

# Tuberculous Peritonitis in PD Patients

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## Outline

- Introduction
- Pathogenesis
- Clinical Manifestations
- Diagnosis
- Treatment
- Prognosis

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## Introduction

- First reported case in 1980
- Risk of active Mtb in dialysis patients 10-15 times that of general population(1)
- Usually occur during first year of starting PD (2)
- Incidence of Mtb peritonitis in PD patients 1-4%
- Mortality rate 25-30% even with treatment
- Only variable predicting death is treatment delay

1. Akpolat T. *Perit Dial Int* 2009; 29 (52): S166-S169.  
2. Chau TN, et al. *Clin Infect Dis* 2007; 45: e343-e346.

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## Pathogenesis

- Majority of reported cases caused by *M. tuberculosis* (Mtb)
- Other Mycobacterium species reported to cause peritonitis (1):
  - *M. fortuitum* (39%)
  - *M. chelonae* (14%)
  - *M. avium* complex (11%)
  - *M. gordonae* (5%)
  - Others

1. Song Y, et al. *Nephrol Dial Transplant* 2012; 27: 1639-1644.

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## Pathogenesis

- Source is often unclear
  - Reactivation of latent Mtb
  - Miliary (disseminated) Mtb
  - Spread from contiguous foci
    - Lymph node
    - GI tract
    - GU tract

1. Abraham G, et al. *Perit Dial Int* 2001; 21 (5): 5202-5204.  
2. Vashisth R, et al. *Peritoneal Int* 2006; 7(5): 969-972.

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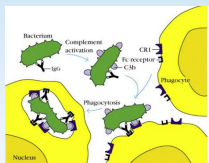
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## Pathogenesis

- Impairment of phagocytic function of macrophages
  - Reduction of opsonic molecules by dilution
  - IgG and C3b in dialysate effluent only 1% that of normal peritoneal fluid (1)



<http://quidet.com>

1. Keane WE, et al. *Perit Dial Int* 1992; 12 (2): 112-117.

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## Pathogenesis

- Impairment of phagocytic and bactericidal activity of PMN's (1)
  - Hypertonicity and acidic pH of dialysate
- Reduction of cytokine production (2)
- Reduction in number of peritoneal lymphocytes

1. Quanttrill SJ, et al. *Nephrol Dial Transplant* 2001; 16: 1024-1027.  
2. Ando M, et al. *Nephrol Dial Transplant* 2005; 20: 2497-2503.

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## Clinical Findings

	Talwani (1)	Chau (2)	Akpolat (3)	Song (4)
Abdominal Pain (%)	92	73	89	88
Fever (%)	78	55	81	81
Cloudy Fluid (%)	90	NA	77	88
PMN Predominant (%)	76	61	65	
Lymphocyte Predominant (%)	12	3	30	
Other (%)	12	36	6	

1. Talwani R, et al. *Clin Infect Dis* 2000; 31: 70-75.  
2. Chau TN, et al. *Clin Infect Dis* 2007; 45: e141-e146.  
3. Akpolat T. *Perit Dial Int* 2009; 29(S2): S166-S169.  
4. Song Y, et al. *Nephrol Dial Transplant* 2013; 27: 1639-1644.

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## Clinical Findings

- Non-specific symptoms:
  - UF failure
  - Weakness
  - Anorexia and weight loss
  - Nausea and vomiting
- Symptoms often acute
- Minority of patients present with typical pulmonary disease

1. Chau TN, et al. *Clin Infect Dis* 2007; 45: e141-e146.

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## Diagnosis

- Requires high index of suspicion
- Symptoms and clinical findings indistinguishable from bacterial peritonitis
- Concurrent bacterial infection occurs in 20-30% of patients
- Majority of patients (75%) have no known Mtb exposure or past disease
- Only 10% have known exposure or positive TST in the past
- 75% had negative or normal chest XR

