Treating a child with cough or difficulty in breathing

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Abstract
Acute respiratory infections (ARI) are the commonest infections in children under the age of five years in Nepal. An under five child will have 4-6 episodes of ARI per year in Nepal. ARI episode does not differ much between developed and developing countries.. Pneumonia is the commonest single cause that causes death in a child with respiratory infections in developing countries. Treating pneumonia is still confusing. This article re-visits the basic concept in the treatment of pneumonia.

Key words: pneumonia, , persistent, pneumonia ,antibiotics .treatment,

Introduction

It is the commonest cause of admission in under five children at Kanti Children's Hospital, approximately 70% of medical admissions are contributed by pneumonia. It is also one of the commonest cause of morbidity and mortality in Nepal and developing countries. Pneumonia is the leading cause of death in a child with acute respiratory infections.

Pneumonia is diagnosed in a child with the history of cough or difficulty breathing having any one of the following signs: *fast breathing* (fast breathing cutoff rates per minute are as follows: young infant 60 or more; 2 months up to 12 months: 50 or more and up to 5 years: 40 or more) *chest indrawing* (observe for the lower chest indrawing during inspiration) and *crepitations* on auscultation.

Differential diagnosis of a child presenting with cough or difficulty breathing:

Diagnosis	*In favour*
Pneumonia	Fast breathing Lower chest wall indrawing Crepitations on auscultation Bronchial breathing Nasal flaring Grunting Head nodding
Cardiac failure	Raised jugular venous pressure Central cyanosis Oedema feet Enlarged liver Heart murmur Gallop rhythm
Pneumothorax	Sudden onset Hyperresonance chest on one side of chest . Diminished air entry on the side of lesion Shift of mediastinum (trachea, apex beat)

Pleural effusion, empyaema	Diminished breath sound on the side of lesion Stony dull on percussion.
Pericardial effusion	Oedema feet Raised jugular venous pressure Apex beat not visible/not palpable Pulsus paradoxicus Enlarge liver
Penumocystis pneumonia	2-6 month old child with central cyanosis Hyperexpanded chest Fast breathing Enlarged spleen, liver and lymphnodes Wasting

Treating pneumonia at Hospital is based on the following information:

1. **Age of the patient.**
2. **Severity of signs**
3. **Duration of the illness**
4. **Associated diseases.**
5. **Availability of drugs.**
6. **Place of residence.**

Age of the patient

Admit all patients below the age of 2 months (young infant).

Assess if the young infant is able to suck well or not.

If the young infant is taking half of the usual amount then insert a nasogastric tube (size 5 or 6) and give EBM 130ml/kg/24 hours divided two to three hourly.

If the young infant has severe chest indrawing/cyanosis/ grunting/nasal flaring/lethargic then:

Insert nasal canula and give oxygen at the rate of 2L/min.

(Measure the distance from the tragus of ear to the tip of the nose and make it half. Mark this length on the canula from the distal end. Insert through the nostril up to the mark and fix it on the forehead with tape.)

Keep the young infant warm and in slightly propped up position. (Educate the mother)

Give Gentamycin IM (6mg/kg single dose) plus Procaine penicillin IM (25-50,000 units/kg single dose) daily for one week.

DO NOT USE IV FLUID UNLESS THERE IS DEHYDRATION (inappropriate ADH secretion is one of the important complication)

Severity of signs

Admit all patients with any of the following severe signs:

Severe chest indrawing, flaring alae nasi, grunting, stridor, audible wheeze, cyanosis, lethargic or unconscious

(*Size of the consolidation in the chest x-ray is not the criteria for the admission*)

If the child has severe signs:

Give oxygen as mentioned earlier. *Using oxygen will reduce the mortality by 70%*

