Other Causes of Fever

Febrile Illness

Fever After Seven Days

Relapsing Fever - Borreliosis

Sore Throat

Dengue Fever
Other Causes of Fever

Febrile Illness Causes

• Fever as a secondary cause
  – management of the condition results in management of the fever
  – pneumonia, measles, dysentery, ear infections, runny nose

• Fever associated with severe illnesses which use danger signs for classification and treatment
  – meningitis, septicemia sepsis
Other Causes of Fever

Febrile Illness

Causes

- Fever associated with malaria, the main focus of IMCI Guidelines
  - difficult to distinguish malaria from other common causes of infection without extensive clinical examination and laboratory testing
  - malaria covered in a separate seminar
Other Causes of Fever

Febrile Illness

Causes

- Non-localizing signs do not allow for distinction at a first-level health facility
- Danger signs identify a seriously ill child who needs to be referred
  - Peritonsillar abscess
  - Typhoid
  - Relapsing Fever
  - Dengue
Fever after Seven Days

Referral

- Differentiates between simple viral fevers and other diseases where the only presenting symptom is fever
- Detects conditions needing diagnostic and therapeutic intervention
  - Tuberculosis, HIV/AIDS, urinary tract infection, relapsing fever, typhoid, osteomyelitis
Other Causes of Fever

Fever after Seven Days

Referral

- Conditions do not have any obvious simple clinical sign but have fever in common

- Prevalence too low to include specific signs and symptoms for each condition
Relapsing Fever - Borreliosis

Overview

- Recurrent attacks of fever lasting three to five days that relapse and remit
- Caused by a spirochete of the Borrelia species and transmitted by lice and soft body ticks
- Symptoms
  - chills, severe muscle pain, headache, joint pain, petechiae, stiff neck, jaundice, hepatosplenomegaly, abdominal tenderness
- All signs less clear in children under 5 years
- Mortality 70% if untreated; 5% or less if
Other Causes of Fever

Relapsing Fever - Borreliosis

Jarisch-Herxheimer Reaction (JHR)

- Treatment for relapsing fever is relatively simple
- Most mortality in treated patients due to the JHR
  - occurs within the first one or two hours after the first antibiotic dose
  - caused by the release of TNF and cytokines caused by lysis of the spirochete
  - characterized by high fever chills and aggravation of existing symptoms, tachypnea, vasoconstriction, high blood pressure, shock

Observe patients for several hours after...
Other Causes of Fever

Relapsing Fever - Borreliosis

Jarisch-Herxheimer Reaction (JHR)

- Tetracycline effective, but associated with 45 percent rate of JHR and case fatality rate of 5 percent
- Low dose procaine penicillin results in a 5 percent JHR rate with no case fatality, but a high rate of relapses

<table>
<thead>
<tr>
<th>Regime</th>
<th>% JHR</th>
<th>% Relapses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracycline</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>Low dose P.P.</td>
<td>5</td>
<td>&gt;45</td>
</tr>
<tr>
<td>High dose P.P.</td>
<td>30</td>
<td>Low</td>
</tr>
</tbody>
</table>

C.F.R.% 5

Regimen % JHR % Relapses
Other Causes of Fever

Relapsing Fever - Borreliosis
Jarisch-Herxheimer Reaction (JHR)

- Antimicrobial treatment alone is not sufficient
  - delouse, boil personal clothes, burn blankets, shave head, and spray dwelling
Other Causes of Fever

Relapsing Fever - Borreliosis

Adaptation

- **High risk malaria** - suspect relapsing fever in all children with persistent fever or remission/relapse pattern.

- **Low or no risk malaria** - treat on suspicion in known relapsing fever situation as "other cause of fever" or in follow up.
**Relapsing Fever - Borreliosis**

**Adaptation**

- Suspect relapsing fever if other cases are occurring and the child has high fever with chills and headache. Treat with procaine penicillin.

- Adapt guidelines to include counselling mother on personal hygiene and delousing.

