

Kidney Infection

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Etiology & Route of Infection

it arises in the following ways:

- § Ascending infection: it is the commonest route of infection especially during vesicoureteric reflux. E. coli is the commonest microorganism, other gram negative organisms, streptococci & staphylococci.
- § Haematogenous infection: staphylococcal infection from primary in the tonsil, skin, teeth, also in renal tuberculosis, & candida.
- § Infection via lymphatics: is seen rarely in inflammatory bowel disease and retroperitoneal abscess.

Classification

- q Acute Pyelonephritis
- q Chronic Pyelonephritis
- q Pyonephrosis
- q Perinephric Abscess
- q Renal Tuberculosis
- q Xanthogranulomatous Pyelonephritis
- q Emphysematous Pyelonephritis

Acute pyelonephritis

It is more common in females (especially during childhood, puberty, marriage, pregnancy).

Clinical features:

- ü Headache, lassitude.
- ü Acute pain in the flank and hypochondrium.
- ü Fever, up to 38.8 or 39.5
- ü Symptoms of cystitis (urgency, frequency, dysuria)
- ü O/E tenderness in the hypochondrium and the loin.

Differential diagnosis:

pneumonia, appendicitis, cholecystitis.

Investigation:

- Midstream urine examination (bacteria, pus cells)
- Urine culture and sensitivity.
- KUB x-ray & Ultrasound of abdomen and pelvis

Treatment:

- while waiting for the C/S. broad spectrum antibiotic is start.
- analgesic
- good hydration
- then change the antibiotic according to the sensitivity result

Chronic pyelonephritis

- Usually associated with vesicoureteric reflux.
- Pathologically, there is interstitial inflammation and scarring of the renal parenchyma.
- The females are 3 times more common affected than males, usually under the age of 40 years.

Clinical features:

- Lumber pain: dull in nature.
- Increased urinary frequency and dysuria.
- Hypertension (40%).
- Headache, anorexia, malaise.
- Pyrexia: attacks of low grade fever.
- Anemia: due to renal impairment
- Uremia.

Investigations:

- Midstream urine examination (bacteria, pus cells).
- Urine culture and sensitivity.
- KUB x-ray & Ultrasound of abdomen and pelvis.
- Voiding Cystourethrography, Excretory Urography, Renal Isotope Scan.

Treatment:

- 1- Prevention of predisposing factors like acute infection, obstruction or stones.
- 2 - Surgical treatment with nephrectomy indicated in end stage disease with infection, hypertension.

Pyonephrosis

the kidney is converted into multilocular sac containing pus or purulent fluid

- ✓ Pyonephrosis can result from:
 - Ø infection of a hydronephrotic kidney
 - Ø Following acute pyelonephritis
 - Ø most commonly arise as a complication of renal calculus disease.
- ✓ usually unilateral

Clinical features:

- ✓ The classical traid of symptoms is anemia, fever and loin swelling.

- ✓ when the condition arises as an infected hydronephrosis, the swelling may be very large and the pyrexia very high and associated with rigors.

Investigations:

- ü GUE
- ü Plain X-ray → may show a calculus
- ü U/S → will demonstrate dilatation of the renal pelvis and calyces.
- ü I. V. U. → will show poor function and features of hydronephrosis on the affected side.

Treatment:

- It is a surgical emergency (lethal septicemia),
- Paraneural antibiotics should be given immediately and the kidney drained by percutaneous nephrostomy or open nephrostomy (if the pus is too thick to be aspirated).
- If there is a stone → should be removed
- Nephrectomy → if the kidney function is fully damaged and the other kidney function is good

Perinephric abscess

The causes include:

- 1) Extension from a cortical abscess.
- 2) Haematogenous spread of distant infection.
- 3) Extension of appendicular abscess.
- 4) Via periureteral lymphatics.

Clinical features:

- ü high swinging pyrexia
- ü Abdominal tenderness & fullness in the loin.
- ü Always there is high leukocytosis but there are no pus cells or microorganisms in urine.

Investigation:

- Ø G.U.E.
- Ø Plain abdominal X-ray → will show obscured psoas shadow, reactionary scoliosis (with the concavity towards the abscess,), elevation and immobility of the diaphragm on the affected side.
- Ø U/S and C T scan are diagnostic.

