TB in Children
TB IN CHILDREN
LEARNING OUTCOMES

• Identify children at risk of developing TB disease
• Correctly manage and refer children suspected of TB
• Manage child contacts
TB Infection and Disease in Children

Contact with smear+ adult

80-90% asymptomatic
10-20% develop disease

Age at infection
HIV /AIDS
Nutritional status
Measles/whooping cough
How recently infected

Infection

Primary TB

Asymptomatic

Miliary/TBM

Extra-pulmonary (spine)

Post-primary TB (adult)
Risk of TB infection in children

Depends on contact with a newly diagnosed smear positive adult:

- Extent and duration of exposure, ie family member has active smear positive TB disease
- Susceptibility to infection, very young <2yrs
- HIV infection
Risk of TB infection in children (2)

Risk of progression from infection to active disease: (often within 12 months of infection)

- Age of child, <2yrs under-developed immune systems
- Severe malnutrition
- Worm infestation
- HIV infection
- Other viral infections - eg measles
- BCG immunization
Primary TB infection in children

- Asymptomatic in 80-90%
  5-10% may develop disease

- Extra Pulmonary TB common


*Children represent about 5-15% of all TB cases*
Diagnosing TB children
How to diagnose TB in children

Difficult!

• Children rarely cough up sputum - gastric aspiration not always possible

• Under 2 years of age

• HIV infection masks TB
Recommended Approach

- Careful history – identify index case
- Clinical examination
- TB Skin Test
- Bacteriology whenever possible
- Investigations relevant to the suspected type of TB
- HIV testing (whenever possible)
How to diagnose TB in children

Diagnosis depends on:

- History of contact with a smear positive adult
- Chronic symptoms
- Clinical picture – suggestive symptoms
- Positive tuberculin skin test
- Chest X-ray suggestive of TB
Clinical signs and symptoms

Symptoms and signs are non specific

• Physical examination important
• Can present as acute pneumonia
• Road to Health Card important
Clinical signs and symptoms (2)

General – most common clues are:

- Failure to gain weight/ failure to thrive
- Loss of appetite without obvious cause
- Chronic cough for 2 weeks or more, not responding to a course of antibiotics
- Painless swelling of the lymph nodes
- An audible wheeze due to airway compression
- Unexplained fever
Tools to help with the diagnosis

- Tuberculin Skin Test (TST) Mantoux Test
- Score System
- Chest X Ray
**Tools to help with the diagnosis (2)**

**Tuberculin Skin Test (TST): Mantoux** - Purified Protein Derivative (PPD) intra-dermal injection, read 48-72 hours later
- It measures the body’s immune response to TB.
- Infected not necessarily active TB disease

**Possible results: positive if**
- Induration 10mm or more
- Induration 5mm or more in HIV+
- Positive in young child - high risk
- After BCG -weak positive
Tuberculosis Skin Test reading

- Measure INDURATION 48-72 hrs later
- A positive result means infection, not disease!!

<table>
<thead>
<tr>
<th>Tuberculin Test</th>
<th>Previous BCG</th>
<th>No previous BCG</th>
<th>HIV infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mantoux</td>
<td>≥ 15mm</td>
<td>≥ 10mm</td>
<td>≥ 5mm</td>
</tr>
</tbody>
</table>
Mantoux Skin Test (PPD skin test)
CORRECT

Only the induration is being measured.

INCORRECT

The erythema is being measured.

(CDC 1995)
Score System for diagnosis of TB in children

- Is one way of trying to improve the diagnosis of TB in children.
- It can help but may also lead to over diagnosis, especially in HIV+
- Do skin test before completing score sheet.
- A score system helps in your clinical judgement.
- Score of 7 or more indicates a high likelihood of TB disease
Score System TB diagnosis in Children

- Weeks of illness
- Nutrition (% weight for age)
- Family history of TB
- Tuberculin test results
- Malnutrition
- Unexplained fever
- Radiography signs - suggestive

- Local features:
  - Lymph nodes
  - CNS symptoms
  - Joint swellings
  - Abdominal ascites
# Score system for TB in children

<table>
<thead>
<tr>
<th>General feature</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks of illness</td>
<td>&lt;2</td>
<td>2-4</td>
<td></td>
<td>&gt;4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrition (% weight for age)</td>
<td>&gt;80%</td>
<td>60-80</td>
<td></td>
<td>&lt;60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family history</td>
<td>None</td>
<td>Reported</td>
<td></td>
<td>Proven AFB+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculin skin test</td>
<td></td>
<td></td>
<td>Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malnutrition</td>
<td></td>
<td></td>
<td>Not improving after 4 wks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unexplained fever</td>
<td></td>
<td></td>
<td>No response to Rx</td>
<td></td>
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</table>
Local signs in score system

