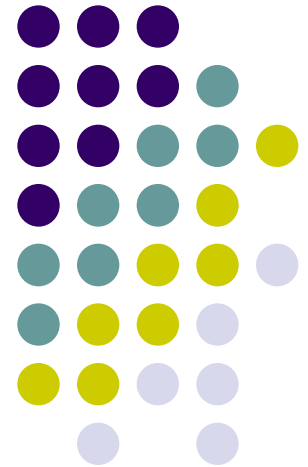


TUBERCULOSIS

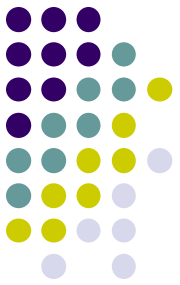
By
Dr. Najaf Masood
Assistant Prof Pediatrics
Benazir Bhutto Hospital
Rawalpindi



Tuberculosis

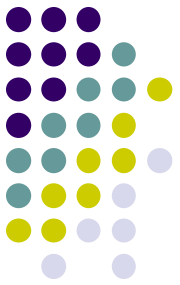


- Infectious , Systemic, Chronic granulomatous disease caused by mycobacterium tuberculosis



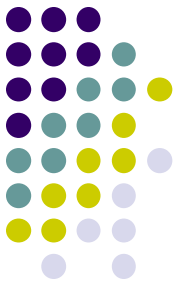
DEFINITION

- Latent Tuberculosis infection
 - No sign & symptoms
 - +ve tuberculin skin test
 - Normal chest X-Ray
- Tuberculosis disease
 - Apparent Clinical Manifestations
 - Findings on chest X-Rays



ETIOLOGY

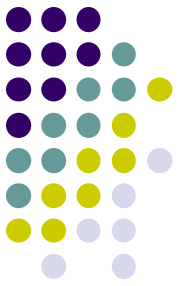
- Mycobacterium Tuberculosis
- Non-Spore Forming
- Non-Motile
- Acid fast
- Weakly Gm + ve curved Rods
- Lipid Rich Cell Wall
- Take 3-6 wks to isolate from clinical specimens & additional 4 wks for drug susceptibility



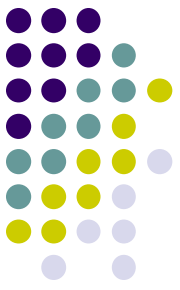
EPIDEMIOLOGY

- WHO Estimates
 - 2.0 Billion ----- Infected
 - > 8.0 Million ----- New Cases / year
 - 3.0 Million ----- Deaths worldwide
- In Children
 - 1.3 Million ----- New Cases / year
 - 450,000 ----- Deaths / year
- Untreated infected Child has 40% likelihood of developing tuberculosis

ENVIRONMENTAL FACTORS



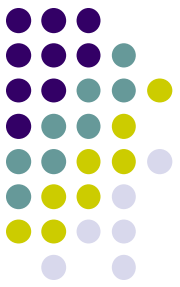
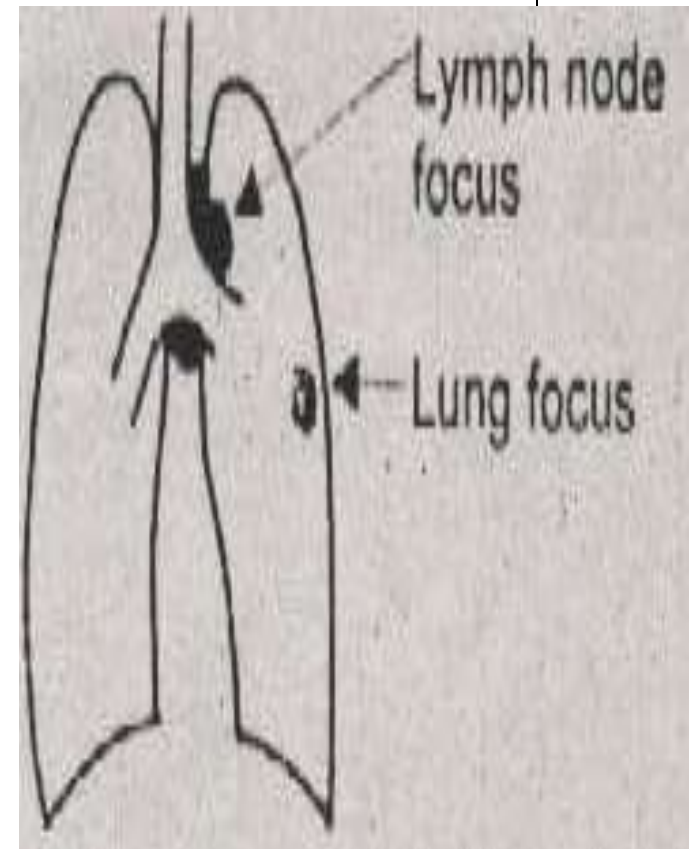
- Poor Socio-Economic Status
- Overcrowding
- Poor Nutrition
- Inadequate health coverage
- Ineffective TB control programs



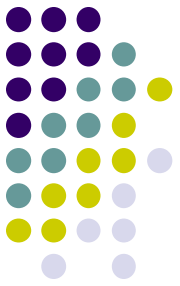
- Age
 - < 5-years and Adults
- Transmission
 - Airborne Mucus Droplet Nuclei
 - +ve Sputum Smear for AFB
 - Extensive Upper Lobe Infiltrates or Cavity
 - Copious amount of Thin Sputum
 - Forceful Cough
 - Rarely by direct contact with infected discharge
 - Children.....Non infectious
- Non Infectious within 2-Weeks of Treatment

Pathogenesis

- Primary Complex
- In-Alveoli & Alveolar ducts
- Survive within Non-Activated Macrophages



Fate of Primary Complex

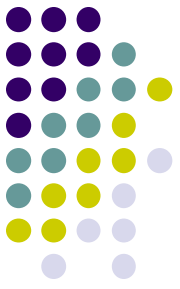


- Heal
- Calcify
- Caseous Necrosis
- If continue to enlarge
 - Fibrosis & Encapsulation
 - Incomplete Healing

Time Interval b/w Infection & Disease



- Disseminated and Meningeal
 - 2 – 6 Months
- Lymph Node & Endobroncheal
 - 3 – 9 Months
- Bones & Joints
 - Years
- Renal
 - Decades



IMMUNITY

- Cell-Mediated Immunity ---- 2-12 Weeks
- Macrophages, Lymphocytes → Lymphokines
→ Chemotaxis
- Helper T-Cells & Suppressor
- Balance Among Mycobacterium Antigen Load ,Cell Mediated Immunity & tissue Hypersensitivity

The natural course of tuberculosis

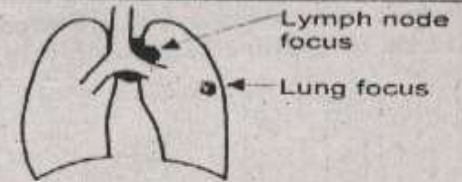
INFECTION

A child becomes infected by inhaling infecting particles from a coughing adult with active pulmonary tuberculosis.

