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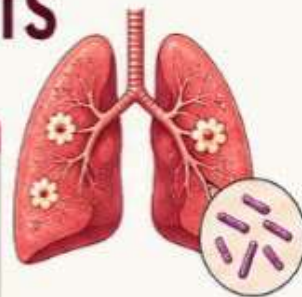
Extracorporeal Nephrology Group

An Academic Forum for Nephrologists,
DM Trainees, Physicians, and
Healthcare Professionals

*Knowledge grows when shared,
wisdom deepens when discussed.*

TUBERCULOSIS (TB) IN CKD & RENAL TRANSPLANTS

Higher risk • Atypical presentation • Early diagnosis • Timely treatment • Better outcomes

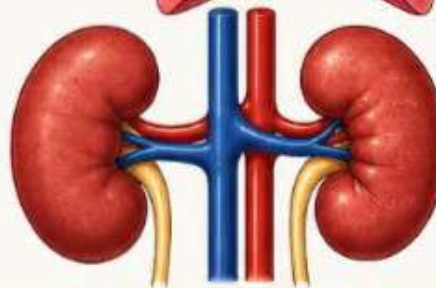


WHY THE RISK IS HIGH?

- Uremia – impaired immunity
- Hemodialysis exposure
- Malnutrition, Diabetes
- Immunosuppressive therapy after transplant
- Previous TB / Latent TB

PATHOGEN

Mycobacterium tuberculosis



CLINICAL PRESENTATION

Pulmonary TB (40–60%)

- Fever
- Cough > 2 weeks
- Weight loss
- Hemoptysis
- Breathlessness



Extrapulmonary TB (30–50%)

- Lymph nodes
- Pleura
- Bone & Joint
- Genitourinary
- Abdominal
- CNS



Disseminated TB (15–30%)

- Miliary TB
- Multi-organ involvement



DIAGNOSIS

Clinical suspicion



Imaging CXR / HRCT



Microbiology

- Sputum AFB
- CBNAAT
- Culture



Histopathology (Granuloma)



IMPORTANT DRUG INTERACTIONS

Rifampicin induces CYP3A4

- ↓ Levels of
- Tacrolimus
- Cyclosporine
- Sirolimus / Everolimus
- Corticosteroids



Risk of
Subtherapeutic
Levels
→ Rejection

What to do?

- ✓ Monitor drug levels
- ✓ Increase dose as needed
- ✓ Frequent monitoring of graft function



IMMUNOSUPPRESSION MANAGEMENT



Do not stop
immunosuppression
abruptly



Reduce MMF /
dose in severe
infection



Continue CNi
with drug level
monitoring

TREATMENT (9–12 MONTHS)

Intensive Phase
(2 months)

- Isoniazid (H)
- Rifampicin (R)
- Pyrazinamide (Z)
- Ethambutol (E)



Continuation Phase
(4–10 months)

- Isoniazid (H)
- Rifampicin (R)



Always give
Pyridoxine
with isoniazid



LATENT TB SCREENING & PROPHYLAXIS

Screen

- TST / IGRA
(before transplant
if possible)



Prophylaxis

Isoniazid 300 mg daily
+ Pyridoxine
for 6–9 months



OUTCOMES

Cure Rate
70–90%



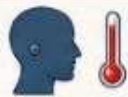
Mortality
15–30%



Poor outcomes with
disseminated TB,
delayed diagnosis,
or drug interactions



KEY TAKE HOME MESSAGES



High index of
suspicion for TB in
any CKD or transplant
patient with fever



Extrapulmonary &
disseminated TB
are more common



Rifampicin causes
major drug interactions –
monitor levels closely



Obtain tissue
diagnosis
whenever
possible



Treat adequately
(9–12 months)
with a multidisciplinary
approach

PREVENTION

- ✓ Screen for latent TB
- ✓ Treat latent TB
- ✓ Good infection control in dialysis units
- ✗ BCG not routinely recommended in adults



HIGH INDEX OF SUSPICION • EARLY TESTING • ACCURATE DIAGNOSIS • BETTER OUTCOMES



A multidisciplinary approach involving nephrologist,
infectious disease specialist and microbiologist is essential.

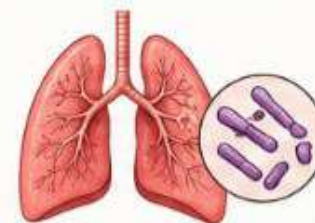


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TREATMENT OF KOCH'S (TUBERCULOSIS)



Robert Koch

Discovered *Mycobacterium tuberculosis* in 1882



TB is curable with early diagnosis, appropriate treatment and complete adherence.

