COMPLICATIONS OF RENAL SURGERY

THESIS
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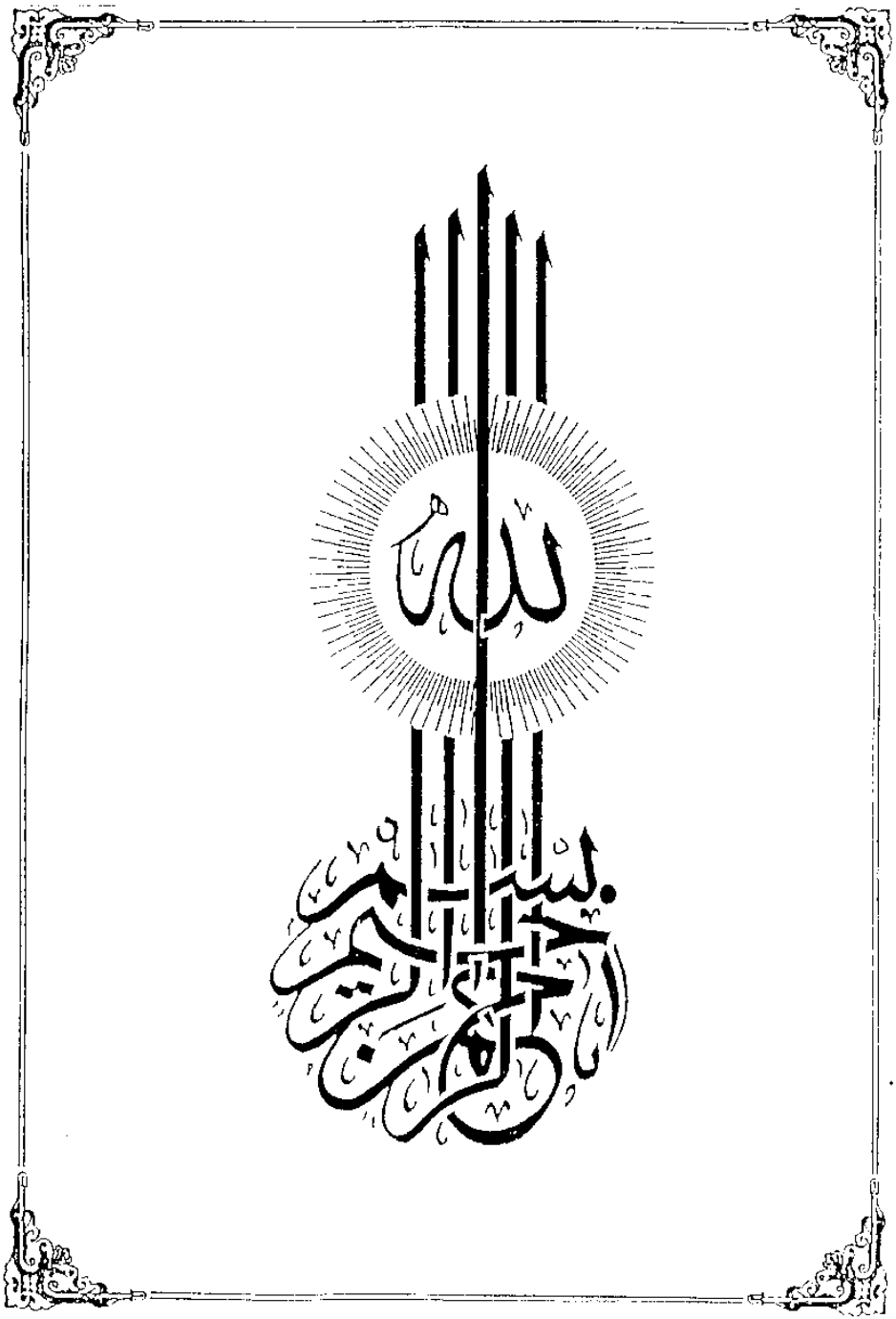
بسم الله الرحمن الرحيم