After 4-8 weeks PRIMARY COMPLEX

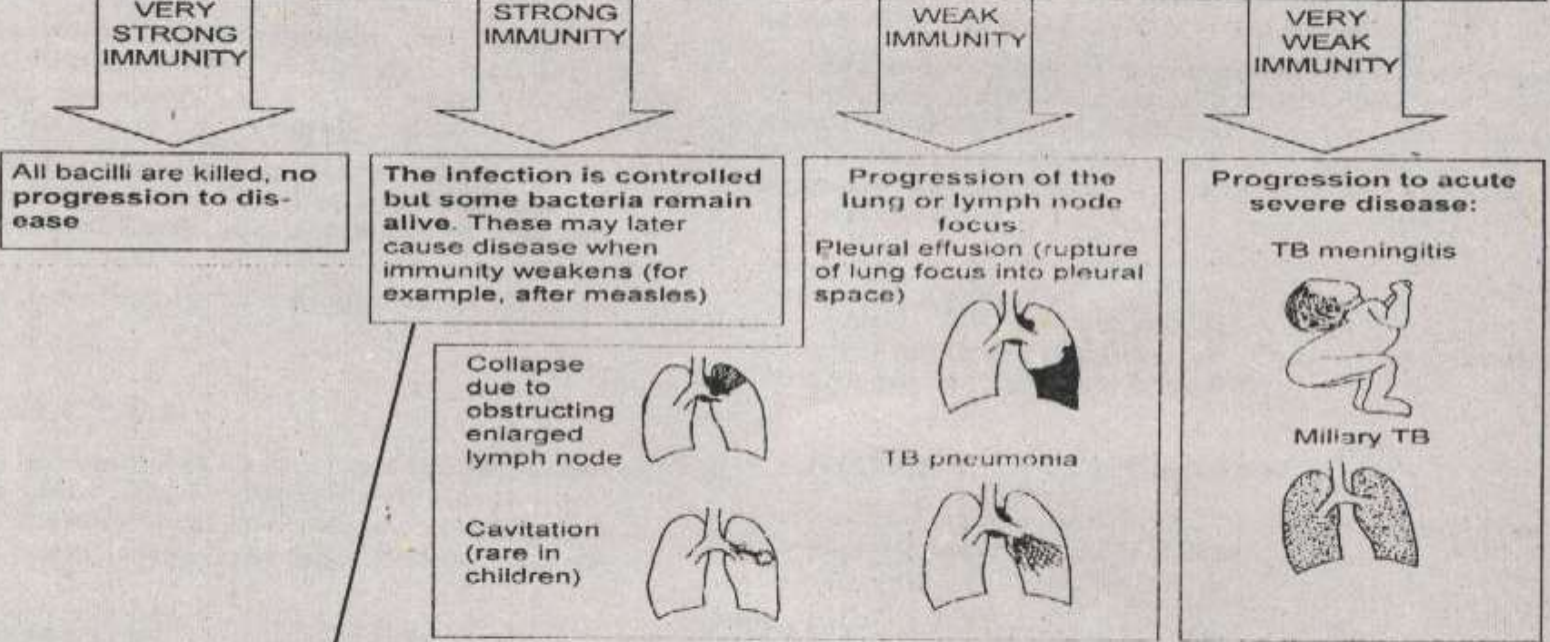
The inhaled TB bacilli multiply and form the **primary complex**. This consists of a lung focus (2-15 mm²) and a focus in the neighbouring lymph nodes.

- Clinical features:*
- Unspecific febrile illness
 - Phlyctenular conjunctivitis
 - Erythema nodosum



OUTCOME depends on immunity

The child's immunity determines the outcome after primary infection



End of first year after infection

After several years

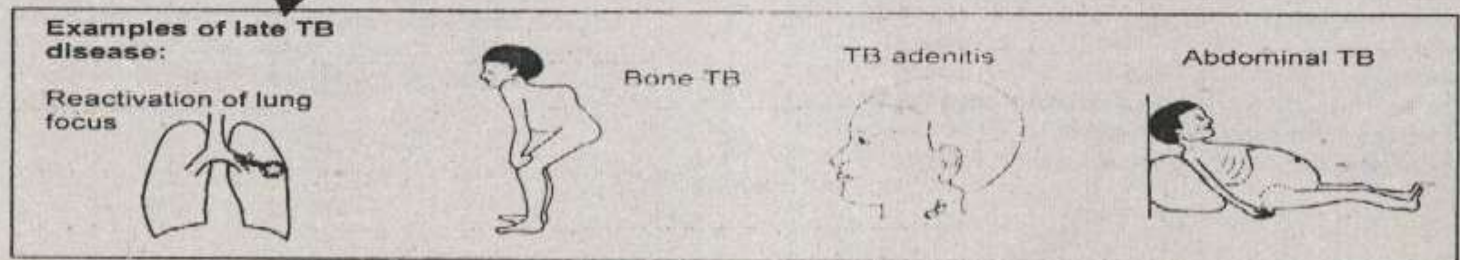
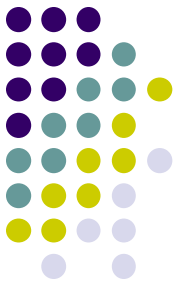
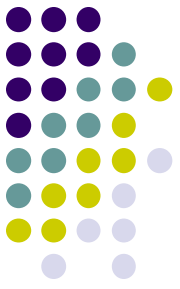


Figure 6-1 The natural course of tuberculosis.



CLINICAL FEATURES

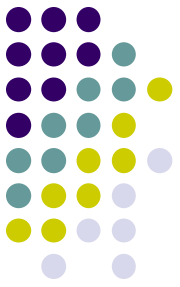
- Primary Pulmonary Disease
 - Hilar LN → Hyper Inflation → Atelectasis
→ Collapse, Consolidation Lesion
 - Endobroncheal, Fistula
 - Lobar Pneumonia
 - Pneumothorax
 - Miliary



