

CONGENITAL ANOMALY OF THE KIDNEY

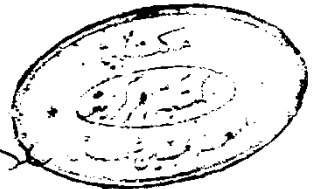
THESIS

Submitted in Partial Fulfilment for
The Master Degree in
UROLOGY



By

RAGAB FAHMY ABD-EL-MAGEED
M. B., B. Ch.



MS
15580

616.01
R. F.

Supervised By

Prof. Dr. FAROUK M. FAHMY
Professor of Urology



Faculty of Medicine
Ain Shams University

1981

DEDICATION

To The Memory Of My
Father, To My Wife, And
My Children: Ahmed,
Ghada And Mohamed.



C O N T E N T S

	<u>Page</u>
- INTRODUCTION	1
- ANATOMY OF THE KIDNEY.....	3
- EMBRYOLOGY OF THE KIDNEY	12
- CLASSIFICATION	16
- ABNORMALITY IN SIZE AND STRUCTURE	18
• Aplasia	18
• Hypoplasia	22
• Hypertrophy	29
• Cystic disease of the kidney	32
• Simple cysts	52
• Lymphatic cyst	66
- INCLUSIONS	71
• Adrenal inclusion	71
• Cartilagenous inclusion	75
- ABNORMALITY OF FORM	77
• Lobulated kidney	77
• Horseshoe kidney	77
- ABNORMALITY OF POSITION	92
• Simple ectopia	92
• Crossed ectopia	103
- ABNORMALITY OF ROTATION	114
- ABNORMALITY OF NUMBER	119
• Agenesis	119
• Supernumerary kidney	127
- ABNORMALITY OF RENAL BLOOD VESSELS.....	132
• Aberrant, accessory, or multiple vessels.....	132
• Renal artery aneurysm.....	137
• Renal arterio-venous fistula.....	142

	<u>Page</u>
- ANOMALIES OF COLLECTING SYSTEM	144
• Calyceal diverticulum.....	144
• Hydrocalicosis.....	146
- ANOMALIES OF THE URETERO-PELVIC JUNCTION	148
- HEREDITARY HEMORRHAGIC TELANGICTASIA	155
- SUMMARY	160
- REFERENCES	162
- ARABIC SUMMARY	

INTRODUCTION

INTRODUCTION

Congenital anomalies in the genitourinary tract occur more frequently in the kidney than in any other organ (Herbut, Donald-Smith, 1978). The presence of a congenital malformation per se, as rule, gives rise to no symptoms but should such conditions as hydro-nephrosis or calculous disease become superimposed or when an operation on the upper urinary tract such as nephrectomy is contemplated, complete urological examination becomes a matter of the utmost importance to determine the exact nature of the deformity, if present, before deciding upon any form of treatment (Davis, 1950). On the other hand, some abnormalities (e.g. polycystic kidneys, Hypoplasia) cause impairment of renal function (D. Smith, 1978). Congenital anomalies of the kidney and of its vessels are Legion, and show a wide variation both of incidence and degree. They are frequently associated with abnormalities of other organs, and on occasion are incompatible with life (Winsbury White, 1948). It is noted that the child with a gross deformity of an external ear associated with ipsilateral maldevelopment of the facial bones is apt to have a congenital abnormality of the kidney (e.g. ectopy, hypoplasia) on the same side as the visible deformity. Lateral displacement of the Nipples

has been observed in association with bilateral renal hypoplasia (D.Smith, 1978).

Congenital abnormalities of the upper U. tract include a diversity of abnormalities, ranging from complete absence to aberrant location, orientation and shape of the kidney as well as structural abnormalities involving the collecting system and blood supply. The wide range of anomalies results from a multiplicity of factors that interact intimately to influence renal development in a sequential and orderly manner, abnormal maturation or inappropriate timing of these processes at critical points in development can produce any number of deviations in the development of the kidney.

ANATOMY OF THE KIDNEY

ANATOMY OF THE KIDNEY

The kidney possess a capsule which gives the fresh organ, glistening appearance. Thick rounded lips of the kidney substances bound the hilum, from which the pelvis emerges behind the vessels to pass down into the ureter.

The kidneys lie high up on the posterior abdominal wall behind the peritoneum, largely under cover of the costal margin, at best only their lower poles can be palpated in the normally built individual. each kidney lies obliquely with its long axis parallel with the lateral border of the psoas major, on its vascular pedicle it lies well back in the paravertebral gutter, so that the hilum faces somewhat forewards as well as medially, as a result of this slight rotation of the kidney an antero-posterior radiograph gives a somewhat foreshortened picture of the width of the kidney, the normal kidney measures rather more than 4 X 2 X 1 inches and weights rather more than 40Z, the hilum of the right kidney lies just below, and of the left just above, the transpyloric plane about 2 inches from the midline.

