

ROLE OF ULTRASONOGRAPHY AND COMPUTED TOMOGRAPHY IN DIAGNOSIS OF RENAL MASSES

Essay

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of radio diagnosis**

by

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿ وَقُلْ رَبِّ زِدْنِي ۖ نَمًا ﴾

{ 114 سورة طه }

صَدَقَ اللَّهُ الْعَظِيمُ

LIST OF ABBREVIATIONS

AML	Angiomyolipoma
AP	Arterial phase
CT	Computed tomography
EP	Excretory phase
HU	Hounsfield Unit
IVC	Inferior vena cava
L1	First lumbar vertebra
L3	Third lumbar vertebra
MIP	Maximum intensity projection
MPR	Multiplanar reconstructions
MRI	Magnetic resonance imaging
MSCT	Multislice computed tomography
RCC	Renal cell carcinoma
T12	Twelfth thoracic vertebra
TCC	Transitional cell carcinoma
VP	Venous phase
XGP	Xanthogranulomatous Pyelonephritis
3D	Three dimensional

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Introduction

Renal masses- like lesions are ubiquitous fortunately, most are benign. The most common renal mass is benign cyst. In fact, a pathologic investigation has shown that approximately one-half of the population over the age of 50 has one or more renal cysts.

(J.holder, Gustav konrad, 2006)

Renal masses may be detected, often incidentally. With a variety of imaging modalities. Approximately 50% of all renal cell carcinomas are diagnosed after incidental detection of a renal mass. Prior to wide spread of cross sectional imaging techniques including sonography, CT and MRI this percentage was only 10%.

(Ronald J .zagoria, 2004)

The available radiographic imaging modalities for evaluating a renal mass include intra venous pyelography (IVP), ultrasonography, CT, MRI and renal arteriography.

IVP can detect many renal masses but can not always distinguish solid from cystic lesions. IVP will also fail to demonstrate anterior or posterior masses that don't distort the architecture of the kidney.

(Martin I.Resnick, Andrew, 2005)

To determine whether a solid or cystic renal mass is benign or malignant. The mass is initially examined by U.S, CT, or a combination of these techniques.

(S.G Silverman, Hartman, 2006)

Ultrasonography is amore sensitive detector of small renal masses than is urography; it can differentiate solid tissue from fluid and can reliably establish the diagnosis of a simple renal cyst, and however it is a less sensitive detector than computed tomography.

In cases in which ultrasonography is indeterminate, computed tomography usually provide a definite answer.

(Robert w. schrier , ٢٠٠٦)

Multi slice computed tomography (MSCT) plays a central role in the evaluation of a patient with a suspected renal mass, not only in the detection but also in the characterization of the mass.

(Carrim and Murchison, 2003)

With advances in CT and U.S technology, radiologists can detect more masses and characterize cysts as small as ٥mm similarly, small solid masses may be also characterized with confidence.

(J.holder, Gustav konrad , ٢٠٠٦)

GROSS ANATOMY OF THE KIDNEY

The urinary system consists of two kidneys, two ureters, the urinary bladder, and the urethra (fig.١) .Tubules in the kidneys are intertwined with vascular networks of the circulatory system to enable the production of urine.

[Van De Graaff, 2001]

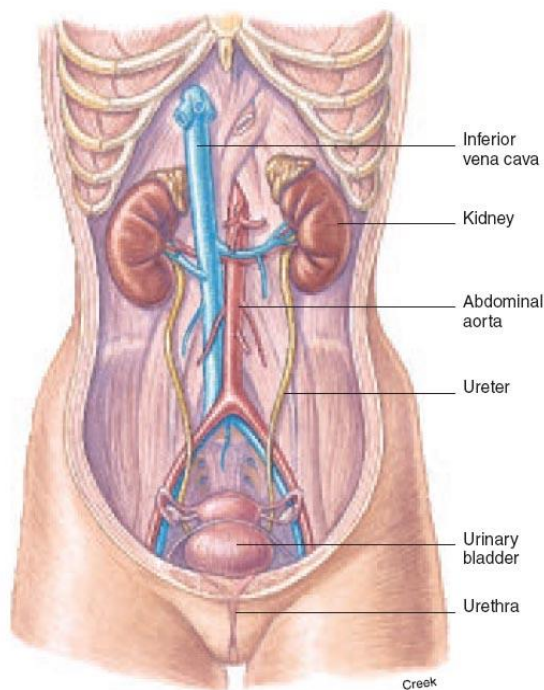


Figure ١ The organs of the urinary system are the two kidneys, two ureters, urinary bladder, and urethra **[Quoted from: Van De Graaff, ٢٠٠١].**

The kidneys are two bean-shaped organs lying on the retroperitoneal space on either side of the vertebral column in the most posterior part of the abdominal cavity.