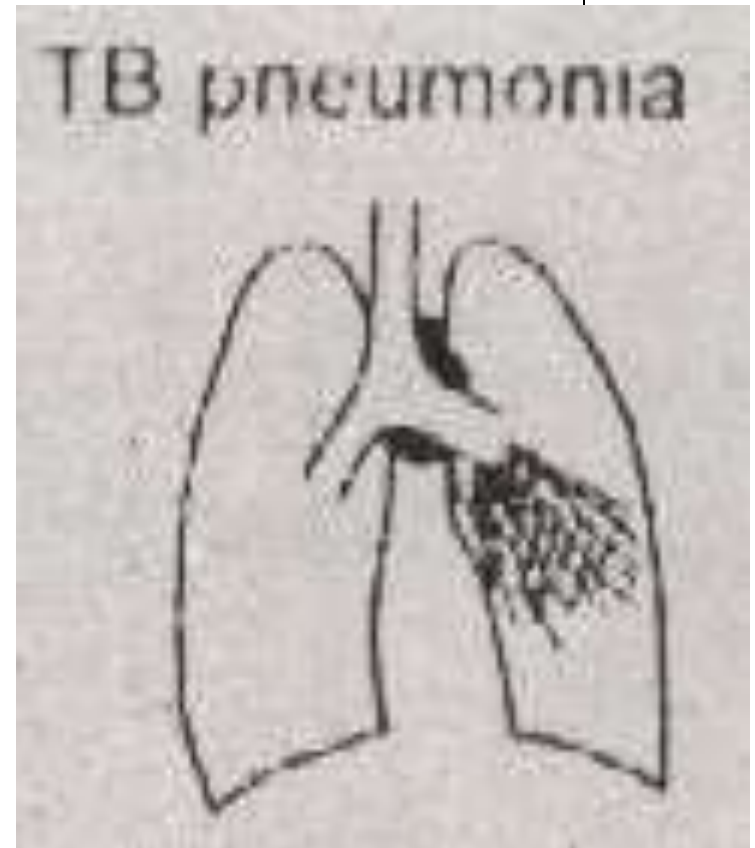
Contd...

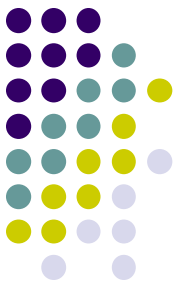
- Infants are more likely to express sign & symptoms
 - Non-Productive Cough
 - Dyspnea
 - Localized Wheeze
- Less Frequent
 - Fever
 - Malaise
 - Anorexia

PROGRESSIVE PRIMARY PULMONARY DISEASE



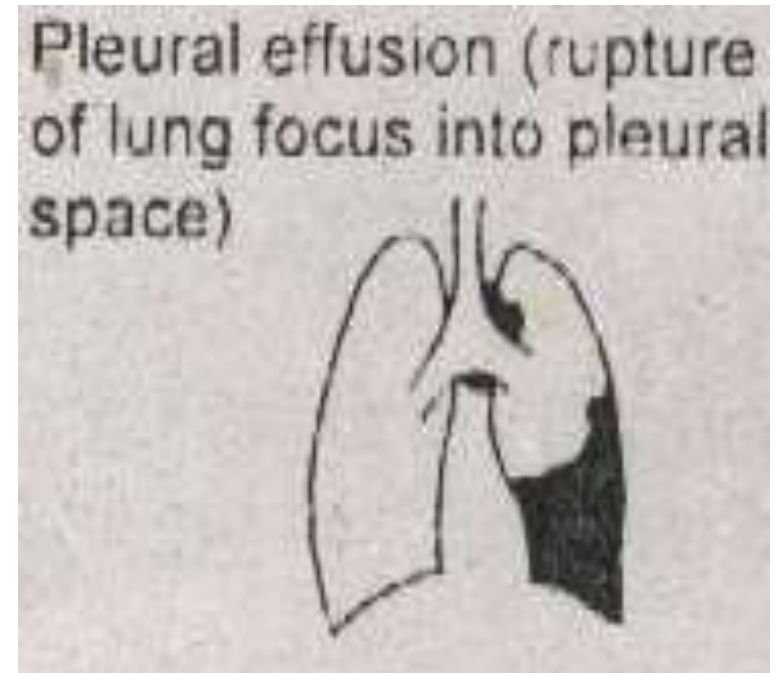
- High fever
- Severe productive cough
- Weight loss
- Night sweats
- On examination
 - Signs of consolidation & collapse



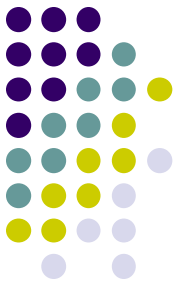


PLEURAL EFFUSION

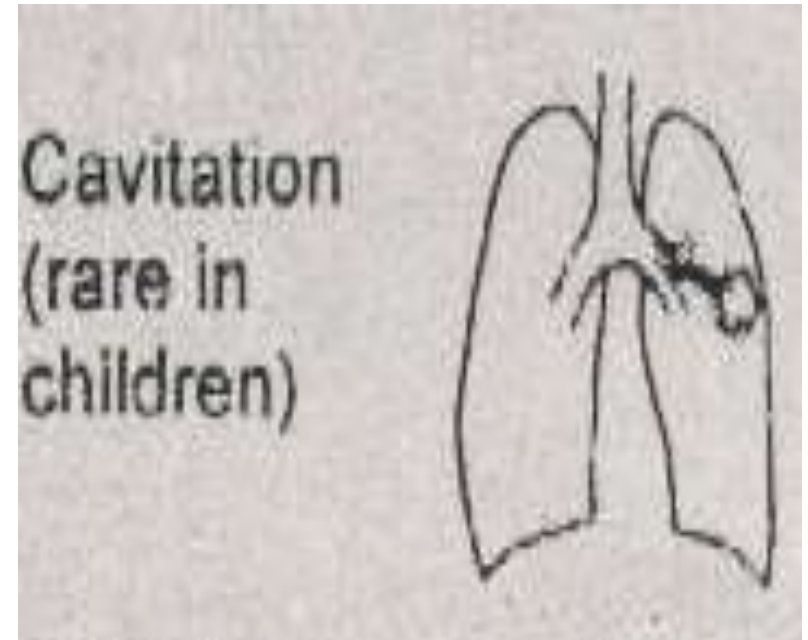
- Usually Unilateral
- Caseating Lymphnode or Subpleural Focus
- Symptoms
 - Cough
 - Pleuritic Pain
 - Shortness of Breath
- Signs



REACTIVATION OR POST PRIMARY TB



- Cavity Formation
- Pneumothorax
- Empyema
- Broncheactasis

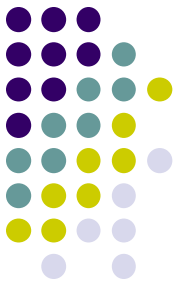


PERICARDIAL DISEASE



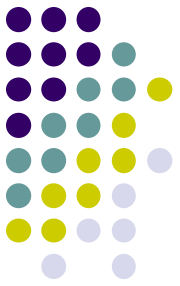
- Direct Invasion or Lymphatics
- Serofibrinous
- Signs
 - Distant Heart Sounds
 - Pulses Paradoxus
 - Frictional Rub

