Respiratory infections in children: management in small hospitals

A manual for doctors

WORLD HEALTH ORGANIZATION
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PREFACE

This booklet provides guidance on the clinical management of acute respiratory infections in children. It is intended primarily for use by non-specialist doctors working in small district hospitals with limited X-ray and bacteriology facilities, and stresses, in particular, the need for rational use of antimicrobial drugs.

The first draft was prepared, at the request of the World Health Organization, by Dr Frank Shann, Melbourne, Australia. It was then revised by the staff of the World Health Organization's Programme for the Control of Acute Respiratory Infections, in the light of comments from:

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CONTENTS

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INTRODUCTION

Acute respiratory infections and diarrhoea are the commonest causes of death in children. The protocols in this manual have been developed by the World Health Organization using the best scientific evidence available. It is hoped that they will enable more children to receive effective treatment for severe respiratory infections, and that they will reduce the unnecessary use of antibiotics in children with mild infections.

Most children who die from acute respiratory infections are less than five years old, and most die from pneumonia. Most of the deaths are due to infections with *Haemophilus influenzae* or *Streptococcus pneumoniae*, both of which are usually sensitive to penicillin, ampicillin, amoxycillin, cotrimoxazole and chloramphenicol. Other antibiotics are usually more expensive or have more side-effects.

Prospective studies have shown that careful observation of breathing movements usually gives a more reliable indication of the severity of respiratory infection in a child than auscultation with a stethoscope — hence the emphasis on respiratory rate and chest indrawing in this manual.

The treatment regimens described in this manual have been designed for use in small hospitals where X-ray and bacteriology facilities are limited or do not exist. It is recognized that treatments other than those outlined here will be required for certain patients, depending on individual circumstances and the availability of facilities.

Further information about the regimens may be obtained from: Control of Acute Respiratory Infections, World Health Organization, 1211 Geneva 27, Switzerland.

SUMMARY OF CASE MANAGEMENT

Very severe: admit to hospital and give chloramphenicol

Cough or wheeze with cyanosis or not able to drink.

(If you do not have chloramphenicol: give benzylpenicillin, ampicillin, or amoxycillin and gentamicin.)

Severe: admit to hospital and give antibiotics

Cough with no wheeze: admit if chest indrawing is occurring.

Cough and wheeze: admit if the respiratory rate is over 50 breaths per minute.

Also admit a child with:

— stridor at rest (laryngotracheobronchitis (croup), diphtheria, epiglottitis);

— an adherent grey pharyngeal membrane (diphtheria);

— convulsions, apnoea, severe dehydration or drowsiness.

Moderate: give antibiotics at home and supportive therapy

Cough and fast breathing (50 breaths per minute) with no chest indrawing.

Red ear drum, or ear discharge for less than two weeks.

Purulent pharyngitis with large and tender lymph nodes in the neck (cervical adenitis).

Mild: give supportive therapy at home, but no antibiotics

Cough or wheeze with a respiratory rate of less than 50 breaths per minute.

Stridor absent when the child is quiet.

Blocked or runny nose.

Red throat.

Ear discharge for more than two weeks.

SUPPORTIVE THERAPY

Supportive therapy is helpful in most cases of respiratory infection. However, do not encourage ineffective supportive therapy, because it may distract people from actions necessary to save the child's life. The most useful simple supportive measures are:

The continuation of breast-feeding. If the child is not able to suck, the mother should express her milk and give it by cup and spoon.

Encouraging the child to drink especially if he or she is thirsty, dehydrated, or has diarrhoea. If the child is dehydrated and unable to drink, give intragastric fluids. Give intravenous fluids only if the child is in shock.

Encouraging the child to eat small meals frequently, but not forcing the child to eat.

Maintaining a neutral thermal environment to minimize oxygen consumption and carbon dioxide production. Putting too many clothes on the child and causing overheating are just as dangerous as exposing the child to cold. The child should be looked after, lightly clothed, in a warm room.

Giving paracetamol to reduce high fever (over 38.5 °C). Sponging with tepid or cold water should be discouraged as it is not very effective in reducing the child's temperature, and it increases oxygen consumption and carbon dioxide production.

Clearing the nose with gentle suction is important. At

home, the mother should use a moist, soft tissue or cloth, in the form of a wick, to clear out nasal secretions.

Cough suppressants, expectorants, mucolytics, decongestants, and antihistamines should not be used. They are expensive and ineffective. Local home remedies are cheap and may be helpful. An inexpensive cough mixture can be made by mixing 20 ml of concentrated peppermint water with 5 ml of a solution of amaranth (or another suitable colouring) in 2 litres of 1% ammonium chloride. The dose is one teaspoonful (5 ml) every 6 hours.

If it is available, oxygen should be administered to any child with cyanosis, or who has wheezing and a respiratory rate of over 70 breaths per minute. Oxygen should be administered by intranasal catheter at 1 litre per minute. Special low-flow meters are helpful to avoid waste and the risk of gastric dilatation. The catheter should be inserted to a depth equal to the distance from the side of the nose (ala nasi) to the front of the ear (tragus). Humidification of the oxygen is desirable, but care must be taken that the water is changed each day, and that the container, tubing and catheter are cleaned and dried twice a week to reduce the risk of bacterial contamination.

