

# TUBERCULOSIS PLEURAL EFFUSION - MANAGEMENT

- **Introduction :** ETB – 15-20%
- Pleural effusion – 20% in non HIV
- Under reporting because of AFB negative in fluid
- In HIV patients: EPTB – 20%
- PTB + EPTB – 50%
- Pleural Effusion – 20%
- It is more common in young populations.  
Now tendency to affect aged patients.  
(*IndianJMedical Res*)

# PATHOGENESIS

- Typically 4-7 months following initial infection with TB.
- Rupture of small subpleural focus
- Delayed hypersensitivity reaction
- Possibility the intense inflammation obstructs the lymphatic pores in the parietal pleura which causes accumulation of protein in pleural cavity.

# CLINICAL MANIFESTATION

- Most commonly manifests as an acute illness
- Cough 70% , usually non productive
- Chest pain 75%
- Usually unilateral
- Bil – Occurs in 10%

# NATURAL HISTORY OF UNTREATED EFFUSION

- 90% usually subside spontaneously
- Effusion usually resolve and all other symptoms disappear within 2-4 months
- Follow up over time – 40-60% develop tuberculosis
- Size of original effusion and the presence or absence of small radiologic residual pleural disease do not correlate with subsequent tuberculosis
- Residual pleural thickening common sequelae ~ 50%.

# DIAGNOSIS

- Diagnosis depends on the demonstration of tubercle bacilli –
- In sputum
- Pleural fluid
- Pleural biopsy specimen
- Granuloma in pleura
- The diagnosis can also be established with reasonable certainty by ADA ↑

# TUBERCULIN TEST

- Positive in 60-75% patients, many of negative patients will become tuberculin positive in 6-8 week
- Negative tuberculin – HIV patients & malnutrition
- There may sequestration of PPD reactive lymphocytes in the pleural space.
- A circulating adherent cell suppresses the sensitized T- lymphocytes

# Sputum Examination

- Even in absence of underlying infiltrate
- Sputum AFB & culture – 55%

# RADIOLOGY

- Parenchymal infiltrates – 20%
- The classic patterns of primary tuberculosis in the form of non cavitory, lower lobe parenchymal infiltrates.
- CT Scan – 40% parenchyma involvement
- Encysted effusion usually occurs during ATT treatment
- Most often encystment occurs in the costoparietal regions ( Post aspects)

# PLEURAL FLUID – ANALYSIS

- Often protein  $> 5.0$  gm/ dl
- Usually more than 50% lymphocytes
- If symptoms less than 2 weeks then pleural fluid may reveal poly.
- Eosinophil  $> 10\%$  usually excludes the diagnosis of tuberculosis pleuritis.
- Mesothelial cells  $< 3\%$  .
- HIV infected patients with tuberculosis pleuritis may have significant number of mesothelial cells in the pleural fluids.

# ADA

- Enzyme that catalyzes the conversion of adenosine to inosine.
- 1978 – Pirus et al
- ADA-1 – All cells
- ADA -2 – Only in monocytes
- Majority of ADA in tuberculosis pleural fluid is ADA -2
- Higher the pleural fluid ADA level, the more likely patient is to have tuberculosis.

# ADA (contd.)

- Level of cut-off value
  - High Specificity – 83%
  - Sensitivity – 77-100%
- L: N > 0.75 – Specificity ↑
- High ADA – empyema
- - Rheumatoid arthritis
- But do not have pleural fluid lymphocytosis
- Cut off value < 40
  - 40-60

## ADA ( contd.)

- Although the use of a ratio of the ADA -1 to ADA -2 less than 0: 42 will slightly increase the sensitivity and specificity of ADA, the separation of ADA into its isoenzyme is not necessary.
- ADA level maintained at ambient temperature. It decreases with time. But addition of glycerol, sodium sulfate–Stable at room temperature for 3 months.

