

**Renal T B**

# EPIDEMIOLOGY

- Young to middle age usually affected, rare in children
- Male : female ratio = 2:1
- True prevalence and incidence not known as patients are usually asymptomatic
- With HIV pandemic, there is scanty evidence that genitourinary TB is also increasing. However there appears no difference in clinical presentation or mortality rates in HIV positive individuals

In Canada , there was a 25% reduction in incidence of genitourinary TB in the period 1991-95 compared with 1986-90. An interesting speculation attributed this decline to the antimycobacterial activity of quinolones which were progressively used over this period for the treatment of bacterial urinary tract infection.

# PATHOLOGY AND PATHOGENESIS

## ➤ Organisms

usual pathogen is *M.tuberculosis*

rarely *M. bovis*, *M. kansasii*, *M. avium*  
intracellulare complex can cause it

➤ Usually, the renal TB is the result of hematogenous spread from the lung during primary infection or secondary infection

➤ Because of high cardiac output and the resultant high oxygen tension, the kidney is the favored site of deposition and reproduction of bacilli.

Renal Cortical Capillaries (Initial Site)

Multiple tubercles throughout kidney

CMI(+)

CMI(-)

Granuloma formation

Progressive granuloma formation & necrosis

Fibrosis

Dormancy

Reactivation

Progressive Disease

Renal TB and Complications

# Progression of Disease

Progressive granuloma & necrosis in cortex



Shedding of organisms into lumen & spread to deeper parts



Hypertonicity of medulla inhibits Macrophage function



Continued proliferation of organism and destruction



Large areas of caseation and cavitory disease



Papillary sloughing and appearance of bacilli in urine and sterile pyuria is evident



Deformed calices and distortion of collecting system architecture due to fibrosis & mass lesion



Calcification of the lesions (an important feature of TB)

# Affection of ureter and bladder

Bacilluria



Ulceration of ureter and bladder



Fibrosis and scarring and calcification



Pelvi-ureteric junction obstruction, VUR, Hydronephrosis



Renal parenchyma thinned to a shell surrounding a large heavily calcified caseous mass filling the dilated pelvis & calices  
(Pyonephrosis or Putty Kidney)



Total loss of function of affected kidney (Autonephrectomy)

- The treatment of bladder neoplasia with BCG is sometimes complicated by a more severe cystitis than desired and systemic dissemination is possible.
- Cases of ureteral obstruction have also been described



# CLINICAL FEATURES

- Most of the patients remain asymptomatic despite many granulomas in the kidney
- Often suspicion is aroused because of persistent sterile pyuria but by this time the disease has usually spread extensively
- May present with dysuria and hematuria
- Back pain or flank pain reflects calyceal or ureteric obstruction
- Nocturia, urinary frequency and urgency may be present reflecting impaired concentrating ability, diminished bladder capacity and inability to empty completely

- These symptoms may also represent and must be distinguished from bacterial cystitis and UTI which frequently complicate renal TB
- Failure of antibiotics to resolve pyuria and lower tract symptoms should lead to consideration of tubercular UTI
- In fact when kidney is involved along with other organ in TB, symptoms are rarely referable to urinary system. Instead, they present frequently with respiratory symptoms, lymphadenopathy, or constitutional symptoms. Such symptoms are much less frequent with involvement of kidney alone

- In one series of 328 patients with pulmonary TB, 10% had positive urine culture and most of them were asymptomatic as regards urinary system
- Renal failure is uncommon as severe renal involvement is asymmetrical
- Azotemia is present in 5-12%
- More severe insufficiency occurs when there is bilateral VVR or ureteric involvement leads to hydronephrosis. It also occurs because of severe destruction of kidney and necrosis of interstitium

- Proteinuria (<1gm\24 hr) may be seen in 50% whereas 15% excrete >1gm\24 hr. rare patients may present with nephrotic syndrome due to amyloidosis
- Hypercalcemia may occur because of tubulointerstitial affection or because of simultaneous adrenal involvement
- Rare manifestation include hypertension, nephrogenic diabetes insipidus, RTA etc

# RADIOGRAPHIC FINDINGS

- In early stage of disease , no abnormality is seen
- IVP – most authorities consider it to be IOC giving unrevealed views of the collecting system with early minor papillary and urothelial changes. In late stage findings include
  - Distortion and dilation of calices (caliectasis)
  - Occlusion of calices, renal pelvis or obstruction at any level
  - Cavitations in renal parenchyma with parenchymal and papillary necrosis leading to filling defects
  - Tuberculoma at any level
  - Non function is manifested by absence of Reno gram in IVP