LYMPHOHEMATOGENOUS (DISSEMINATED) DISEASE

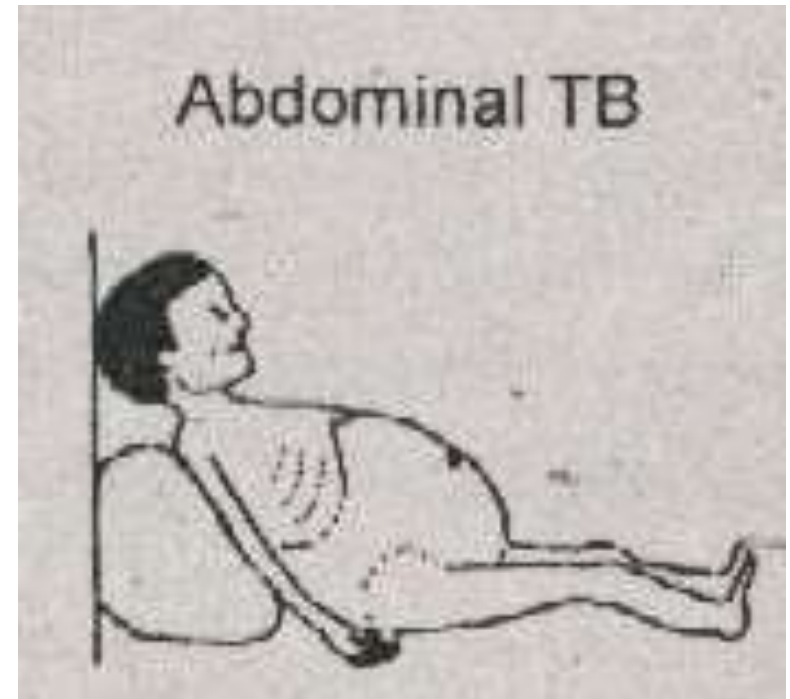


- Distant Site
- Low Grade Fever, Wt Loss, Anorexia
- High Spiking Fever
- Hepatosplenomegaly, Generalized Lymphadenopathy
- Chest Involvement
- Headache → Meningitis
- Abdominal Pain → Peritonitis

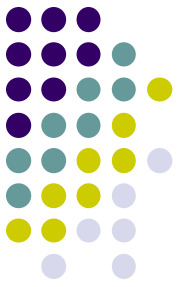
ABDOMINAL TUBERCULOSIS



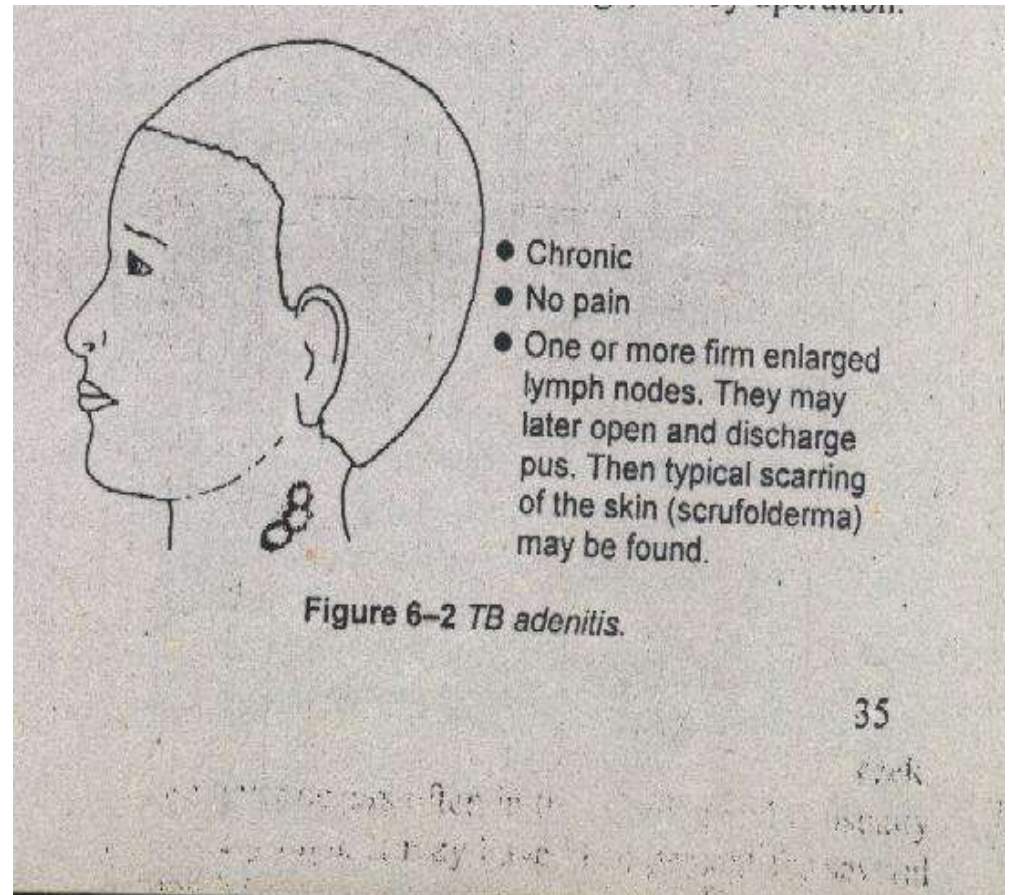
- Swallowed Sputum
- Hematogenous
- Forms
 - Tuberculous Enteritis
 - Mesenteric Adenitis
 - Generalized Peritonitis



SUPERFICIAL LYMPHNODE TUBERCULOSIS

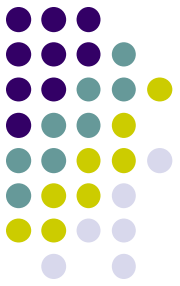


- Submandibular, Tonsillar, Anterior Cervical, Axillary
- Low Grade Fever
- Firm
- Matted
- Non-tender
- Fluctuant

