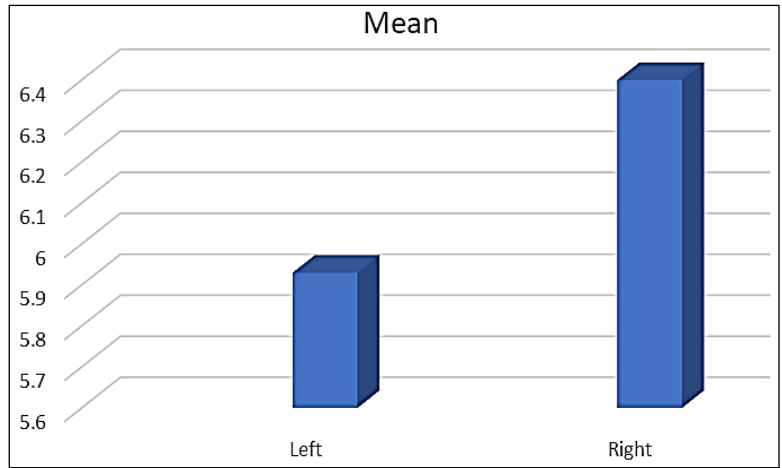


Bar Graph 2 Showing mean length difference between left and right side of kidney respectively 10.66 & 12.66cm

In our current study we observed the mean length of left and right kidney is 10.66 & 12.66cm.

Table 3: Showing mean breadth difference in left and right side of kidney

Side	Mean	Std. Deviation	Std. Error Mean
Left	5.93	1.53	0.39
Right	6.40	2.06	0.53

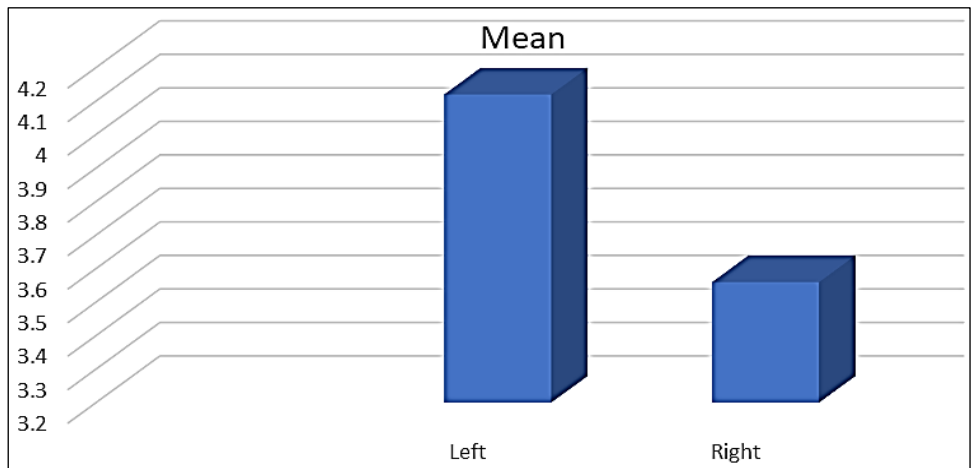


Bar Graph 3: Showing mean breadth difference between left and right side of kidney respectively 5.93 & 6.4 cm.

In our current study we observed the mean breadth of left and right kidney is 5.93 & 6.4 cm.

Table 4: Showing mean breadth difference in left and right side of kidney

Side	Mean	Std. Deviation	Std. Error Mean
Left	4.12	1.22	0.31
Right	3.56	0.93	0.24



Bar Graph 4: Showing mean thickness difference between left and right side of kidney respectively 4.12 & 3.56 cm

In our current study we observed the mean thickness of left and right kidney is 4.12 & 3.56 cm.

DISCUSSION

Kidneys are the important retroperitoneal organs that maintain the homeostatic function of the body and act as endocrine organs. The present study was done to find out morphological variations of right and left kidneys and describe their significance. In the present study, all the 30 (100%) kidneys were bean-shaped as mentioned in the standard textbooks of Anatomy.

In our present study, we observed that the weight of the kidney varied from 150 gm to 190 gm and the mean weight on the left side was 153.67 gm and right 155.33 gm Joao A. Pereira-Correia^[1] in their finding observed that the weight of right and left kidney were

169.83 gm and 173.00 gm respectively. Another study by J. Oyuela-Carrasco^[2].

Observed that the mean weight was 168.87 gm. All the above findings are close to our study.

In our study, we observed that the Length of the Kidney varied from 8 to 15 cm. The mean length of the left side kidney was 10.66 cm and the right was 12.66 cm while comparing with Sivanageswara Rao Sundara Setty^[3].

The mean length of right kidney varied between 8 and 14 cms with an average of 10.92 cms. The length of the left kidney varied between 9.5 and 14.5 cms with an average of 11.32 cms which is almost similar to our study. In another study by ranjeet s rathore^[4].

The mean length of the left kidney was 11.02 cm and those for the right kidney was 10.86 cm. This is also similar to our study^[5].

In our study, we found the thickness of the kidney varied from 2 to 5.3 cm. The mean thickness of the left side kidney was 4.12 and the right side 3.56 cm. which is similar to the study of Sivanageswara Rao Sundara Setty^[3] 59 who found the average width of right kidney 3.34 cms and left kidney 3.54 cms. One more study by to Ranjeet S Rathore^[6] observed that the mean width was 4.65 ± 0.84 cm on the left side while on the right side it was 4.73 ± 0.95 cm^[5].

Conclusion

Renal dimensions and hilar structural arrangements could possess significant clinical value. It is necessary to distinguish a pathological kidney from a normal sized healthy kidney. Determination of renal anatomical variants should be greatly encouraged to strengthen the current literature and improve the knowledge needed for surgical and radiological interventions.

Figures



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