" نَرفَعُ دَرَجٰتٍ مَن نَشَاءُ
وَفَوْقَ كُلِ ذِى عِلمٍ عَلِيـــمٌ "

صدق الله العظيم



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INTRODUCTION

Definitive renal surgery dates back to 1869 when Gustave Simon carried out the first nephrectomy for treatment of ureterovaginal fistula. The operation was preceded by extensive experimental surgery on dogs to demonstrate that they can survive normally with a single kidney. From this date until now, renal surgery has achieved a dramatic progress in the different surgical techniques. This progress is too much aided by the recent advances in the diagnostic tools which were not available in the past, e.g. renal angiography, Ultrasonography and radioisotopic studies.

Despite the rapid progress in renal surgery, the recent advances in basic science e.g. physiology, pathology, immunology and biochemisty, and the recent surgical instruments, renal surgery still has its own complications even in the most skillfull hands. John Blandy stated:Every surgeon of any experience will tell you his favourite horror story about haemorrhage during a kidney operation, and if you have not encountered it, then you are either wanting in experience or unusually fortunate!.

In this work I want to express the common renal procedures, stressing on the possible complications, how to avoid, and to manage them.

I hope I would be able to realize what I have been trying to approach.

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SURGICAL ANATOMY OF THE KIDNEY

The kidney is a paired organ which lies on the posterior abdominal wall behind the peritoneum.

Each kidney is about 11 cm in length, 6 cm in breadth and 3 cm in the anteroposterior thickness. The average weight of the kidney is about 150 grams in the adult male and about 135 grams in the adult female. The center of the medial border of the kidney is concave and occupied by a deep fissure called the hilum, which transmits the renal vessels and nerves, and contains the renal pelvis.

The kidney consists of an internal medulla and external cortex. The medulla consists of the renal pyramids, the bases of which are directed toward the cortex, while the apices converge and project into the calices as the renal papillae.

The upper pole of the kidney lies nearer to the middle line than the lower pole, so that the axis, which is a line extending through the centers of the upper and lower poles, is oblique.

Any deflection of this axis suggests extrarenal pressure with displacement e.g. adrenal tumours, duplicated kidney, retroperitoneal tumours and other related conditions. It may also suggest malrotation and fusion anomaly as horseshoe kidney.

SURFACE ANATOMY OF THE KIDNEY:

The kidney occupies the area between the twelfth thoracic vertebra and the second lumbar vertebra. A vertical line, perpendicular to the middle of the Poupart's ligament, cuts the kidney longitudinally, so that one third of the kidney lies laterally and tow thirds lie medially. Posteriorly the twelfth rib crosses the kidney at an angle about 45 degrees, in such a way that one third or more lies above and under cover of the last ribs.

The right kidney occupies a more or less lower position than the left one, due to the displacement of the right kidney by the liver, also the kidneys occupy a lower position in children, women and long thin individuals. Anteriorly, the kidney may be located as extending from the interchondral articu-

lation of the sixth and seventh costal cartilages, to the sixth and seventh costal cartilages to approximately 2.5 cm. above the umbilicus.

Relation Of The Kidney To Neighbouring Organs:

a- The Anterior relations:

On The Right Side: The kideny is related to the following structures:

1- The suprarenal gland which occupies a small area on the medial part of the upper pole.

2- The right lobe of the liver occupies about two thirds of the anterior surface of the right kidney.

3- A small area along the medial border of the anterior surface of the kidney is related to the second part of the duodenum. This intimate relationship must be considered in operations near the pelvis

4- The lower part of the kideny is related to the descending colon and loops of small intenstine.

On The Left Side: The kidney is related to the following structures:

1- The suprarenal gland occupies a small area on the medial border of the upper pole.

