

Effectiveness on Balloon Therapy and Steam Inhalation among Children with Lower Respiratory Tract Infection

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Abstract- ARI constitute one-third of the deaths in under-five in developing countries. They contributed 67 million disability adjusted life years in the year 2015. Pneumonia remains the leading infectious cause of death among children under five, killing 2,500 children a day. Pneumonia accounted for 15 per cent of all under-five deaths and killed 920,000 children in 2017. The effects of pneumonia on the lungs involve overproduction of mucus and other fluids, leading to difficulty breathing and inhibiting gas exchange in the lungs. Long term, pneumonia can be associated with permanent lung damage, risk of respiratory failure. The effects of pneumonia on the lungs can lead people to have shortness of breath, a bluish tinge in the extremities, and rapid breathing as they fight for air. Patients may also cough, often producing sputum. In some cases, pneumonia leads to the development of an abscess in the lungs, a potentially serious complication to reduce the sign symptoms of lower respiratory tract infection. Various methods are there but among them pursed lip breathing is one of them. This is relatively common following viral upper respiratory tract infection (URTI) or LRTI. Most often, LRTI is accompanied by fever and may be preceded by a typical viral URTI. It is important to assess all children with a fever accurately.

I. INTRODUCTION

Lower respiratory tract infection is more fatal than upper respiratory infection. Moreover in 2013, 6.9% of occurred due to respiratory illness which is the leading cause when compared to other diseases. Lower respiratory tract Infection manifests symptoms like wheezing, fever, tachypnea and chest retraction.

A child is an important asset to the family and the society, he is a precious gift with lots of potential and he is truly the foundation of our nation. Hence the focus on every child should be to promote their breath and safe guard them. In India about 35% of total population is children before 15 years of age.

Healthy children grow to become healthy adults, who are strong both in body and mind healthy children are the greatest resource and pride of our nation. Nurses and other health care professionals are increasingly concerned with the care of children health teaching in preventing illness and promoting optional physical development and emotional health have become significant parts of nursing.

Main causes for lower respiratory tract infection for children:

Viral infections

About 45% of children hospitalised with pneumonia have a viral aetiology

- Influenza A.
- Respiratory syncytial virus
- Human metapneumovirus
- Varicella-zoster virus (VZV) - chickenpox.

Bacterial infections

These constitute about 60% of hospitalised pneumonia cases^[3]:

- Streptococcus pneumoniae (the majority of bacterial pneumonias).
- H. influenzae.
- Staphylococcus aureus.
- Klebsiella pneumoniae.
- Enterobacteria - eg, Escherichia coli.
- Anaerobes.

Atypical organisms

- Mycoplasma pneumoniae (14% of all cases of hospitalized pneumonia in children)
- Legionellapneumophila

- Chlamydomphila pneumoniae (9% of hospitalized pneumonia in children)
- Coxiellaburneti.

Sings / Symptoms of lower respiratory tract infection; Toddlers/preschool children:

- Again, preceding URTI is common.
- Cough is the most common symptom.
- Fever occurs most noticeably with bacterial organisms.
- Pain (chest and abdominal) occurs more often in this age group.
- Vomiting with coughing is common (post-tussive vomiting).
- Be aware that:
 - Lower lobe pneumonias can cause abdominal pain.
 - Severe infections will compromise breathing more.

Assessment of the children:

- Examination can be difficult in young children (particularly auscultation).
- A careful routine of observation is essential to identify respiratory distress early.
- Pulse oximetry can be very useful in evaluation. Typically - in pneumonia, for example - oxygen saturation may be 95% or less.
- High fever over 38.5°C may occur often.
- Look for other diseases (for example, rashes, pharyngitis) with careful systematic examination.

The following are signs of respiratory distress:

- Cyanosis in severe cases.
- Grunting.
- Nasal flaring. In children aged under 12 months this can be a useful indicator of pneumonia.
- Marked tachypnoea (see below).
- Chest indrawing (intercostal and suprasternal recession).
- Other signs such as subcostal recession, abdominal 'see-saw' breathing and tripod positioning.
- Reduced oxygen saturation (less than 95%).