Treatment:

By either percutaneous or open lumbar incision drainage under antibiotics control

Renal Tuberculosis

- Ø It arises from a haematogenous infection from a distant focus
- Ø Usually unilateral
- Ø Mycobacteria and pus cells are discharged into the urine
- Ø there will be tuberculous abscess, pyonephrosis, perinephric abscess, and the kidney is progressively replaced by caseous material which may calcified (cement kidney).
- Ø Renal tuberculosis may be associated with tuberculosis of the bladder, epididymis.

Clinical features:

- Usually occur between 20 to 40 years of age, men are more affected than females.
- Frequency: day & night time frequency.
- Sterile pyuria.
- Painful micturation: suprapubic pain with dysuria.
- Renal pain: dull ache in the loin.
- Haematuria 5%
- Constitutional symptoms: Evening pyrexia, weight loss.
- O/E prostate, seminal vesicle, vas and scrotum are nodular & thick

Investigations:

- ü bacteriological examination of at least 3 early morning urine samples, stained with Ziehl - Nielsen stain to show the presence of acid fast bacilli
- ü Plain abdomen X-ray: may show calcified lesion of the kidney
- ü I.V.U.: hydrocalyces & hydronephrosis due to fibrosis of the renal pelvis or the ureter, tuberculous abscess may show as space-occupying lesion, shrunken bladder.
- ü Cystoscopy: the bladder is studded with granulomas near the ureteric orifice it may coalesce to produce tuberculous ulcer.
- ü chest X-ray: to exclude an active lung lesion.

Treatment:

- ü Antituberculous combination chemotherapy.
- ü Pyeloplasty in case of strictured renal pelvis.
- ü Boari flap in case of ureteric stenosis.
- ü Nephroureterectomy in case of non- functioning kidney.
- ü iliocystoplasty in case of small contracted bladder

Neoplasms of the kidney

- ✓ Benign neoplasms including adenoma, angioma & angiomyolipoma
- ✓ Malignant neoplasms including RCC (adult), Wilm's tumor (children).

Renal Neoplasms in Adults

Renal cell carcinoma (Hypernephroma) (Grawitz's tumor):

- It is an adenocarcinoma, arises from the renal tubules.
- Spread By
 - ☐ direct extension to adrenal gland, the renal capsule, into the renal vein, inferior vena cava (IVC), right atrium
 - ☐ By lymphatics to hilar and para-aortic lymph nodes
 - ☐ Hematogenous to lung, bone, liver, and brain.

clinical features:

it is more common in males than females.

- Haematuria: sometimes with clot colic.
- Pain in the loin.
- Mass in the loin.
- Varicocele in the man (rare).
- atypical presentation include:
 - ü Symptoms due to secondary deposits like fractures of long bones, cough and haemoptysis, pyrexia.
 - ü Anemia.
 - ü Polycythemia : due to high secretion of erythropoietin by tumor cells.
 - ü High E.S.R.
 - ü Hypocalcaemia
 - ü Nephrotic syndrome

Investigations:

- § I V U: stretched & distorted calyces, determine the function of the other kidney.
- § U/S , CT scan: it determine whether the mass is solid or cystic, hilar lymphadenopathy, renal vein involvement.
- § Renal angiography
- § Chest X-ray: to detect lung secondaries.
- § Isotope bone scanning, to detect bone secondaries.

Treatment:

- Nephrectomy is performed when the tumor is confined to the kidney with removal of the perinephric fat
- RCC does not respond well to radiotherapy or chemotherapy.
- Interlukin-2 use with promising results.

Prognosis: good in operable cases

Renal neoplasms in children

- Nephroblastom (wilm's tumor)
- It is mixed tumor containing epithelial & connective tissue elements, during the first 4 years of life.

Clinical features:

- Abdominal tumor; an abdominal mass which rapidly grows.
- Pyrexia
- Haematuria

Imaging: space occupying lesion in I.V.U, CTscan, U/S

Metastasis: by blood to lung, liver, bone.

Treatment:

- nephrectomy followed by radio therapy \pm chemotherapy
- Partial nephrectomy may be possible in patient with bilateral disease.

Prognosis: under 1 year of age 80% survive for 5 years, prognosis less good in older children.