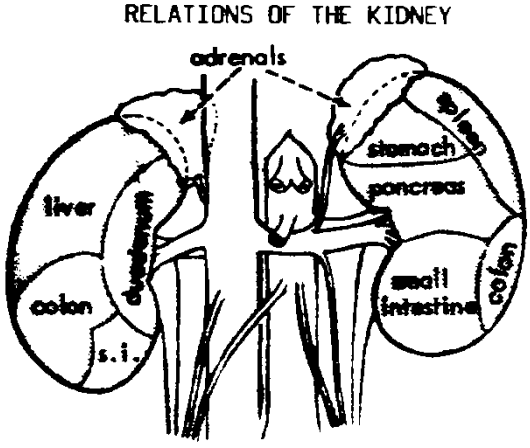

Fig. 1 Anterior relations

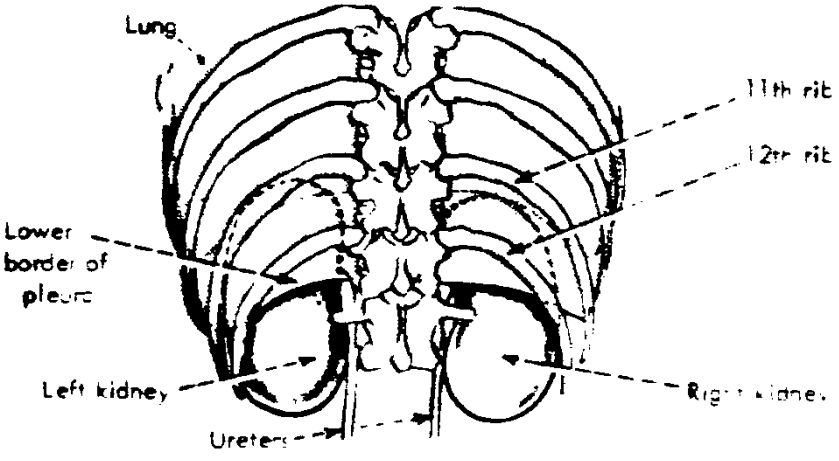

Fig. 2 Relations of the kidney to the lung, pleura, and ribs.

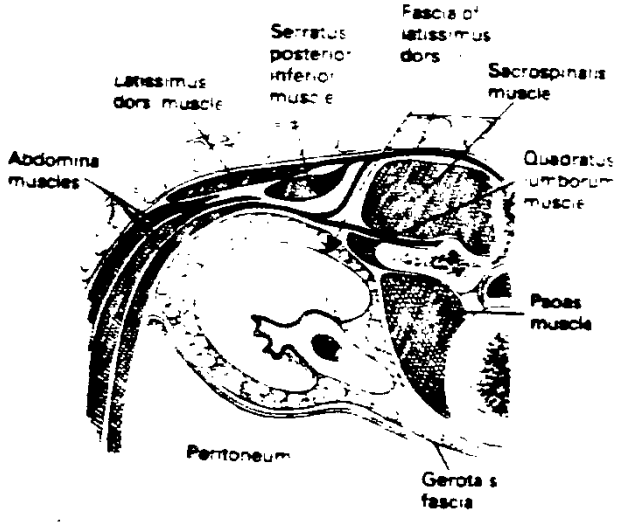

Fig. 3 Relations of the kidney to the muscles of the abdomen and back.

2- The spleen is related to the upper two thirds of the lateral half of the anterior surface.

3- A quadrangular area on the middle of the anterior surface is related to the pancreas and the splenic vessels in its upper border.

4- The lower part of the anterior surface is related to the splenic flexure of the colon and loops of jejunum.

b- The Posterior Relations:

The kidney lies on the diaphragm, the psoas muscle, the quadratus lumborum and the aponeurotic part of the transversus abdominis muscle.

Intervening between the posterior surface of the kidney and these structures, are the subcostal vessels, the subcostal nerve, the ilionypogastric and the ilio-iguinal nerves. The right kidney rests on the twelfth rib, and the left kideny rests on the eleventh and twelfth ribs. The diaphragm separates the kidney from the pleura which descends to form the costo-diaphragmatic recess. The relations of the kidney to the pelura is of upmost importance in renal surgery.

Fascial Coverings Of The Kidney:

1- The kideny is enclosed in the true renal capsule which is fibrous and closely applied but not adherent to the kidney.