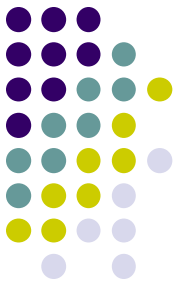


RENAL

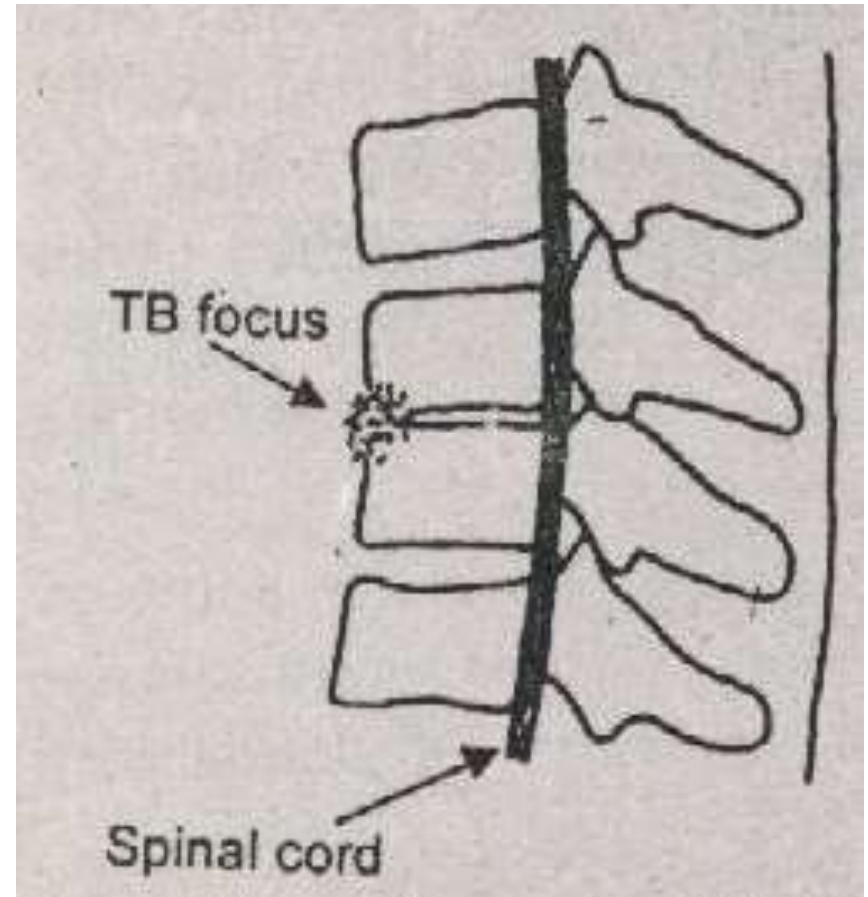
- Sterile Pyuria
- Hematuria
- Dysuria
- Flank Pain