The bulk of the right lobe of the liver accounts for the lower position of the right kidney. The upper pole of the left kidney may overlies the eleventh rib in a radiograph, that of the right kidney seldom

ascends so high, though it must be remembered that each kidney moves in a vertical range of almost 1 inch during full respiratory excursion of diaphragm.

Structures :

The structure of the kidney is displayed when the organ is split open longitudinally; a dark reddish and vascular cortex lies beneath the capsule and extends towards the pelvis between a number of darker striated areas, triangular in outlines, the pyramids of the medulla. The apices of several pyramids open together into a renal papilla, each of which projects into a minor calyx of the pelvis. The cortex contains glomeruli and convoluted tubules, The medulla contains all the collecting tubules, the parallel arrangement of which lends the striated appearance to the pyramids.

The histological and functional unit of the kidney is the nephron. The glomerulus consists of a tuft of capillaries clasped in Bowman's capsule, the incoming arterioles is of larger bore than the outgoing vessel. The efferent arteriole breaks up into capillaries that enmesh the convoluted tubules. Proximal convoluted tubule in the cortex leads from Bowman's capsule to the loop of Henle, which lies in the medullary pyramid. From the loop a distal convoluted tubule returns to the cortex and makes

contact with its Bowman's capsule at the macula densa, here lie the large gland-like cells of the juxta glomerular apparatus possibly concerned in the production of renin.

The relation of the kidneys are roughly symmetrical: Posteriorly the relation are the same, comprising mostly the diaphragm and quadratus lumborum muscles, with overlap medially on to the psoas and laterally on to transversus abdominis muscle. The upper pole lies on those fibres of the diaphragm which arises from the lateral and medial arcuate ligaments. Thus the posterior recess of the pleura lies posteriorly, a point of importance in posterior approaches to the kidney. The subcostal vein, artery and nerve, on emerging beneath the lateral arcuate ligament, touch the posterior surface of the kidney, as do the ilio-hypogastric and ilio-inguinal nerves. The upper lumbar arteries and veins lie behind the quadratus lumborum and thus do not come into contact with kidney. The hilum of the kidney lies over the psoas muscles and the convexity of the lateral border lies on the aponeurosis of origin of the transversus abdominis. The supra-renal glands lie somewhat asymmetrically.

The right gland pyramidal in shape surmounts the upper pole of the right kidney, behind the inferior vena cava and the bare area of the liver, while the left gland crescentic in shape is applied to the medial border of the left kidney above its hilum^m, behind the peritoneum of the posterior wall of the lesser sac.

The anterior relation of the two kidneys are more symmetrical than appears at first sight and may be studied simultaneously with advantage, on each side the peritoneum of the posterior abdominal lies in contact with certain areas of the kidney, while intervening structures force it away from the kidney in other areas. The hilum is separated from the peritoneum, on the right side by the second part of the duodenum and on the left side by the tail of the pancreas, the lateral part of the lower pole is separated from peritoneum by the hepatic and splenic flexures of the colon on the right and left sides respectively. The medial part of the lower pole, on each side lies in contact with peritoneum^u which separates it from coils of jejunum, here, between peritoneum and kidney is an artery, the ascending branch of the right colic and of the upper left colic arteries

respectively. The upper halves of each kidney, up to the superior pole, lie in contact with peritoneum. On the right kidney is the peritoneum of the hepatorenal pouch, in contact with the under surface of the liver. The left kidney is in contact with both stomach and spleen and the lienorenal ligament passes forwards from it along a line of attachment which separates these two areas. The perinephric fat is at body temperature of rather more solid consistency than the general body fat. It is in the shape of an inverted cone, filling the funnel-shaped hollow of the supra iliac part of the paravertebral gutter, and it plays a part in retaining the kidney in position. The development of nephroptosis (floating kidney) after severe loss of weight is thus explained.

The perinephric fascia :

Surrounds the perinephric fat and separates the kidney from the supra-renal gland. In truth it is little more than a vague condensation of the areolar tissue between the parietal peritoneum and the posterior abdominal wall, but certain of its attachments are worthy of note, since they serve to restrain the

extension of a perinephric abscess. At hilum of the kidney the fascia is firmly attached to the renal vessels and the ureter, a further factor in stabilizing the kidney and in discouraging spread of pus across midline. It ascends as a dome between the upper pole of the kidney and the supra-renal, and explains why in nephrectomy the latter gland is not usually displaced. It is usually described as deficient below when traced downwards, but it is far better to regard it as merging, below into the areolar tissue which connects the peritoneum to the posterior abdominal wall. Pus in the perinephric space does not track downwards, and injections into the space does not flow downwards. Similar remarks apply to an alleged layer of fascia passing between the anterior surface of the dome-shaped perinephric fascia in front of the aorta and inferior vena cava, this layer is no more than the areolar tissue that attaches the parietal peritoneum to all the structures on the posterior abdominal wall.

Blood supply:

The kidney is divided into various segments, each supplied by a single "end" arterial branch that generally course from one main renal artery. "Multiple" renal arteries is the correct term to describe any kidney supplied by more than one vessel. The term "anomalous" or "vessels" should be reserved for those arteries that originate from vessels