If this does not respond to oxygen and general support of the child's own respiratory effort, intubation is likely to be required. Intubation is required when the child's own breathing

becomes ineffective (with, for example, hypoxia, rising carbon dioxide and reduced level of consciousness).

Observation:

- Further careful observation in good light, with the chest and abdomen uncovered, is essential
- Count respirations and note the respiratory rate (RR) - in breaths per minute. Tachypnoea is measured as (see reference in Further Reading, below):
 - RR >60/minute age 0 to 5 months.
 - RR >50/minute age 6 to 12 months.
 - RR >40/minute age over 12 months.
- Observe the infant's feeding (to uncover decompensation during feeding).
- Observe the chest movements (for example, looking for splinting of the diaphragm).

Auscultation:

- Examine with warm hands and a stethoscope.
- Take the opportunity to examine a quiet sleeping child.
- Concomitant upper respiratory noises can be identified by listening at the nose and chest.
- Crackles and fever indicate pneumonia.
- Crackles in the chest may indicate pneumonia, particularly when accompanied by fever.

Percussion:

- Identifies consolidation.
- Consolidation is a later and less common finding than the crackles of a pneumonia.
- Later in older children there may be dullness to percussion over zones of pneumonic consolidation.
- Bronchial breathing and signs of effusion occur late in children and localisation of consolidation can be difficult to diagnose.

Differential diagnosis

- [Asthma.](#)
- [Inhaled foreign body.](#)
- [Pneumothorax.](#)
- Cardiac dyspnoea.

Management of problems with lower respiratory tract infection:

Most children with LRTI and pneumonia can be treated as outpatients, with oral antibiotics. Older children can be managed with close observation at home if they are not distressed or significantly dyspneic and the child's carer(s) can cope with the illness. Viral bronchitis and croup do not require antibiotics and mild cases can be treated at home.

- Oxygen saturation <92%.
- Respiratory rate >70 breaths/minute (≥ 50 breaths/minute in an older child).
- Significant tachycardia for level of fever.
- Prolonged central capillary refill time >2 seconds.
- Difficulty in breathing as shown by intermittent apnoea, grunting and not feeding.

Presence of comorbidity - eg, congenital heart disease, chronic lung disease of prematurity, chronic respiratory conditions such as cystic fibrosis, bronchiectasis or immune deficiency should also prompt consideration of admission.

Admission should also be considered for:

- All children under the age of 6 months.
- Children in whom treatment with antibiotics has failed (most children improve after 48 hours of oral, outpatient antibiotics).
- Patients with troublesome pleuritic pain.

Physiotherapy has no place in treatment of uncomplicated pneumonia in children without pre-existing respiratory disease.

In hospital

- ✓ Resuscitation and respiratory support as required.
- ✓ Intravenous access and fluids in severe cases.
- ✓ CXR confirmation of the diagnosis and identification of effusions and empyema
- ✓ Antipyretics (avoid aspirin due to the danger of [Reye's syndrome](#)).

Antibiotic treatment:

- ✓ It can be difficult to distinguish between viral and bacterial infection and young children can deteriorate

rapidly, so consider antibiotic therapy (depending on presentation) and likelihood of bacterial aetiology.

- ✓ Amoxicillin in a child-friendly formulation, should be used first-line, unless there is reason to suspect a penicillin-insensitive organism (particularly pneumococcal disease). Evidence shows that children with non-severe community-acquired pneumonia who receive amoxicillin for three days, do as well as those who receive it for five days.
- ✓ If a child is genuinely allergic to penicillin, consider using a cephalosporin, macrolide or quinolone, depending on any local antibiotic prescription guidelines, patterns of resistance and suspected organism.
- ✓ Vancomycin may be added to treatment of toxic-looking children when there is a high rate of penicillin resistance.