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COUGH WITH WHEEZE - BRONCHIOLITIS

The first attack of wheezing in a child under 12 months old is probably due to bronchiolitis. In young infants, bronchiolitis may present as episodes of apnoea. Recurrent episodes of wheezing suggest asthma. Sometimes wheeze is due to an inhaled foreign body (see page 28).

If it is difficult to hear the wheeze, watch the child breathe. A child with wheeze takes longer than normal to breathe out, and seems to make an effort.

Almost all children with wheeze have chest indrawing, so indrawing in a child with wheeze is not an indication for admission.

Very severe bronchiolitis

Symptoms: wheezing and cyanosis, or the child is unable to drink.

1. Admit to hospital.
2. Give intranasal oxygen at 1 litre per minute.
3. Give chloramphenicol 25 mg per kg of body weight, intramuscularly, every 6 hours.
4. Clear the child's nose gently, when necessary to unblock the airway.
5. Give oral or nebulized salbutamol if the child is over 12 months old:

   — oral (1-5 years): 1 mg, 3 times a day.

   — nebulized: 0.1 mg, every 4 hours.

Do not give fluid intravenously, unless the child is in shock.

Severe bronchiolitis

Symptoms: wheezing and very fast breathing (over 70 breaths per minute), but the child is not cyanotic and is able to drink.

1. Admit to hospital.
2. Give intranasal oxygen at 1 litre per minute.
3. Give benzylpenicillin 50 000 units per kg of body weight, intramuscularly, every 6 hours.
4. Clear the child's nose gently when necessary.
5. Give oral or nebulized salbutamol if the child is over 12 months old:

   — oral (1-5 years): 1 mg, 3 times a day.

   — nebulized: 0.1 mg per dose, every 4 hours.

Moderate bronchiolitis

Symptoms: wheezing and fast breathing (between 50 and 70 breaths per minute), but the child is not cyanotic and is still able to drink.

1. Admit to hospital (some cases can be treated as outpatients.)
2. Give an antibiotic for at least 5 days:

   — either procaine penicillin, 50 000 units per kg of body weight, intramuscularly, once a day;

   — or amoxycillin, 15 mg per kg of body weight, orally, every 8 hours;

   — or ampicillin, 25 mg per kg of body weight, orally, every 6 hours;

   — or cotrimoxazole, 4 mg (of trimethoprim) per kg of body weight, orally, every 12 hours.

3. Give oral salbutamol if the child is over 12 months old:
   — (1-5 years): 1 mg, 3 times a day.

Mild bronchiolitis

Symptoms: wheezing without fast breathing (fewer than 50 breaths per minute), the child is not cyanotic and is able to drink.

1. Treat as an outpatient.
2. Do not give an antibiotic.
3. Give oral salbutamol if the child is over 12 months old:
   — (1-5 years): 1 mg, 3 times a day.
4. Advise the mother to:
   — continue breast-feeding.
   — encourage the child to drink.
   — encourage the child to eat.
   — come back if the child gets worse.

RECURRENT COUGH WITH WHEEZE - ASTHMA

Most children with these symptoms are more than 1 year old. Chest indrawing and respiratory rate are not reliable indicators for deciding about management. A mildly ill child may have chest indrawing, and a seriously ill child may breathe slowly. Antibiotics and antihistamines do not help.

Mild asthma

1. Treat as an outpatient.
2. Give salbutamol orally:
   - (1-5 years): 1 mg, 3 times a day.
   - (over 5 years): 2 mg, 3 times a day.
   - or give epinephrine (1 mg/ml) 0.01 ml per kg of body weight, subcutaneously, followed by oral salbutamol.
3. Advise the mother to encourage the child to take fluids and to eat small frequent meals. Ask her to come back if the child gets worse.

Moderate or severe asthma

If the child does not quickly respond to epinephrine or salbutamol:

1. Admit the child to hospital.
2. Give oxygen.
3. Give nebulized salbutamol: 0.1 mg, every 4 hours.
4. Give aminophylline, 0.4 ml per kg of body weight, intravenously, slowly over 15 minutes, followed by 0.2 ml per kg of body weight given over 1 hour, every

6 hours. Use a 250 mg/100 ml ampoule and, if possible, a burette to obtain a drip feed.

Further details on the treatment of asthma vary from country to country, and are beyond the scope of this manual. Information can be found in most medical textbooks.

COUGH FOR MORE THAN 30 DAYS

Tuberculosis

Look for evidence of tuberculosis, such as:

— fever,

— large lymph nodes,

— malnutrition,

— someone in the household with tuberculosis.

If there is any suggestion of tuberculosis, arrange for the child to have a chest X-ray and an intradermal tuberculin (Mantoux) test.

Pertussis

A child with pertussis has a cough for many weeks. Pertussis (whooping cough) causes bouts of very severe coughing. Often the child whoops or vomits at the end of the coughing.

Tell the mother that the cough should slowly get better after several weeks. Do not give an antibiotic (unless the child is breathing fast or has chest indrawing when not coughing).

Asthma

Most children with a chronic cough have asthma. A child with asthma may have a wheeze and difficulty breathing out, but these signs may not be present when you see the child. The cough is often worse at night.

Give salbutamol (see page 36) — the child may need to take the drug for many weeks. Explain to the mother that the medicine will help the cough, but will not cure

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