- Add procaine penicillin box to guidelines.
Other Causes of Fever

Sore Throat

Overview

- Streptococcal sore throat and rheumatic fever predominately in children older than 5 years
- IMCI Guidelines don’t address the child over 5 years
- Main reason to treat streptococcal sore throat is prevention of rheumatic fever and rheumatic heart disease
- Rheumatic heart disease accounts for 1.1 percent of deaths in developing countries

- Ghana study in 1981 - 1% of healthy days of life lost due to
Other Causes of Fever

WHO recommends secondary prevention of rheumatic heart disease
- Does not prevent RHF but prevents its progression
- Prophylactic benzathine penicillin every 3 to 4 weeks to children who have had rheumatic fever

Ideal prevention of rheumatic fever entails treatment with streptococcal pharyngitis with penicillin
- Limited use in developing countries because of expense
- Directed at school-age children and of little use to children under 5

Sore Throat

Prevention
Other Causes of Fever

Management issues

- Management of sore throat is complicated by many factors
  - 30-50% of RHF follows unapparent infection
  - 15-20% sore throats are Group A Streptococcus and reliable signs are needed to avoid over-treatment
  - Selection of signs to use remains problematic
  - Children under 3 often have non-specific signs such as fever and crusts around nose
  - GAS infections generally rare in children under 2 years
Other Causes of Fever

Sore Throat

Management issues

- Sensitivity and specificity tend to move in opposite directions
- Difficult clinical diagnosis of GAS infection without rapid diagnostic test or routine culture

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>Sensitivity %</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of fever</td>
<td>92.3</td>
</tr>
<tr>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>Temp &gt;38ºC</td>
<td>37.4</td>
</tr>
<tr>
<td>66.0</td>
<td></td>
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<tr>
<td>Exudate</td>
<td>31.0</td>
</tr>
<tr>
<td>31.0</td>
<td></td>
</tr>
</tbody>
</table>
Other Causes of Fever

Sore Throat

Management issues

- High prevalence RHF or RHD - high sensitivity is better

- Low prevalence - high specificity is better to prevent over-treatment
Other Causes of Fever

Sore Throat

Treatment options

- Treatment to prevent RHF and RHD, but also reduces duration of symptoms and signs, and anorexia

- Single dose of IM Benzathine penicillin remains best treatment
  - levels of penicillin remain elevated for up to 10 days
  - can prevent a sore throat developing for up to 21 days later
  - administration can be very painful and incorrect administration can cause sterile abscesses, sciatic nerve injury

- Penicillin V or amoxicillin are alternatives but more expensive and 10-day compliance is poor
Other Causes of Fever

Sore Throat

Adaptation

• Sore throat is common, but not a major cause of mortality
• Treatment (injection of benzathine penicillin) is expensive
• Lack of reliable clinical signs leads to over-treatment of sore throats
Other Causes of Fever

Sore Throat

Adaptation

• Possible adaptation depends on:
  - prevalence of GAS sore throat
  - sensitivity and specificity of the signs and symptoms being considered

• Option to use the ARI box ‘as is’ and accept low sensitivity but should not be used on younger children
Other Causes of Fever

Dengue Fever

Overview

- Problem in Asia and becoming a significant problem in Latin America and east Africa
- Presents as shock or bleeding, occurs in epidemics every 3 to 4 years
- Major and politically important cause of morbidity in some countries
- Most common in children 5-15 years but not less than 5 years
- Untreated, mortality can be up to 10 percent, but when treated effectively, as low as .5 percent
Other Causes of Fever

Dengue Fever

Overview

• First-level treatment comprises management of shock and referral
• Major clinical manifestations
  – Shock -- circulatory failure
  – Hemorrhage
  – Fever (with or without hepatomegaly that is tender)
• Selection of signs for the algorithm depends on
  – Predictive value
  – Feasibility
  – Types of treatment available
Other Causes of Fever

Dengue Fever

Referral

• Signs and symptoms needing referral
  – Shock
  – Cold clammy extremities, severe bleeding from nose or gums, black vomit or stools (3)
  – Weak or undetectable radial pulse, skin petechiae, frequent vomiting, abdominal pain (2)
  – Capillary refill time >3 seconds, lethargy or restlessness, right upper abdominal tenderness, positive tourniquet test, petechiae plus positive tourniquet test (1)

• Algorithms from Indonesia, Philippines and Vietnam show great variation in type and number of signs used
Other Causes of Fever

Dengue Fever

Referral

• Signs requiring observation
  - Abdominal pain (1)
  - Restless (1)
  - Skin petechiae + negative tourniquet test (1)
  - High continuous fever for 3 days or more (1)
  - No other apparent cause of fever (1)

• Studies show only shock and mucocutaneous bleeding had specificities and sensitivities over 80 percent

• Other signs and symptoms add considerably to the complexity of the algorithms
Other Causes of Fever

Dengue Fever

Treatment Plan and Adaptation

• Main treatment plans that fit needs of most national guidelines
  – Management of shock - Plan C or modified
  – Management of potential fluid loss - Plan A
  – Observation - watch for any sign of bleeding or worsening

• Adaptations problematic because of inadequate analysis of data to define best signs and symptoms