<table>
<thead>
<tr>
<th>Local feature</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymph nodes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Joint or bone swelling</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abd. mass/ ascites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CNS signs, CSF abnormal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Broad mediastinum</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(hilar glands)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Angle deformity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(spine)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
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</tbody>
</table>
Treatment of TB in children

- Same case definitions apply to both adults and children
- Same treatment principles as adults
- Note age and weight of child (<5, 5 – 14yrs) for reporting purposes
- 2 phases as in adults (intensive, continuation)
- 2(RHZ)/4(RH) under strict DOT
- **No Ethambutol if <8yrs**
- Monitor response to treatment monthly (weight, clinical condition, adherence)
## Treatment of TB in children

<table>
<thead>
<tr>
<th>Pre treatment body weight</th>
<th>2 months initial phase treatment</th>
<th>4 months continuation phase treatment</th>
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<tbody>
<tr>
<td></td>
<td>RHZ 60,30,150</td>
<td>RH 60,30</td>
</tr>
<tr>
<td>3-4 kg</td>
<td>½ tab</td>
<td>½ tab</td>
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<tr>
<td>5-7 kg</td>
<td>1 tab</td>
<td>1 tab</td>
</tr>
<tr>
<td>8-9 kg</td>
<td>1½ tabs</td>
<td>1½ tabs</td>
</tr>
<tr>
<td>10-14 kg</td>
<td>2 tabs</td>
<td>2 tabs</td>
</tr>
<tr>
<td>15-19 kg</td>
<td>3 tabs</td>
<td>3 tabs</td>
</tr>
<tr>
<td>20-24 kg</td>
<td>4 tabs</td>
<td>4 tabs</td>
</tr>
<tr>
<td>25-29 kg</td>
<td>5 tabs</td>
<td>5 tabs</td>
</tr>
<tr>
<td>30-35 kg</td>
<td>6 tabs</td>
<td>6 tabs</td>
</tr>
</tbody>
</table>
Prevention

• Treat & cure adults with smear positive TB
• Always try to identify the index case
• BCG vaccination:
  – weakened *Mycobacterium Bovis*
  – intradermal injection - given at birth
  – protects against severe forms of TB eg.TB Meningitis, Miliary TB
Prevention (2)

- Treat all child contacts less than 5 years according to schedule INH 5mg/kg (6H)
- Immunise child fully
- A good National TB Control Programme protects children against TB
- Prevention of malnutrition
- Counseling for HIV
Extra Pulmonary TB in children
Most common forms of Extra Pulmonary TB in Children

- Miliary TB
- TB Glands
- TB Bones - long bones or spine
- TB Meningitis

*Refer to hospital as soon as possible*
Signs and symptoms of Extra Pulmonary TB in children

TB Bones - often long bones or spine
- Pain and swelling locally
- Lump (gibbus)
- May refuse to walk, or limps
- Stiff back
- Often abscess, paralysis or weakness of lower limbs

Refer to hospital as soon as possible
Signs and symptoms (2)

TB Meningitis

• Life threatening disease
• May lead to irreversible serious
• complications, e.g. retardation
• TB affects brain, meninges and spinal cord
TB Meningitis (2)

- Often chronic longstanding irritability, the crying child
- Fever, headaches, vomiting
- Stiffness of the neck, increased drowsiness - refer for lumbar puncture immediately

Refer for lumbar puncture immediately
Treatment of Extra Pulmonary TB

- Treatment regimens same as uncomplicated TB
- Treatment duration may be extended based on the severity of the disease and response to treatment
- Steroids may be added in severe forms, eg. TB Meningitis, Miliary TB and Pericarditis
Contact Management

All asymptomatic children <5yrs of age who are in close contact with a smear positive adult should receive course of INH prophylaxis
Who are child contacts

- <5 years
- Close contact with a smear positive adult
- Live in the same household or spends more than 4hrs with a smear positive client
Contact screening

**Always exclude active TB disease:**
- Thorough history taking and clinical examination
- Skin test and chest X-ray
- If index case is the parent and is HIV+, check the status of the child as well

**Dosage**
- INH 5mg/kg/day X 6 months
Smear + contact

Age

<TST & score sheet

Positive

Negative

<5 yrs

Chemoprophylaxis if <5 years

>5 yrs

Screen (AFB) if symptomatic

Sick

No

Failure to thrive, TB symptoms

Yes

Further Dx, score sheet, CXR

TB

Regimen 3

Chemoprophylaxis

INH 5mg/kg - 6H
Thank you