# INTERFERON – GAMMA

- Produced by CD4
- Sensitivity & specificity > 94%
- It retains diagnostic efficacy in HIV patients
- IFN -  $\gamma$  is more specific than ADA chiefly due to low levels of IFN in lymphoma and empyema.
- Expensive not used routinely.

# PCR

- PCR is certainly not superior to either the pleural fluid ADA or interferon gamma levels
- Sensitivity ~ 80%
- Specificity is not 100%
- False positive may occur due to DNA contamination
  - Nonviable organism
  - Latent infection
  - Reactivation due to immunosuppression caused by primary malignant involvement of pleura.

# Lysozyme

- Released from lysozyme containing cells – granulocytes, monocytes, macrophages.
- The value of lysozyme levels in the diagnosis of tuberculosis effusion, however, is controversial

- **ADA : Lysozyme** , has been found to be useful in differentiating tuberculosis from empyema. A thresholds value above 3.3 has been shown to be highly specific for tuberculosis pleural effusion.

# PLEURAL FLUIDS STAINS AND CULTURE

- In immunocompetent patients AFB smear – rarely positive.
- In HIV patients AFB smear is positive – 20%
- Pleural fluid culture is positive ~ 40%
- Use of BACTEC system with bedside inoculation provides higher yield and faster results than do conventional methods.

# PLEURAL BIOPSY

- The demonstration of granuloma in the parietal pleura suggests TB
- Other common causes of granuloma
  - fungal disease
  - RA
  - Sarcoidosis
- Acid fast stain is positive in 25%.  
Culture for AFB positive – 60% .  
Combination of three test. Positive in 91%.

- Standard recommendation for biopsy
- If ADA > 70      L:N > 0.75 – No biopsy
- If ADA – 40-70 : L:N > 0.75  
    Presumptive diagnosis of tuberculosis  
    Biopsy if clinical picture is not  
    supportive of tuberculosis
- ADA < 40- Clinical picture suggestive of  
tuberculosis – Pleural biopsy

- USG guided ( Tru cut ) biopsy of pleura

Involvement of pleura is not uniform, so closed biopsy may miss actual site of lesions.

- Closed biopsy with cope or an abrams needle can obtain adequate specimen and achieve 57-80% diagnostic rate in tuberculosis pleuritis.

# DISADVANTAGES

- Air leakage
- Needle breakage
- May not be diagnostic
- Abrams needle wide bore, needs skin incision
- Nonspecific changes upto as high as 68% have been reported in the closed biopsy.

# USG GUIDED TRU CUT BIOPSY

## Advantages

- It can localize the minimal or loculated effusion
- it can demonstrate focal pleural thickening
- sensitivity for pleural tuberculosis – 86%

# TREATMENTS

## Goals

- To prevent the subsequent development of active tuberculosis
- To relieve symptoms
- to prevent development of a fibrothorax

# ATT

- Average patient becomes afebrile without 2 week
- Complete resorption of fluid 6-12 weeks
- The incidence of pleural thickening at 6-12 months -50%

# CORTICOSTEROIDS

- No role of systemic steroids
- If more than mildly symptomatic
  - A therapeutic thoracentesis is recommended
- Severe symptoms & diagnosis has been established – Steroids

## **Surgical procedure**

- Large pleural effusion – thoracentesis,  
Decortication rarely necessary

## **Tuberculosis Empyema**

- ICTD + ATT

# HIV & TUBERCULOSIS PLEURAL EFFUSION

- Incidence – CD4 < 200 - 0 ↓
- CD > 200 - ↑
- Overall incidence - ±↑↓
- Duration of illness longer
- Chest pain less common

- Systemic manifestation – Fever, anemia, lymphadenopathy, organomegaly – common
- Mantoux test often negative (40%)
- AFB smear in pleural fluid -25%
- If CD4 count < 100. 50% positive fluid AFB smear positive
- Significant number of mesothelial cells in their pleural fluid
- Biopsy – Granuloma on pleural biopsy are less well formed
- In pleural fluid ,the level of albumin are relatively low
- The level of ADA in patients without AIDS are comparable.

THANK YOU