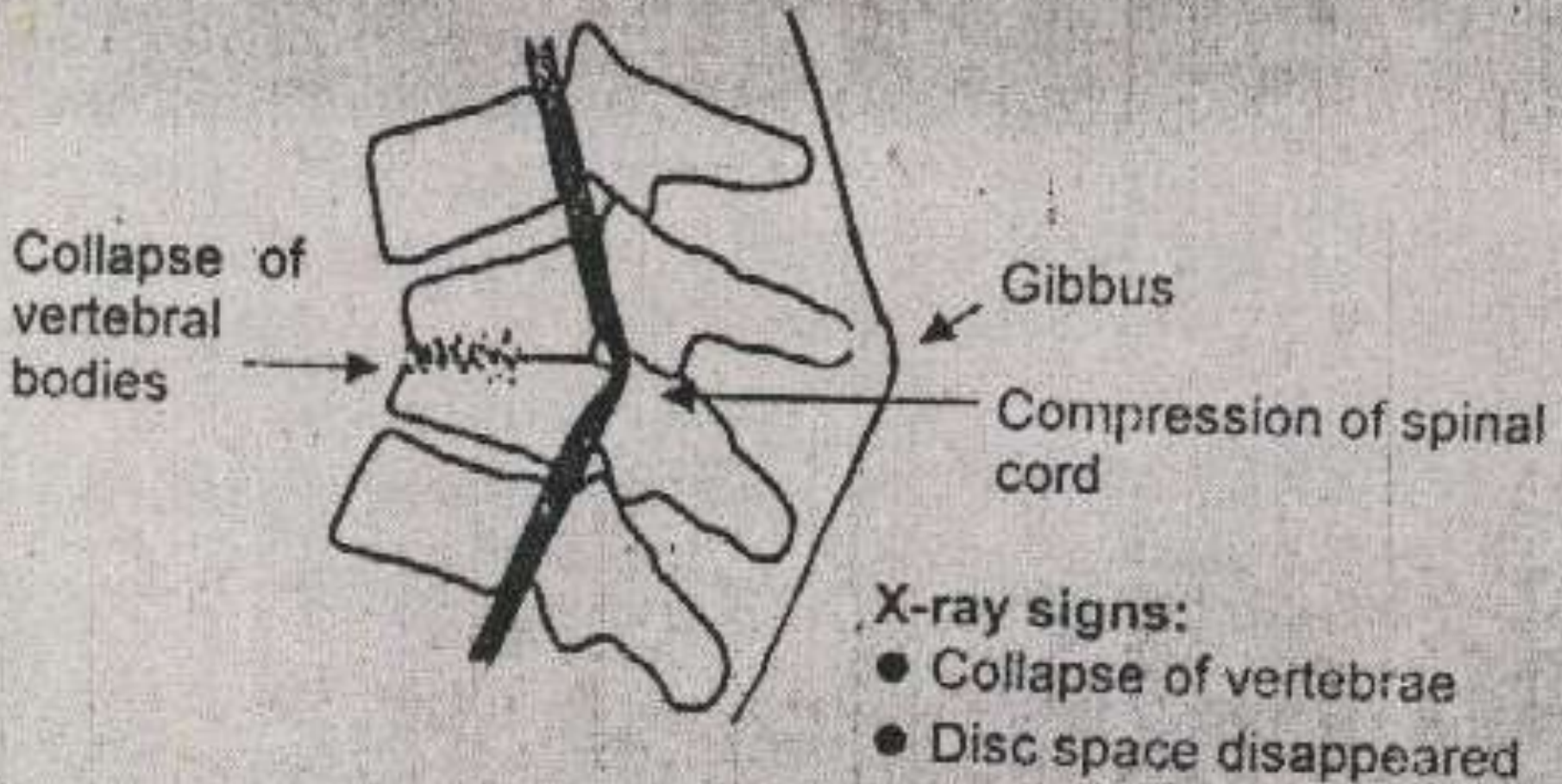


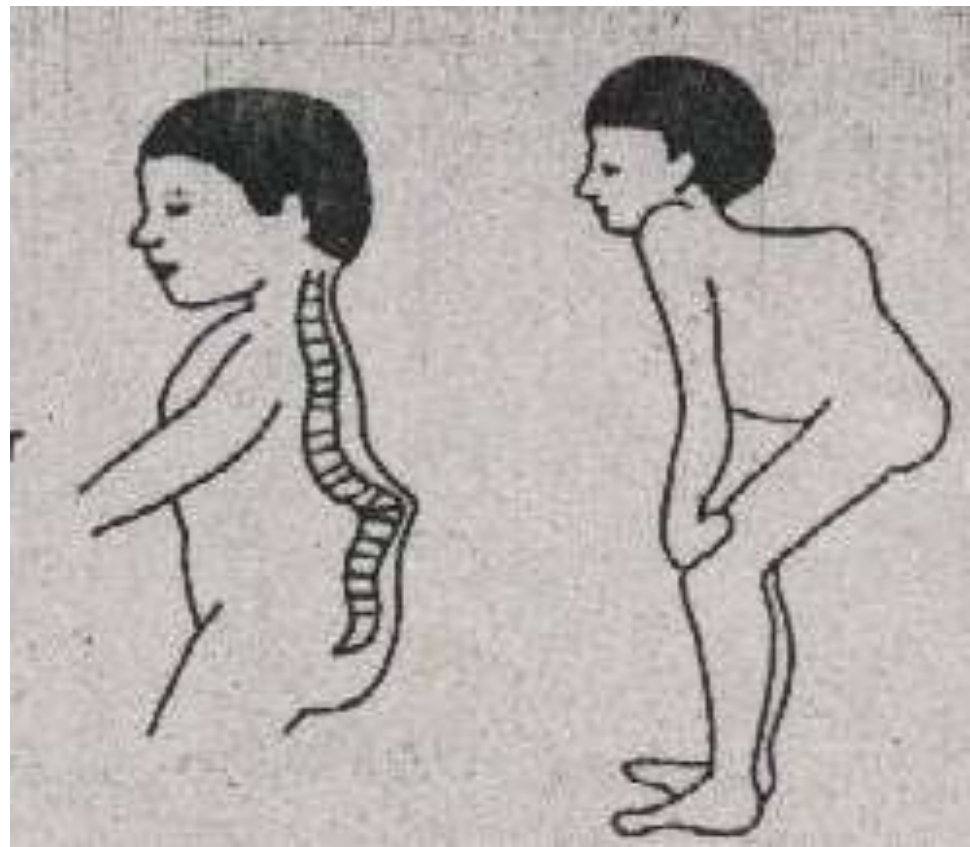
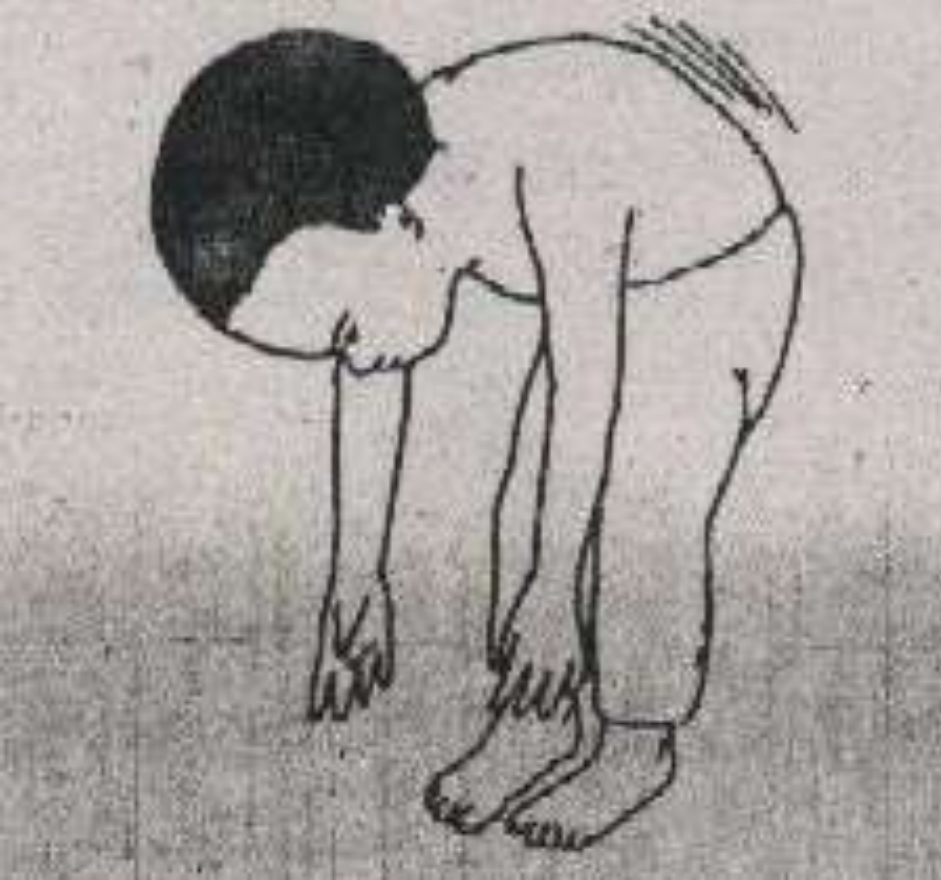
SKELETAL



- Pott's Disease
 - Vertebral Body Involvement
 - Gibbus formation
- Paravertebral Abscess
- Process begins in metaphysis
- Joint involvement
- Low grade fever
- Abnormal posturing or gait

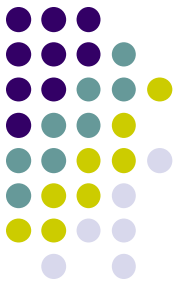


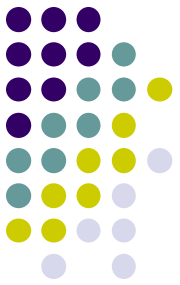




PERINATAL

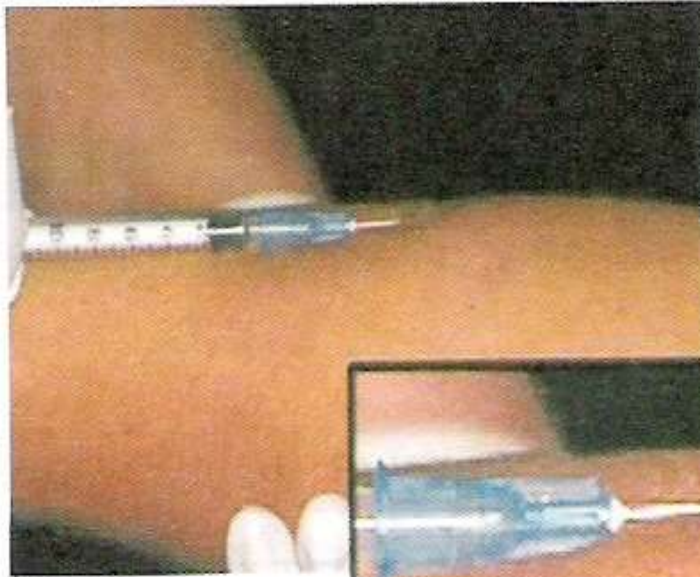
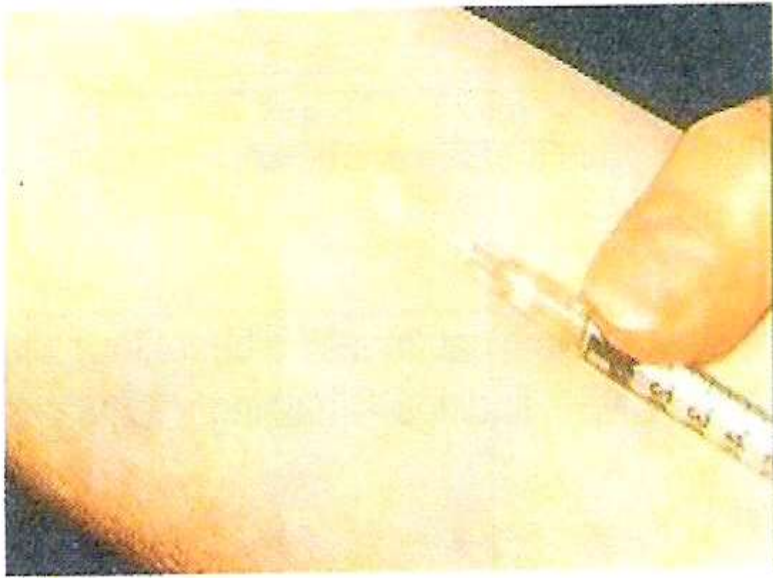
- Primary Focus in Placenta
- Liver Involvement
- Less Pulmonary Finding