1. STANDARD TREATMENT REGIMEN (Drug Susceptible TB)

INTENSIVE PHASE 2 MONTHS

Isoniazid
(H)



5 mg/kg
(Max 300 mg)
OD

Rifampicin
(R)



10 mg/kg
(Max 600 mg)
OD

Pyrazinamide
(Z)



20–25 mg/kg
OD

Ethambutol
(E)



15–20 mg/kg
OD



CONTINUATION PHASE 4 MONTHS

Isoniazid
(H)



5 mg/kg
(Max 300 mg)
OD

Rifampicin
(R)



10 mg/kg
(Max 600 mg)
OD



Total duration: 6 months (2HRZE/4HR) for most forms of TB

2. SPECIAL SITUATIONS

Drug Resistant TB (RR/MDR-TB)



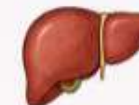
- Use second line drugs based on DST
- Longer duration (9–20 months)
- Specialist care essential

TB in CKD / Dialysis



- No dose adjustment needed for Isoniazid, Rifampicin, Pyrazinamide
- Ethambutol: 15 mg/kg thrice weekly after dialysis
- Monitor for toxicity

TB in Liver Disease



- Use with caution
- Monitor LFT
- Pyridoxine 25–50 mg/day with Isoniazid

TB in Pregnancy



- HR safe in all trimesters
- Avoid Ethambutol in first trimester
- Pyridoxine 25 mg/day

3. SUPPORTIVE CARE



Adequate
nutrition



Hydration



Avoid
Alcohol



Stop
Smoking



Pyridoxine
(with INH)
10–25 mg/day

4. MONITORING DURING THERAPY



LFT: Baseline & if symptoms



Vision testing: if Ethambutol used



Hearing: if injectable used (MDR TB)



CBC, Renal function: as indicated



Assess symptoms & adherence regularly

Watch for Adverse Effects

- Hepatotoxicity
- Peripheral neuropathy
- Optic neuritis
- GI upset
- Rash, hypersensitivity

5. DURATION OF TREATMENT (Guideline Based)



Pulmonary TB (most cases)

6 months



Extrapulmonary TB

6–9 months



Meningeal TB

9–12 months



Bone & Joint TB

9–12 months



MDR / RR TB

9–20 months

6. ADHERENCE IS THE KEY TO SUCCESS



Regular drugs
complete course



Family support
& counseling



Do not
miss doses



Follow up
regularly



Ensures cure
& prevents
drug resistance

7. KEY TAKE HOME MESSAGES



TB is curable
with standard
treatment



Complete the full
course – Do not
stop early



Take medicines
regularly &
correctly



Regular follow up
improves cure
& outcomes



Prevent spread:
Cover cough,
good hygiene

8. PREVENTION



BCG vaccine in infants (as per programme)



Early detection & treatment of TB



Good ventilation & cough etiquette



Good nutrition & strengthen immunity



EARLY DIAGNOSIS • APPROPRIATE TREATMENT • COMPLETE ADHERENCE • TB CAN BE CURED

“ Let us unite to eliminate TB –
for a healthier tomorrow. ”



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DIAGNOSIS OF TUBERCULOSIS IN CKD AND POST TRANSPLANT PATIENTS



TB in CKD and Post Transplant patients is often atypical and paucibacillary.
High index of suspicion and a combination of tests are essential for early diagnosis.

1. CLINICAL SUSPICION



- Prolonged fever, cough > 2 weeks
- Weight loss, night sweats, anorexia
- Atypical presentation (especially in CKD/Tx)
- Extrapulmonary TB is common

2. IMAGING



- **Chest X-ray:** may be normal or non-specific
- **HRCT chest:** increased sensitivity for early/atypical TB
- Imaging of involved organ (USG/CT/MRI) in suspected extrapulmonary TB

3. MICROBIOLOGICAL TESTS



- Sputum for AFB smear (low sensitivity)
- **NAAT (CBNAAT/GeneXpert):** detects MTB & Rifampicin resistance – preferred test
- **Culture (LJ/MGIT):** Gold standard – higher yield (takes time)
- Repeat samples (early morning sputum/BAL/induced sputum)

4. OTHER DIAGNOSTIC TOOLS



- **TST:** variable in CKD/Tx, may be anergic
- **IGRA** (e.g., QuantiFERON-TB Gold): useful adjunct, not affected by BCG
- **ADA** (Adenosine deaminase): pleural/fluid samples
- **Histopathology:** caseating granuloma supports diagnosis

5. EXTRAPULMONARY TB



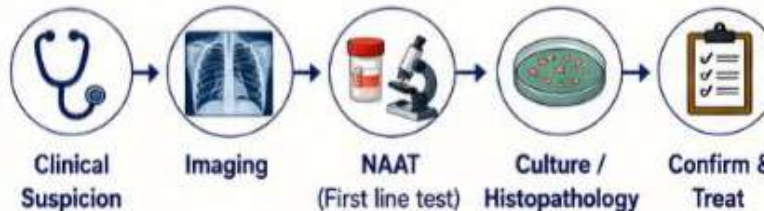
- Evaluate based on clinical site involved
- Pleural fluid: ADA, NAAT, culture
- Urine AFB/NAAT for genitourinary TB
- Tissue biopsy for histopathology & NAAT

SPECIAL CONSIDERATIONS



- CKD patients may have atypical, paucibacillary disease
- Immunosuppressed post transplant patients – higher risk of reactivation & atypical presentation
- Drug interactions & toxicity may affect test choice
- Always rule out other infections and malignancy

ALGORITHM (STEPWISE APPROACH)



KEY TAKE HOME MESSAGES

- ✓ Think TB in any CKD or post transplant patient with compatible symptoms.
- ✓ Use a combination of microbiological, radiological and immunological tests.
- ✓ NAAT (GeneXpert) is the preferred initial test.
- ✓ Early diagnosis improves outcomes and prevents complications.



HIGH INDEX OF SUSPICION • EARLY TESTING • ACCURATE DIAGNOSIS • BETTER OUTCOMES



Multidisciplinary approach involving nephrologist, infectious disease specialist and microbiologist is essential.