1. Tahwani R, et al. Clin Infect Dis 2000; 31: 70-75.

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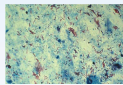
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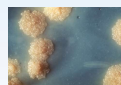
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## Diagnosis

Method	Characteristics
AFB Smear	Early diagnosis; low sensitivity and specificity
Culture	Gold standard; takes time (4-6 weeks)
Biopsy	Invasive
Polymerase Chain Reaction (PCR)	Early diagnosis; false positive and negative common; not sensitive in smear negative fluid; expensive



AFB smear<sup>1</sup>



Culture<sup>2</sup>

1. Akpolat T. Perit Dial Int 2009; 29 (S2): S366-S369.  
2. <http://www.cdc.gov/tb/education/corecur1/pdf/chapter4.pdf>

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## Diagnosis

- TST predictive value not clear
  - TST was positive in only 48% of cases where result was available (1)
  - Ten out of 11 patients in another series with TST result was anergic (2)
  - Does not distinguish between active and latent Mtb
- PCR only yielded 25-33% positive result in smear negative fluid

1. Tahwani R, et al. Clin Infect Dis 2000; 31: 70-75.  
2. Akpolat T. Perit Dial Int 2009; 29 (S2): S366-S369.

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## Diagnosis

- "...the diagnosis should be considered if prolonged failure to thrive, prolonged symptoms despite adequate antibiotics, or relapsing peritonitis with negative bacterial cultures." (1)
- Diagnosis should also be considered in patients from endemic areas (i.e. Indian subcontinent or Asia)

1. Li P KT, et al. *Perit Dial Int* 2010; 30: 399-423.

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## Treatment

- Based on protocols for tuberculosis infections
- Four drug regimen (1):
  - Isoniazid (INH)
  - Rifampin
  - Pyrazidamide (PZA)
  - Ofloxacin
- PZA and Ofloxacin stopped after 3 months
- INH and Rifampin stopped after 12-18 months

1. Li P KT, et al. *Perit Dial Int* 2010; 30: 399-423.

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## Treatment

- Pyridoxine given to prevent INH-induced neurotoxicity (1)
- Complicated by different metabolisms of antituberculosis drugs in dialysis patients (2)
  - Streptomycin not recommended due to ototoxicity and effect on residual kidney function
  - Ethambutol not recommended due to risk of optic neuritis
  - INH half-life 4X that of patients with normal renal function

1. Li P KT, et al. *Perit Dial Int* 2010; 30: 399-423.  
2. Alvin C, et al. *Perit Dial Int* 2000; 20: 362-367.

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## Treatment

- Compliance issues
  - Prolonged treatment course
  - Pill burden (renal and tuberculosis drugs)
  - Side-effects
- Implications of noncompliance
  - Drug resistant Mtb
  - Public health risk

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## Treatment

- Catheter removal still a contentious issue (1)
- About half requires catheter removal
- In review of 98 patients, 25 patients had catheter removed and 26 did not (no data on the other 47 patients)(2)
- Case reports of successful treatment without catheter removal

1. Li P,KT, et al. *Perit Dial Int* 2010; 30(3): 393-423.  
2. Alcocer T. *Perit Dial Int* 2009; 29(12): 1366-1369.

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## Non-Mtb Peritonitis

- Treatment protocol not well established
- Requires individualized regimens based on susceptibility testing
- Review of 57 cases of PD associated non-tuberculosis peritonitis (1):
  - Treatment ranged from 2 days to 24 months (mean 4.6 months)
  - Catheter removal in 52 patients (>90%)

1. *Nephrol Dial Transplant* 2012; 27: 1639-1644.

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## Prognosis

- Mortality rate is 20-30%
- Main factor predicting mortality is treatment delay
- Presentation of symptoms to diagnosis average 7 weeks

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## Summary

- Peritonitis associated tuberculous peritonitis is rare
- Very high mortality due to treatment delay
- Diagnosis requires high index of suspicion and takes a long time
- Treatment consists of multiple drugs and is prolonged
- Need for catheter removal is unclear

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Thank You

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