Non-severe pneumonia in childhood: guidelines for management in first-level health facilities

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Among the under 5-year-olds worldwide there are about 156,000,000 cases of pneumonia each year. This causes about 20% of all deaths in this age group. Effective implementation of the WHO Integrated Management of Childhood Illness (IMCI) reduces this morbidity and mortality. The recommendations for treating pneumonia for first-level health facilities were made over ten years ago although there was an update in 2005

In last 10 years there have been advances in:

- our knowledge of the epidemiology of pneumonia and resistance to antimicrobials
- the development of a greater range of antimicrobials.

Hence there is a need for a review of the guidelines for management. A team of experts in this subject has undertaken an in-depth review of published medical research and their conclusions are summarised below under the following headings:

1. What is the most appropriate first-line antimicrobial?
2. How to diagnose treatment failure.
3. Why treatment fails and what to do.

1. What is the most appropriate first-line antimicrobial?

Give:

- **Amoxicillin** 50mg/kg per day in two divided oral doses for **three days but**
- **If there is a high prevalence of HIV** in the area then give amoxicillin 50mg/kg in two divided doses for **five days**. This longer course of treatment is advised because of the lack of evidence for the effectiveness of the shorter course and the fact that the risk of severe pneumonia is greater in the HIV infected group.
- Co-trimoxazole[a] may still be used (8mg trimethoprim /kg per day in two divided oral doses) if the resistance to this drug is known to be low.

Guidelines for treatment are useful but only after the clinical situation has been properly assessed and a judgement made about the severity of pneumonia. The features of **non-severe pneumonia** in childhood are based upon:

- Cough or
- Breathing difficulty.
- Tachypnoea: breathing rate of over 40/minute in a child aged 12 – 59 months and over 50/minute in a child 2 – 11 months.

Referral to hospital is needed for severe or very severe pneumonia, which is indicated by:

- Lower chest undraping or
- Cyanosis
- Stridor when calm
- Inability to feed
- Convulsions
- Persistent vomiting
- Lethargy
- Unconsciousness.

Children under age two months have a high mortality from pneumonia and so all in this age group must be placed in the severe category.

The causative organisms for severe pneumonia vary in their proportions between and within countries. Studies in resource-poor countries are sparse. Nevertheless it remains important to target the most likely organisms that may lead to severe pneumonia and these are:

- *Streptococcus pneumoniae* in probably 17% - 37% of cases
- *Haemophilus influenzae* in probably up to 31% of cases.

However in perhaps 25% of cases of pneumonias acquired in the community are viral based. But this does not mean that a bacterial infection does not co-exist.

2. How to diagnose treatment failure

The detection of treatment failure is needed as this may indicate a need to change antimicrobial therapy and/or to refer the patient to hospital. If the clinical features listed above under **'Referral to hospital** is needed' are noted at 72 hours (48 hours in an area of high HIV incidence) then treatment failure is likely.

3. Why treatment fails and what to do

A clinical assessment will often give useful clues to a likely cause of treatment failure. The following list of many of the causes should be considered:

- Causative bacterium is not sensitive to the antimicrobial prescribed
- Inability or unwillingness to take the prescribed drug
- Drug vomited and not replaced
- Smaller dose than a child needed

[a] Co-trimoxazole contains trimethoprim and sulphamethoxazole in the ratio of 1 part to 5 parts. It should generally be avoided in infants under age 6 weeks.

- Alternative diagnosis or coexisting conditions such as:
- Anaemia
- HIV infection – see below
- Malaria - see below
- Bronchial asthma
- Foreign body
- Heart disease
- Malnutrition
- Empyema
- Abscess
- Viral infection
- Tuberculosis
- Tuberculosis
- *Staphylococcus aureus* infection *or* mycoplasma pneumoniae
- H1N1

There are many rare causes (e.g. fungal infections) that have not been included.

Most cases of treatment failure should be referred to hospital, if possible. When this is done it is essential to send with the patient a short note about the clinical status at the time of referral and the treatment already given.

Where HIV prevalence is high

Where HIV infection rates exceed 5% the risk of pneumonia is increased and mortality is high. All children with pneumonia in these areas should be assessed for HIV infection and appropriately tested. There are reports of 85% of pneumonia deaths occurring in HIV-positive children. The prophylactic use of co-trimoxazole for these children reduces the pneumonia-related death rate. If a child is already taking prophylactic co-trimoxazole and has non-severe pneumonia amoxicillin is still indicated.

Where malaria prevalence is high

In children the clinical distinction between malaria and pneumonia can be difficult. Also a child with pneumonia may coincidentally also have malaria parasites on a blood slide. So if malaria cannot be excluded and pneumonia is still probable then treatment for malaria and pneumonia should be given together. A child who has malaria may develop severe anaemia that in turn leads to a tachypnoea. All patients should be checked for anaemia preferably by the laboratory but if this is not possible then look for pallor of the

- Palms of the hands
- Nail beds
- Conjunctivae and
- Mucous membranes.

If severe anaemia is present then urgent hospital referral is essential.

When transfer to hospital is impossible

Although clinically indicated it may not be possible to transfer a patient to a place where a higher level of clinical care is available. Under these circumstances the child should be given antimicrobial treatment that covers a wider range of possible causative organisms. The drugs to consider are injectable:

- chloramphenicol
- ceftrioxone
- penicillin and gentamicin.

Key learning points

- Amoxicillin is the first choice in the treatment of non-severe pneumonia in children less than 5 years and not allergic to penicillin. Consider Erythromycin for children allergic to penicillin and those older than 5 years.
- Be aware of the clinical features of severe pneumonia and treatment failure.
- Consider the list of causes of treatment failure.
- Never forget malaria and
- Anaemia.
- Pay special attention to the possibility of HIV infection in a child with recurrent non-severe pneumonia
- Tachypnoea alone is an important clinical sign to assess the severity of pneumonia.

Reference

1. Grant GB, Campbell H, Dowell SF, Graham SM, Klugman KP, Mulholland EK, Steinhoff M, Weber MW and Qazi S. Recommendations for treatment of childhood non-severe pneumonia. *Lancet Infectious Diseases, Vol 9 issue 3, pp 185 - 196, March 2009* http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(09)70044-1/fulltext

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Quiz – see answers on page 17

1. World wide how many children die:
   In their first month?
   Before their first birthday?
   Before their fifth birthday?
2. What percent of children dying before their fifth birthday die of:
   HIV/AIDS?
   Measles?
   Malaria?
   Diarrhoea?
   Pneumonia?
3. In what percent of under-five year old deaths is malnutrition the underlying cause of death?