- Plain x ray reveals large mass of caseous material with diffuse and focal areas of calcification which are very suggestive of TB. They must be distinguished from renal stones
- USG- may reveal focal lesions
- CT- because of improvement in techniques, helical CT may become IOC. It particularly excels at demonstrating caliceal involvement, cortical thinning, parenchymal abscesses and involvement of other organ and retro peritoneum

- MRI doesn't appear to offer advantage over CT
- Ureteral involvement
  - Strictures with or without obstruction
  - Corkscrewing or beading
  - Pipe stem formation
  - Ulceration, hydroureter and rarely calcification
- Bladder
  - Luminal irregularities and filling defects
  - Thickened fibrotic walls leading to a markedly diminished capacity
  - Bladder calcification( d/d shistosomiasis)

# DIAGNOSIS

- Acid fast staining: yield is low because of scant bacilluria
- Urine culture:
  - Mainstay of diagnosis
  - High positive rates: 80-90%
  - 3-5 morning samples should be cultured for highest yield
  - False positive results can occur owing to colonization of the external genitalia by non pathogenic mycobacterium. It can be minimized by prompt culturing as opposed to older practice of concentrating 24 hr specimens which may have allowed proliferation of skin contaminants



- Positive in only 25% of patients with military TB  
some of them have normal urinary sediments
- Disadvantage is that culture results take long time
- Mantoux test: positive in about 90% of patients
- Urine PCR for mycobacterium tuberculosis
- Has been used in an effort to obtain an earlier diagnosis
- In an Indian study by Hemal AK, Gupta NP published in Urology 2000;56:570-74 of 42 patients with suspected genitourinary TB, several diagnostic evaluation including urinary PCR was evaluated. Urine PCR was positive in 81%, urine culture were positive in 31%, bladder biopsy was positive in 46% and 88% of IVP was suggestive of

- Guided aspiration from affected site increases the diagnostic yield by demonstrating the organism or typical histology in more than 95% of the patients

# TREATMENT

## ➤ Medical recommendations

- No adequately controlled RCT specific to renal TB comparing different treatment regimens have been performed
- None of the summaries of treatment recommendations for TB makes explicit references to the treatment of kidney and genitals instead combining them with other causes of extra pulmonary TB
- The general recommendations are similar to other forms of extra pulmonary TB
- Care should be taken with drugs such as amino glycosides and ethambutol in patients with renal

- Some authors suggest that the possibility of covert prostatic infection, which is more difficult to eradicate might be appropriately dealt with by treating all patients for 2 yrs. However no data exist to support this point of view and most estimates of this incidence of prostatic infection are low enough to suggest that this is a unnecessary precaution

# SURGICAL TREATMENT

- Nephrectomy may be done in cases of non functioning kidney. It accomplishes removal of bulk of caseous material allowing a much shorter course of therapy. It also prevents later formation of fistulas and sinuses
- More recently, laproscopic nephrectomy makes removal of an affected kidney with shorter recovery time with similar success rates
- Some authors are of view that chemotherapy for as long as 2 yrs is sufficient to eradicate the organisms from these massively infected organs reserving nephrectomy for those with persistent hematuria, pain or bacterial UTI, suspected cancer or rare cause of

➤ For obstructive uropathy , pyeloplasty , ureteral dilation and reimplantation may be needed

Bladder augmentation surgery can be done when bladder capacity is severely reduced

# ATT and Renal Diseases

- Renal insufficiency complicates the management of tuberculosis because some ATT drugs are cleared by Kidneys and by haemodialysis
- Decreasing the dose of selected drugs may not be the best method of treating TB because, although toxicity may be avoided, the peak serum concentration may be too low. Therefore, instead of decreasing the dose, increasing the interval is recommended.
- General approach involves measuring creatinine clearance. Management is similar in patients on haemodialysis and creative clearance less than 30 ml/min.
- Further, patients with ESRD may also be suffering from other clinical conditions such as DM and gartroparesis that may affect absorption and cause drug interaction.
- In patients with creative clearance more than 30 ml / min but less than 50 ml, there are insufficient data to recommend dosing. However, in such patients standard doses should be used but serum concentration must be monitored.

- Rifampin, INH, Ethionamide and PAS require no change in frequency or dose

Drug                      Recommended Dose and frequency

PZA                      25-35 Mg/Kg. → 3 times a week (Not Daily)

ETM                      15-25 Mg/Kg. → 3 times a week (Not Daily)

Levofloxacin 750-1000 Mg. → 3 times a week. (Not Daily)

Cycloserine              500 Mg.              → 3 times a week. (Not Daily)

Aminoglycosides 12-15 Mg./Kg. → 2 to 3 times a week.

(Not Daily)

- In general, antitubercular drugs should be given after



**All the  
best..**