Give IV fluid 1/5th Normal saline in 10% dextrose (half of the total fluid requirement if the child is not able to drink) for 24 hours.
Give *IV ceftriaxone 50mg/kg twice daily* (if cannot afford give IV *Chloramphenicol 50mg/kg/day divided six hourly plus Penicillin G potassium or sodium 100,000 units/kg in divided every six hourly)*. It is important to realize that the chloramphenicol if given orally will have the same MIC in the blood as compared to the IV. *Chloramphenicol should never be given IM.*
Assess if the patient is able to drink. If the patient is able to drink and does not have the above mentioned signs except fast breathing:
If they can afford use amoxycillin plus clavulanic acid (15mg/kg//dose of amoxycillin 8 hourly) for 5 days or give oral amoxycillin (20mg/kg/dose eight hourly) for five days and send home with counselling for fever, food and when to return.
If the child has wheeze give nebulized salbutamol as follows:

Place the 2.5mg of salbutamol solution (0.5ml of the 5mg/ml) and 2-4ml of sterile saline in the nebulizer compartment and treat the child until the liquid is almost all used up. Auscultate the child after the nebulizer and if the wheeze has improved teach parent the use of salbutamol by metered dose inhaler with spacer device. Once the child has improved to be discharged , oral salbutamol can be given if inhaled salbutamol is not available. The dose is:

Age 2-12 months: 1 mg 6-8 hourly.
12 months to 5 years: 2 mg 6-8 hourly
(strength available: Syrp: 2mg/5ml; tablet: 2,4 mg/tab)

If the child has wheeze which is severe and more than 24 hours use oral *prednisolone 1mg/kg once a day for 3 days*.
If the child does not improve after three doses of nebulized salbutamol use aminophylline in the following doses:

Bolus dose: 5-6 mg/kg (up to maximum of 300 mg) followed by a maintenance dose of 5mg/kg every 6 hours. This IV dose has to be given diluted 4 times with 5% dextrose over 30 minutes.

Pneumonia in older children often present in many ways:

1. Typical presentations (predominantly respiratory signs): fast breathing, chest indrawing, and cyanosis.
2. Atypical presentations (single or in combinations):
    - Acute abdominal pain
    - Acute pain in chest or shoulder
    - Convulsion
    - Fever
    - Miningism

<u>Duration of illness</u>
If the duration of the illness is more than one week and the child does not have severe signs, assess for reactive airway disease, tuberculosis, bronchiectasis, eosinophilia etc. Investigate with CBC, ESR, chest-Xray and Mantoux test. Counsel the parents: cause of cough, necessity of investigation and follow-up.
If the duration of illness is less than one week follow as above.

It is important to differentiate recurrent and persistent pneumonia. Presence of a symptom free interval during which chest radiographs show clearing of infiltrates,

suggests recurrent infection. At times persistent infections may present as recurrent infections because of inadequate or appropriate therapy. Congenital malformations, aspirations, defect in the clearance of airways secretions and disorders of local/systemic immunity are important causes of recurrent or persistent infections.

Associated diseases

Pneumonia often associates with wheeze. If the wheeze is present a rapid acting bronchodilator should be used along with the oxygen.
Admit the patient with pneumonia if the following associated conditions are present: severe malnutrition, congenital cyanotic heart disease, sepsis, seizure in the present episode, prupuric rashes, some or severe signs of dehydration. These cases needs further workup and specific treatment along with the treatment for pneumonia.

Availability of drugs:
For OPD treatment, if affordable the use of amoxycillin plus clavulanic acid (15mg/kg//dose of amoxycillin 8 hourly for 5 days) is recommended. If not affordable oral cotrimoxazole (10mg trimethoprim plus 50mg sulfamethoxazole/kg/24 hour divided every 12 hourly) or amoxycillin (20mg/kg/dose every 8 hourly) is also equally effective.
For inpatient: if patient ca affordable use of parental ceftriaxone in all age group is recommended. If it is not affordable use of crystalline penicillin plus gentamycin for young infant and Chloramphenicol plus penicillin in older children with severe pneumonia is recommended.