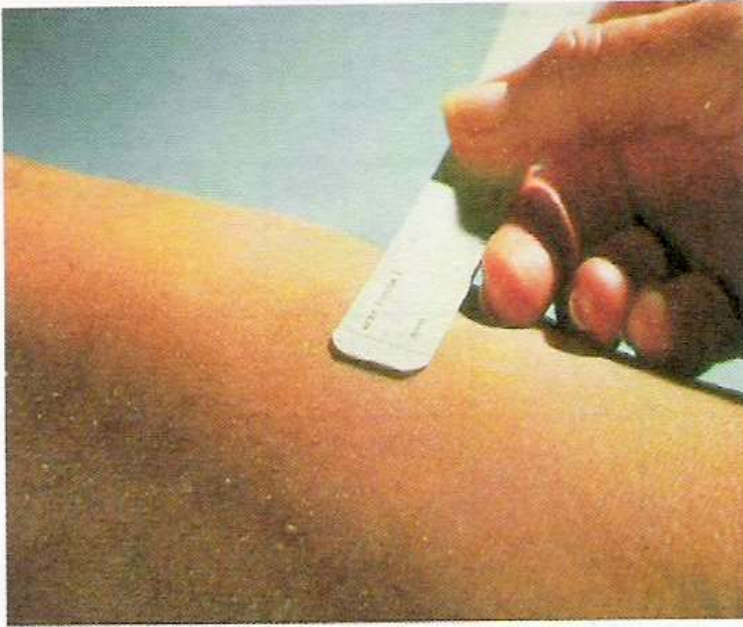
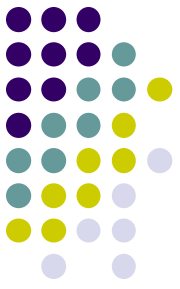




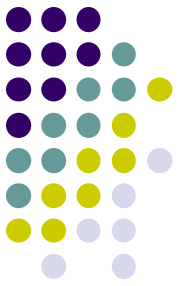
DIAGNOSIS

- Contact Tracing
 - Took ATT within last 2-yrs
- Tuberculin Skin Test
 - Purified protein derivative
 - 5TU
 - 0.1 ml

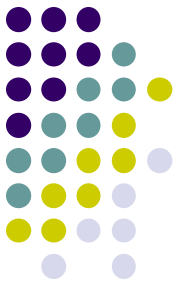




+ve Skin Test



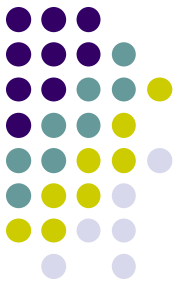
- Vaccinated Child
- Active TB
- Past Infection
- Repeated Tuberculin Tests



Contd...

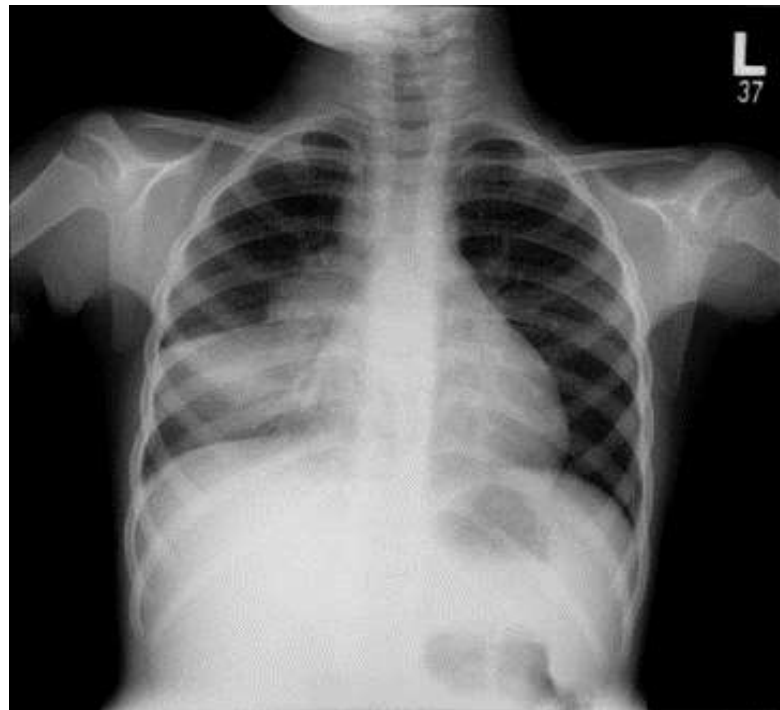
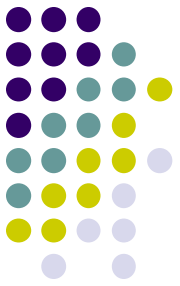
- -ve Skin Tests
 - Not Suffered from TB
 - Not Vaccinated
- False –ve
 - Malnourished Child
 - Miliary TB
 - Measles / Whooping Cough
 - Steroid Therapy
 - Cytotoxic Drugs
 - Incubation Period