Delayed antibiotics

- The study found that strategies of no prescription or delayed antibiotic prescription resulted in:
 - Fewer than 40% of patients using antibiotics.
 - Less strong beliefs in antibiotics.
 - Similar symptomatic outcomes to immediate prescription.
- It was concluded that, if clear advice is given to patients, there is probably little to choose between the different strategies of delayed prescription.
- There is insufficient evidence to recommend zinc supplementation for reduction of the incidence of pneumonia.

II. BALLON THERAPY

Aim

- To improve lung expansion
- To reduce the occurrence of respiratory tract infection

Goal

- To know the importance of balloon blowing exercise
- To motivate blowing balloon regularly.
- To create awareness among others.

Duration

- 3 to 5 minutes

Steps:

- ✓ obtaining a balloon
 - Balloon selected for the children in an attractive color
- ✓ loosening a balloon by stretching it in all directions
- ✓ It helps the children to blow the balloon easily and allow for equal air entry
- ✓ grasping the end of the balloon
 - The researcher asked the children you hold the open end of the balloon
- ✓ Taking a deep breath and seal lips around the opening of the balloon
 - The researcher asked the child to inhale deeply from lungs an place
- ✓ The researcher asked the children to do inhale and exhale repeatedly, watching the balloon initially resisting and gradually increasing.
- ✓ sealing the balloon with thumb and index finger
 - The researcher asked the children to hold the balloon tightly with thumb and index finger
- ✓ releasing sir from the balloon and repeating the steps
- ✓ The researcher asked the children to practice again and again.

III. STEAM INHALATION THERAPY

DEFINITION:

Steam inhalation is useful in relieving the congestion of bronchitis, common cold, sinusitis and other respiratory conditions. It decreases the viscosity of the mucus, so that it can be discharged and patient can breathe more easily. It is given either as plain water inhalation or with herbs added to it.

Steps of the Procedure:

- Either a sink or a pot (stainless steel or glass/enamelled) can be used. If herbs or plain warm water are added to the steam, glass or enamelled pot is preferred.
- When using a sink, fill the sink with very hot water. Keep the water hot and steaming. Hold your head over the sink with face far enough from the water and breathe in the steam for 5-10 minutes.
- When using a pot, fill a wide pot with water and bring it to a boil. Remove the pot from the store and allow the water to cool slightly, hold your head over the pot and breathe in the steam. Drape a towel over your head and the pot to prevent escape of the steam. Continue for 5-10 minutes.

- After each steam inhalation treatment, take several deep breaths to clear lung congestion. Therapy may be repeated as and when required.

Complications and prognosis

- Bacterial invasion of the lung tissue can cause pneumonic consolidation, septicaemia, empyema, lung abscess (especially *S. aureus*) and pleural effusion.
- Respiratory failure, hypoxia and death are rare unless there is previous lung disease or the patient is immunocompromised.

Prevention

- Prevention of pneumococcal pneumonia and influenza by vaccination, for high-risk individuals with pre-existing heart or lung disease.
- Smoking in the home is a major risk factor for all childhood respiratory infection.
- There is insufficient evidence to recommend zinc supplementation for reduction of the incidence of pneumonia

IV. DISCUSSION

The results revealed that steam inhalation as well as twin technique can be used in the treatment of lower respiratory tract infection , During clinical exposure, the researcher has seen children diagnosed and hospitalized frequently with lower respiratory tract infection and found to continuously cough, vomiting, not taking food properly, increased school absenteeism and they do not have interest in activities. Family members looked worried. So the researcher wanted to help the children and family by improving the health status of children. So the researcher intended to do a study on balloon therapy and steam inhalation among children with lower respiratory tract infection.

V. CONCLUSION

This study is on the basis of findings balloon therapy and steam inhalation is more acceptable among children as it is a part of their normal routine play activity and excitement to explore blowing balloons and steam inhalation. It is cost effective, convenient, requires less skills so the researcher strongly suggest approaching the hospitalized sick children with acceptable form of innovative therapeutic regimen for their complete participation in their health care.

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