2- The kidney is surrounded by a dense lemon yellow perirenal fat, which is more abundant on the posterolateral aspect of the kidney.

3- The perirenal fat is surrounded by a relatively dense fibrous fascia known as Gerota s fascia. This fascia consists of an anterior or Tolat and a posterior or Zukerkandle layers. Superiorly, a thin layer of fascia separates the kidney from the suprarenal gland. Inferiorly, Gerota fascia fuses around the ureter. Medially it is not continuous with the other side, but it closes infront of the vertebral column, so that perinephric collection in one side does not spread to the contralateral side.
The perinephric fat is traversed by fine but firm fibrous fibrils extending from the renal capsule to the fascia of Gerota. These fibrils are particularly dense superiorly and medially. In the

right side the medial fibres are condensed to form the duodeno-renal ligament and in the left side they form the lienorena. ligament. The uppermost fibres i.e. the diaphragmatic fibres, account for the difficulty encountered during dissecting the upper pole of the kidney. Outside Gerota's fascia, a thin layer of fat called the paranephric fat is present. It is through this layer that retroperitoneal infection may spread to the diaphragm and may traverse the crura of the diaphragm to induce infection in the pleural cavity.

Renal Blood Supply:

The blood supply to the kidney is about twenty times greater than that of any other organ.

1- The Renal Artery:

Emerges from the aorta, runs laterally to enter the kidney in the medial depression which is called the renal sinus. The right renal artery lies below the left and passes behind the inferior vena cava

RENAL BLOOD SUPPLY

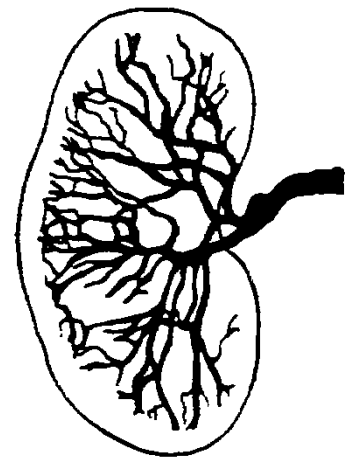

Fig. 4 The renal artery divides into anterior and posterior branches.

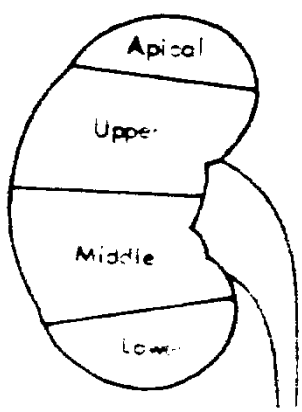

Fig. 5 The anterior division supplies these segments.

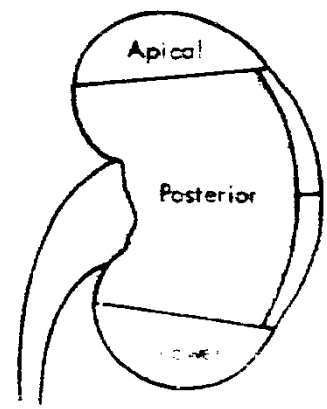

Fig. 6 The posterior division supplies the shaded area.

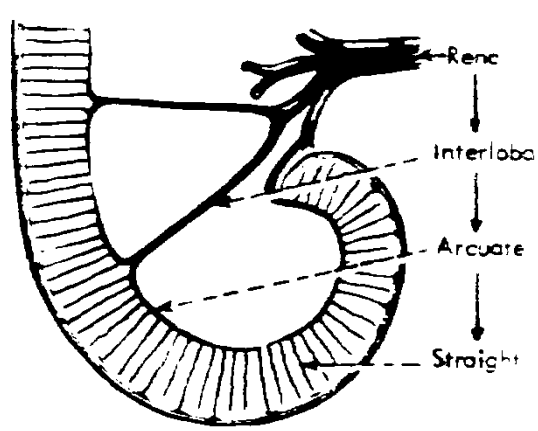

Fig. 7 Intrarenal distribution of the renal artery.