RADIOLOGICAL EVIDENCE

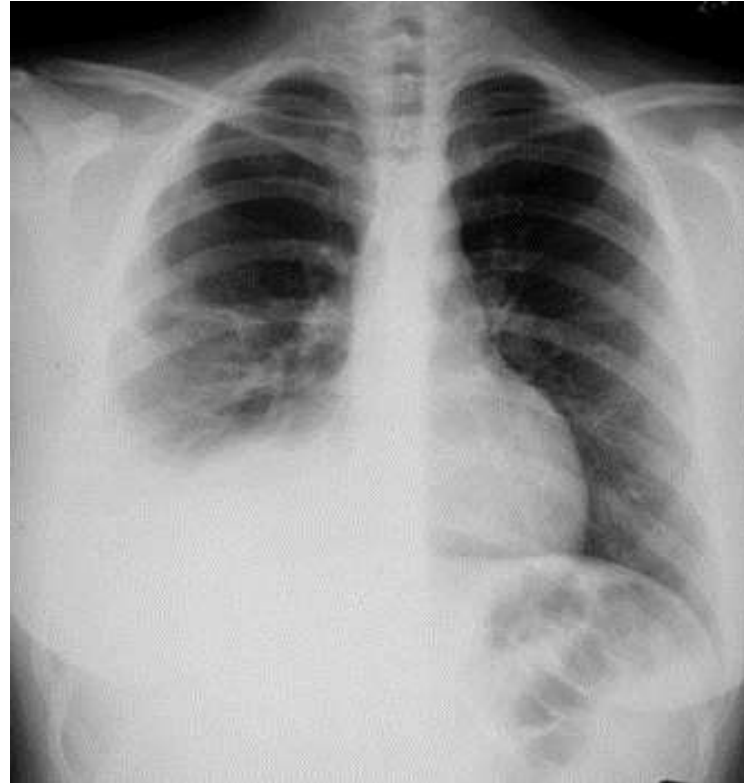
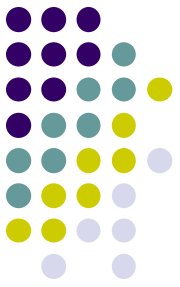


- Primary Focus --- Coin Shadow
- Obstructive Emphysema
- Tuberculous Bronchopneumonia
- Collapse Consolidation
- Bronchiectasis

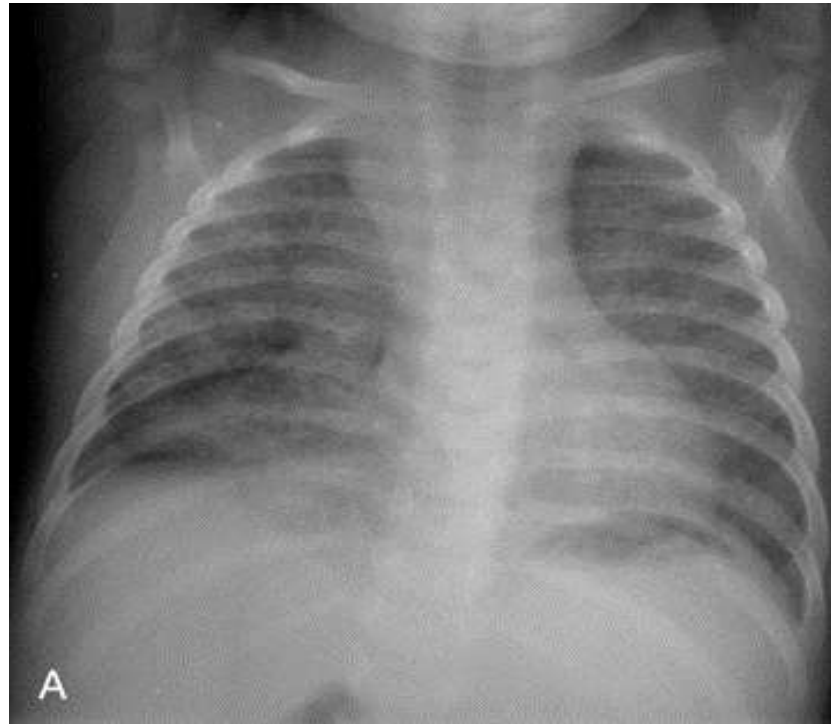
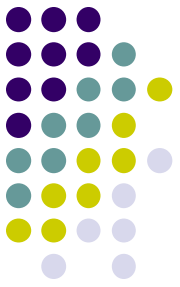
PRIMARY PULMONARY TB



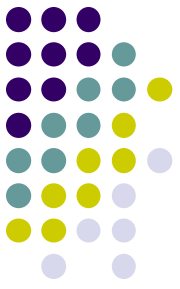
PLEURAL EFFUSION

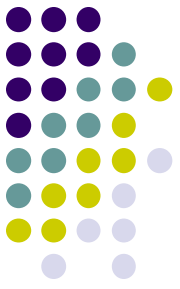


MILIARY TB

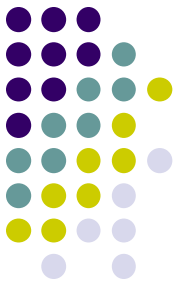








AFB SMEAR & CULTURE



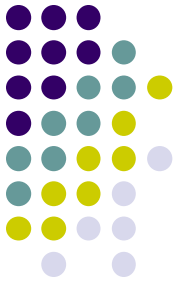
- Gastric Aspirate --- 30-40 %
- Pleural Fluid --- < 30%
- Pericardial --- 30-70 %
- Peritoneal --- 30-70 %
- Spinal --- 50-70 %



NEWER TECHNIQUES

- BACTEC radiometric system
 - Selective liquid medium containing fatty acids labelled with radioactive carbon
 - Measure released CO₂
- PCR
 - Results within 24-48 hrs
 - 95 % sensitive & specific
- ELISA
 - 50-90% sensitive & 92-95% specific

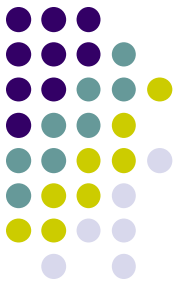
MANAGEMENT



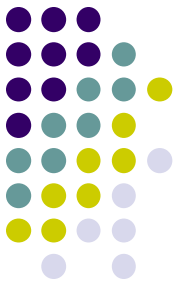
- General
 - Bed Rest
 - Nutrition
 - Hospital Admission
 - Steroids

1st LINE TREATMENT

- INH
- Rifampicin
- Streptomycin
- Pyrazinamide
- Ethambutol

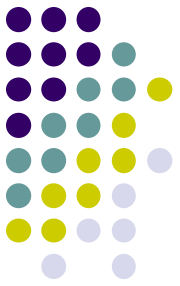


2nd LINE TREATMENT

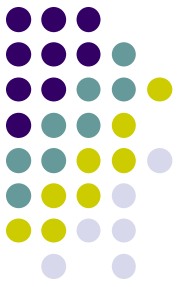


- Ethionamide
- Aminoglycoside
- Capreomycin
- Cycloserine
- Quinolone

Contt....



- Steroids
 - Tuberculous Meningitis
 - Endobronchial disease
 - Miliary tuberculosis
 - Serosal involvement



thankyou