They lie posterior to the lower portion of the liver on the right and posterior to the lower spleen on the left. The lower ribcage thus forms a protective enclosure for kidneys.

[Bontrager and Lampignano, 2005]

The right kidney being about ١,٢٠ cm lower than the left, probably due to its relationship to the liver.

The left is a little longer and narrower than the right and lies nearer the median plane.

Size and weight:

Each kidney is about ١١ cm in length, ٦ cm in breadth and ٣ cm in anteroposterior dimension.

In adult males the average weight is about ١٥٠ g, in adult females ١٣٥ g.

(*Brodel M., et al., ٢٠٠٥*)

Relations of the Kidney:

Relations to Surfaces:

The Anterior Surface Relations (fig.٢):

The convex anterior surface of the kidney actually faces antero-laterally and its relations differ on the right and left.

[*Standring et al., 2005*]

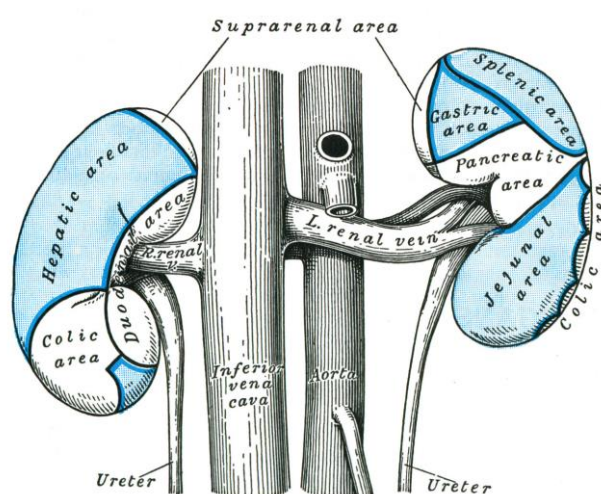


Figure ٢ The Anterior surfaces of the kidneys, showing the areas related to neighboring viscera [Quoted from: *Standring et al., ٢٠٠٥*].

Anterolateral Surface of the Right Kidney:

A small area of the superior pole is in contact with the right suprarenal gland.

A large area below this is immediately related to the renal impression on the right lobe of the liver. A narrow medial area is related to the descending part of the duodenum. Inferiorly the anterior surface is in contact laterally

with the right colic flexure and medially with part of the small intestine.

[Standring et al., 2005]

The areas related to the small intestine and in contact with the liver are covered by peritoneum which overlies the renal fascia, whereas the suprarenal, duodenal and colic areas are devoid of peritoneum.

[Standring et al., 2005]

Anterolateral Surface of the Left Kidney (fig. 9):

A small medial area of the superior pole is related to the left suprarenal gland. Approximately the upper two-thirds of the lateral half of the anterior surface are related to the spleen. ***(Standring et al., 2005)***

A central quadrilateral area lies in contact with the pancreas and the splenic vessels. Above this a small variable triangular region, between the suprarenal and splenic areas, is in contact with the stomach.

(Brodel M., et al., 2005)

Below the pancreatic and splenic areas, a narrow lateral Strip which extends to the lateral border of the kidney is related to the left colic flexure and the beginning of the descending colon. An extensive medial area is related to loops of Jejunum. ***(Brodel M., et al., 2005)***

The gastric area is covered with the peritoneum of the lesser sac and the splenic and jejunal areas are covered by the peritoneum of the greater sac. Behind the peritoneum covering the jejunal area, branches of the left colic vessels are related to the kidney. The suprarenal, pancreatic and colic areas are devoid of peritoneum.

[Standring et al., 2005]