Tuberculosis in Children

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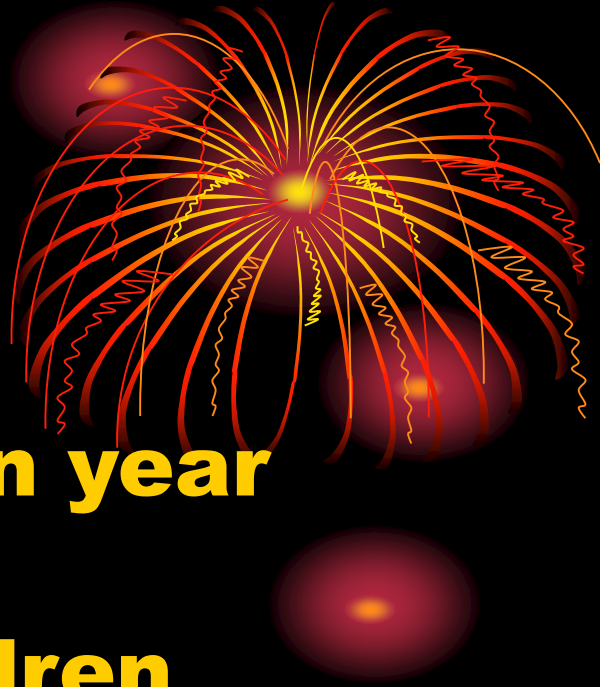
History of the disease

- **Spinal TB described in Neolithic man**
- **Bone lesions from mummies from Egypt**
- **Hippocrates (460 BC) first named TB as *phthisis***
- **Robert Koch (1843-1910) identified the bacillus**

Relevance to paediatrics

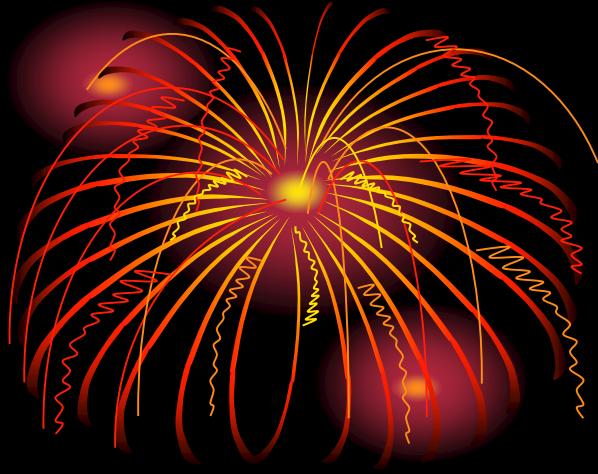
- Global emergency of TB declared by WHO in 1993
- Major cause of death and morbidity in developing world
- Increasing HIV increases the vulnerability

Epidemiology



- 8.3 million new cases in year 2000.
- 11% of them were children
- 75% of the disease burden is from 22 countries
- Poverty and deprivation are 2 most important factors in sustaining the epidemic

Spread



- Droplets inhalation
- Cavitating pulmonary disease is the main source
- Children <8 years contribute little to transmission
- Adult type disease develop around adolescents is a risk factor for transmission

Spread

- Risk of infection after exposure
  - Infectiousness of the source case
  - Proximity of the contact
  - Duration of the contact
- Exposure within congregate settings is a high risk factor
  - Household
  - Schools
- Disease manifest within a year of exposure

Risk of disease after exposure

- Less than 2 years
  - No disease 50-70%
  - Pulmonary disease 10-30%
  - Miliary TB 2-10%
- More than 10 years
  - No disease 80-90%
  - Pulmonary disease 10-20%
  - Miliary TB less than 0.5%

Primary pulmonary disease (Ghon focus)

- Local pneumonic consolidation at the site of deposition
- Usually transient and mild
- Clinically
  - Mild fever
  - Non productive caugh
  - FTT
  - Physical signs- minimal

Progressive pulmonary disease

- Poor containment at the site of entry
- Pneumonic consolidation, cavitation
- Intrapulmonary spread through bronchi
- Clinically
  - Fever, weight loss
  - Features of consolidation and cavitation
  - Localized wheezing

Lymph node disease

- Involvement of peri-hilar and paratracheal nodes
- Localized airway obstruction
  - Ball valve effect
  - Check valve effect
- Erosion of the node
  - Endobronchial TB
  - Diffuse pulmonary disease

Pleural effusion

- Unilateral
  - Spread from Ghon focus
  - Hypersensitivity reaction
- Bilateral
  - Haematogenous spread
- Uncommon less than 3 years
- Clinically
  - Low grade fever
  - SOB
  - Features of effusion

Miliary disease

- Disseminated disease in 2 or more organs with numerous gramulomata
- Due to
  - Lymphohaematogenous spread
  - LN erode in to pulmonary vessels
- Usually less than 2 years or immune compromised children
- Organs involved are
  - Lung
  - Liver
  - Spleen
  - Brain and meningies
  - Bone marrow

Miliary disease

- Clinically
  - Insidious onset
  - Gravely ill
  - High fever
  - Hepatosplenomegaly
  - Lymphadenopathy
  - Lung involvement is late with signs
  - Frank RD with alveolar capillary block
  - Features of meningitis
  - Peritonitis
- Prognosis is good with early detection and treatment

Adult type disease

- Generally around puberty
- Cloudy opacity in apical lung field
- Rapid paranchymal breakdown
- Clinically
  - Fever
  - Anorexia
  - Weight loss
  - Productive cough and haemoptysis
  - Minimal physical sighs
- Highly contagious

Other disease entities

- Meningitis
- Peritonitis
- Genitourinary TB
- TB enteritis
- Superficial LN
- Skin
- Pericardial disease
- Bone and joints
- TB of the upper respiratory

Diagnosis

Isolation of the organism

- The gold standard
- Difficult to get specimen in children
- Older child multiple sputum samples
- Younger child early morning gastric aspirate
- Smear positive only in 10-15%
- Culture takes time
- Overall isolation is possible in only 30-40% of children

Tuberculin skin test

- Tuberculin reactivity develops 3 wk to 3 months after exposure
- Mantoux skin test
- Intradermal injection of 0.1 mL of PPD with 5 tuberculin unit
- Measure amount of induration after 48-72 hours
- More than 10 mm is highly suggestive of childhood tuberculosis

Tuberculin skin test

- False positive
  - Non tuberculous mycobaceria
  - BCG vaccination
- False negative
  - Miliary TB
  - Immunodeficiencie
  - Malnutrition
  - Measels and some other viral infections
  - HIV

Other Investigations

- ESR
- Chest X-ray
- PCR

MANAGEMENT

Few facts

- Notification
- Contact tracing
- Parental education
- Referral to anti-TB campaign
- Follow up

Chemotherapy

- **Separate lecture**