

Disease of the kidney and ureter

Introduction

The kidney as an organ has a lot of important functions some are secretory and others are excretory functions .the secretory regulatory functions of the kidney are more important than the excretory functions ,in the fact that that humans can survive weeks of lack of excretory functions but losing the regulatory function can be lethal if the patient lack it for hours.

The excretory function of the kidney include disposing nitrogenous waste products in the form of blood urea nitrogen,where as the regulatory function include regulating water balance in the body ,maintain electrolytes in the safe range in the circulation ,acid base regulation and control of blood pressure .

Anatomy

The kidneys are paired organs bean shaped roughly about the size of the fist of the hand measuring 10-12 cm length and 5-6 cm width ,covered by a tough connective tissue capsule the kidney capsule .the surface of the kidney is adherently covered on both sides by fat that cushion the kidney.the right kidney is lower down than the left ,the diaphragm cover the upper third of the kidneys where it is in close relation to the pleura.

The blood supply to the kidney is by the renal artery in 75% of cases it is single and it arise from the lateral border of the aorta just caudal to the origion of the superior mesenteric artery.

Congenital anomalies of the kidney

Absence of one kidney

Incidence is 1:1400 individuals it can be discovered accidentally or in the path of investigation of the urinary system for other problem by radiography or ultrasound

Renal ectopia

Incidence is 1:1000 individuals where the kidney is set away from its normal position in the same side or might be in the opposite side and called cross ectopia

Horse shoe kidney

Incidence is 1:1000 individuals there will be fusion of the lower pole of each kidney with its contralateral one at the level of L4 the patient might be asymptomatic or he might present with recurrent UTI caused by the stasis of urine due to the angulation of the ureter crossing the fused lower poles as it crosses over.

Unilateral fusion

In this condition the lower pole of one kidney will fuse with the upper pole of the contralateral kidney as it will be situated in the opposite side

Congenital cystic kidney

Also called polycystic kidney usually associated with cystic liver pancreas and lung rarely present before the fourth decade of life the patient might present with loin pain, haematuria, renal failure, UTI, hypertension or palpable mass due to enlargement of the kidney

The treatment is by either expectant or surgical removal of the cyst pressing on the parenchyma

Other types of cysts in the kidney include single simple solitary cyst, and the unilateral multicystic disease and infantile polycystic kidney having the same pathology but to a lesser scale.

Aberrant renal vessels

Common in female more on the left side more unilateral it will cause hydronephrosis and it is treated by division if the aberrant vessel is a vein but for aberrant arteries division will result in infarction, so it is treated by dismembering the pelvis and reconstructing it in front of the vessel

Duplication of the renal pelvis and ureter

Incidence is 4% with a resultant reflux of urine from one to another ending in repeated UTI the treatment is by dilating the stenosed ureter or resecting the damaged segment of the kidney by heminephrectomy

Hydronephrosis

It is aseptic dilation of the pelvis and calyces by obstructing or non-obstructing factors such as reflux or megaureter

Causes could be

PUJ obstruction like aberrant vessel or stenosis aperistaltic segment

Stone in the ureter

Tumor inside the ureter

Inflammation with or without stricture formation

Mass compressing the ureter from outside

Uretrocele

BPH urethral stricture bladder neck obstruction by tumor or infection

The clinical presentation varies from asymptomatic to renal failure or intermittent colic

Ultrasound and imaging may be useful in diagnosis

The treatment depends on the underlying cause

Infection of the kidney

Renal infection is more common in female the common causative organism is E.coli and Proteus.

The infective organism reach the kidney either through blood stream or it might ascend from lower or upper tract.

It can rapidly cause septicemia or more commonly acute pyelonephritis

- Clinically
- Fever
- Pain
- Headache
- Nausea
- Urgency
- Frequency
- Dysurea
- uraemia

investigation

- Midstream urine sample
- Culture and sensitivity
- Ultrasound
- Renal function test
- Blood culture
- Cystoscope

- Contrast study

Treatment is by treating the underlying cause and culture and sensitivity to give the proper treatment

Gentamycin and amoxicilline is the first line in the treatment options
chronic pyelonephritis

Interstitial inflammation and scarring

Pyonephrosis is a hydronephrosed infected kidney

Renal carbuncle abscess formation in the kidney parenchyma

Perinephric abscess

Renal neoplasm

- Benign tumors
- Adenoma
- Angioma
- angiomyolipoma

malignant tumors

it is divided into two groups

the first affect age 1-7 children group

the second adult group above age of 40

Wilms tumor

Age below five

Lower pole

Unilateral

The child present with renal mass, hypertension, haematuria and loin pain

Disease of the kidney and ureter second lecture

Renal tumors

It could be benign or malignant

Benign tumors could be adenoma, angioma, angiomyolipoma and oncocytoma

Incidentally found tumors are in 25% benign type, found in the course for investigating other medical problems

It is usually difficult to differentiate between benign and malignant tumors by imaging .

Most people do not have signs and symptoms in benign tumors, later on when the tumor extends to adjacent tissues and organs it will cause symptoms . haematuria might be a presenting symptom.

Another possible presentation is pain or lump.

Investigations

Ultrasound ,CT scan

If any imaging shows a mass above one cm it should be considered malignant until proven otherwise and thus should be followed for six months

Treatment

The patient should be surveilled actively by CT

Or surgical approach in the form of partial or radical nephrectomy

Malignant tumors

In children it is the Wilms tumor or nephroblastoma ,in adults it could be adenocarcinoma ,transitional carcinoma,lymphoma and sarcoma

Adenocarcinoma is the commonest type representing 85% of all malignant tumors

It represents 5% of all adult malignancies

It originates from the proximal renal tubular epithelium

The age incidence is 40-60

Male :female ratio 3:1

It is of unknown etiology, although an increased risk by smoking ,and family history

Histology it is clear cell type =renal cell carcinoma

Clinical presentation

Haematuria 40%,pain 40% ,mass 25%

**Symptoms might be due to metastasis like in lung =haemoptysis
dyspnoea,back pain ,wt loss ,apetite loss
,fever ,malaise, night sweat and jaundice**

Paraneoplastic syndrom

Non metastatic symptoms due to tumor factors

**In the liver it will cause increase in liver enzymes and jaundice,Stauffer
syndrome.**

**The patient might have anaemia or
polycythemia,hypercalcaemia,hypertension,or even diabetes**

Investigation

Urea ,blood picture,liver function test

Ultrasound ,CT ,MRI,chest x ray

Staging

TNM

Stage 1=confined to capsule

Stage 2=confined to gerota

Stage 3=to renal vein or lymph nodes

Stage 4=adjacent organs or distant metastasis

Treatment by nephrectomy

Wilms tumor

**It is a mixed tumor contain blastemal ,stromal and epithelial elements
of embryonal nephrogenic origin**

Age incidence less than 5years if occur older it carry bad prognosis

**An interesting finding is the child looks healthy while the tumor
rapidly grow**

**Clinical the child might present with fever nausea vomiting pain or a
mass**

The child might present with hypertension

When the child present with haematuria it indicate extension metastasis Usually to the lung ,rarly to liver and bones

Investigation

Gue blood picture ,renal function ,liver function

Ultrasound ,CT,MRI

Treatment by chemotherapy and surgery