Place of residence:
If patient has been referred or come from long distance and or does not have a place to stay and can afford, it is desirable to admit the patient.
If can not afford ask to stay in Kuruwa Ghar.
Other management is accordingly as mentioned earlier to be decided according to the severity.

Follow-up
Observe daily: respiratory rate, chest indrawing, feeding, convulsion, rash.
If the condition is worse after 24 hours following workup is needed:
CBC, Chest X-ray. If there is convulsion do LP
These results must be obtained immediately. Observe for shift to the left, leukaemoid reaction, pneumothorax, and meningitis.

On the third day: If the condition is the same following work up is needed: CBC, ESR, Mantoux test, Chest x-ray, history of contact or foreign body aspiration, change the antibiotics to gentamycin and cloxacillin. Observe till the results are available. Follow-up should be done daily as mentioned earlier. *One of the common causes of persisting fast breathing in a child with pneumonia after 48 hours of treatment is congestive cardiac failure. Therefore if the child has signs suggestive of cardiac failure use diuretics (furosamide 1mg/kg/day and oral lanoxin). In this case the symptoms should improve after 24 hours of this therapy.*

If the condition is better switch over to oral antibiotics except for young infants. Continue parental antibiotics in young infants for one week if there are no complications.

Older children can be discharged home the next day of oral antibiotics. The total duration of antibiotics (including oral and parenteral) should be 10 days. Children with pneumonia should not be prescribed cough mixtures containing cough suppressants and antihistamines.

Once the patient is discharged from the hospital it is essential to educate the parents and be sure that the parent understands the following points:

1. How to give the drug.
2. When to give the drug.
3. When to return.

Cost of treatment:

It is very important to consider the cost of the treatment because many drugs are costly and the result will be same. Below is the example of the cost of the treatment for a child of 10 kg from OPD.

Name of the brand and preparation	Approximate c*ost of the drug for 5-day treatment*
Amoxicillin with clavulanate Pot.	Rs 435/
Cotrimoxazole (Syrp)	Rs 36/-
Cotrimoxazole(Paed. Tablet)	Rs 25/50

Drugs available as:

Amoxycillin plus Clavulanate Pot

Dry syrup: Amoxy 200mg + Clavulanate Pot 28.75 mg per 5ml: Augmentin (Rs145.0 for 30ml)
Dry syrup: Amoxy 125mg + Clavulanate Pot 31.25mg per 5ml; Tablet: Amoxy 250mg + Clavulanate Pot 125 mg
Clavam(Rs95.0 for 30ml; Rs32.78 per tablet), Enhancin

Co-trimoxazole

Syrup/tablet: Trimethoprim 40mg + sulphamethoxazole 200mg per 5ml or tablet (Bactrim, Septran, Ardiprim Lomoprim Tab: Rs18.0 for 50ml; Rs1.28 per tablet)
Trimethoprim 80 mg + sulphamethoxazole 400 mg
(Bactrim, Septran, Ardiprim Lomoprim Tab)
Paed. Tab:Trimethoprim 20 mg + sulphamethoxazole 100 mg; (Ardiprim-P, Septran-Rs0.85 per tablet)

Chloramphenicol:

Suspension/capsule 250mg (3.97/cap), 500mg(Rs5.90 per capsule)
Chloromycetein (Susp: 125mg/4ml; Rs 59.0 per 60ml)
G-Phenicol, Nephenicol(125mg/5m;Rs 29.0 per 50ml)
Paraxin (: 125mg/5ml; Inj: 1g/vial; Rs45.0/vial)

Ceftriaxone

	Monocef IV,	*Oframax,*	*Lyceft*
250mg/vial,	*Rs72.0*		*Rs59.0*
1G/vial	*Rs197.0*	*Rs196.0*	*Rs170.0*

Gentamycin

Gentamicin, 20mg/ml(Rs9.0/2ml vial), 80mg/ml(Rs13.0/0.5ml vial)

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