Safety, feasibility and efficacy of outpatient management of moderate pneumonia at Port Moresby General Hospital: a prospective study

Dr Rose Morre
Master of Medicine research project, 2017
Aim

• To trial a model for outpatient management of moderate pneumonia in COPD Port Moresby General Hospital so that such children are not admitted but treated as outpatient in a way that is safe, effective and feasible
Objectives:

1. Safety
   • admission rate in 3 and 5 days
   • mortality to zero

2. Efficacy
   • cure i.e. resolution of signs of pneumonia at 6 days

3. Feasibility
   • number of children with moderate pneumonia in to this model can be applied to
   • recognising danger signs on D 1 & 2
   • % oximeter reliable in outpatient.
Introduction

• Pneumonia is the leading global cause of morbidity and mortality in children under 5 years old worldwide.
• 2015-5.6 million children died worldwide (18% PNA)

• Developing countries – in PNG pneumonia is its top 5 causes of death
• In PNG 2015;
  • 21% Pneumonia admissions
  • case fatality rate (CFR) of 4.9%,
  • severe pneumonia had CFR of 11.9%.

• To reduce admissions a model of outpatient pneumonia management is needed.
### Standard Treatment for Common Illnesses of Children in Papua New Guinea:

<table>
<thead>
<tr>
<th>Classification of severity of pneumonia</th>
<th>Cough and difficult breathing with...</th>
<th>Severe pneumonia</th>
<th>Moderate pneumonia</th>
<th>Mild pneumonia</th>
<th>Simple cough</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe pneumonia</td>
<td>Too sick signs, cyanosed</td>
<td>Admit.</td>
<td>Give oxygen &amp; chloramphenicol, if cough persist more than 14 days then do TB score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate pneumonia</td>
<td>Chest indrawing</td>
<td>Admit, benzylpenicillin IV for 24 hrs, if improve then change to amoxicillin for 1 week Do TB score if cough &gt; 14 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild pneumonia</td>
<td>Fast breathing</td>
<td>Home on oral amoxycillin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple cough</td>
<td>No signs</td>
<td>Home on cough relieve remedy</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Previously what WHO called “severe pneumonia”, PNG called moderate pneumonia
Literature Review

• In 2008, an observational study in Bangladesh and a randomised controlled trial in Pakistan showed that children aged 2-59 months who have severe pneumonia but no signs of very severe pneumonia can be safely and effectively treated at home with oral amoxicillin after diagnosis in health facilities. 
  Lancet 2012: 379, February 25th

• “Severe Pneumonia (Mod PNA) can be effectively treated in the community” (WHO)
Methodology

All patients screened at COPD and identified only moderate pneumonia cases from July 2015-July 2016.

Inclusion criteria:
I. Moderate pneumonia,
II. Aged 1 month to 12 years old
III. Informed consent from legal guardian

Exclusion criteria:
I. Chronic illnesses- malnutrition, TB, HIV, known asthma
II. Congenital abnormalities e.g. Down syndrome, CHD
III. Persistent vomiting
IV. Caregiver refused to participate
Day 1

Patients were recruited and recorded the information as below:

1. Socio-demographical information:
   - Time and date, residence
   - Patients name, Mothers name,
   - Mothers education level and contact details

2. Clinical information:
   - Weight, Age, Sex
   - duration of cough, feeding, convulsion,
   - Examination: vital signs - HR, RR, axillary Temp, SpO₂, chest indrawing, wheeze

   - Stat benzylpenicillin 50,000 units/kg IM & observe for 2-3 hrs
   - Short video shown to identify signs of severe pneumonia
   - At pm on day 1, if no signs of severe pneumonia than child sent home on oral amoxy 25mg/kg TDS and reviewed on day 2
Day 2

• Admitted if severe PNA or danger signs
• Examined vital, clinical signs
• If well home on oral amoxyl
• Phone contact if absent & reason noted
• No phone= lost to follow up (LTFU)
• Admitted patients were followed up until discharged

• All data collected were analysed using SPSS version 20.
**Definition of treatment failure**

1. Developing signs of severe pneumonia and admitted
2. Symptoms persist after 5 days completion of oral amoxicillin
3. Death

**Danger signs**

- Cyanosed or SpO₂ 90% or less
- Not breast feeding well or vomiting
- Has signs of heart failure i.e. hepatomegaly, pulse rate is 160 bpm or more
- Convulsion+

**Definition of partially improved**

Signs of moderate pneumonia resolved but subject has other symptoms from another illness

**Correct dose, frequency and duration of oral amoxicillin:**

25mg/kg TDS for 5 days
Picture of equipment used in this study
Results – demographic characteristics (n=120)

• 120 patients recruited
• Gender – male 71 (60%) , female 49 (40%)

• Median age 12 (IQR 6-24) months
• Median weight 8.95 (IQR 7.4-12) kg

• Mothers education: 33% no education, 27% primary, 25% secondary, 15% Tertiary (67% some form of education)
• In possession of phone 75 (63%)
Summary of study

Day 1
- 120 patients
  - 117 patients
    - 2 patients admitted for severe pneumonia
  - 1 patient for moderate pneumonia and acute gastroenteritis

Day 2
- 105 patients
  - 102 patients
    - 3 Patients admitted for severe pneumonia
    - 2 Lost to follow up
      - 2 Phone engaged
      - 2 No bus fare
      - 2 children improved
      - 6 no mobile phone
  - 12 Lost to follow up

Day 6
- 99 patients
  - 97 patients improved (92.4%)
  - 3 lost to follow up
    - 3 no mobile phone
  - 1 investigated for PTB/TBLN
  - 1 admitted for scalp infection-MRSA
<table>
<thead>
<tr>
<th>Clinical characteristics</th>
<th>Day 1  n=120</th>
<th>Day 2  n=105</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RR (breaths per min, median, IQR)</strong></td>
<td>50 (48-58)</td>
<td>38 (36-42)</td>
</tr>
<tr>
<td><strong>HR (beats per minute, median, IQR)</strong></td>
<td>150 (130-166)</td>
<td>129 (108-140)</td>
</tr>
<tr>
<td><strong>Temp (C), median, IQR</strong></td>
<td>37.5 (36.7-38.6)</td>
<td>36.7 (36.5-38.6)</td>
</tr>
<tr>
<td><strong>SpO₂ (%) median, IQR</strong></td>
<td>97 (95-99)</td>
<td>98 (96-99)</td>
</tr>
<tr>
<td><strong>Cyanosis n (%)</strong></td>
<td>none</td>
<td>1 (0.95)</td>
</tr>
<tr>
<td><strong>Chest indrawing n (%)</strong></td>
<td>120 (100)</td>
<td>54 (51)</td>
</tr>
<tr>
<td><strong>Wheeze n (%)</strong></td>
<td>79 (65.8)</td>
<td>28 (26.7)</td>
</tr>
<tr>
<td><strong>Not Feeding well n (%)</strong></td>
<td>4 (3.3)</td>
<td>4 (3.8)</td>
</tr>
<tr>
<td><strong>Duration of cough (median, IQR)</strong></td>
<td>3 (1-5)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Was the medicine given correctly?</th>
<th>Day 2  n=105</th>
<th>Day 6 n= 99</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Correctly</strong></td>
<td>98 (93.3)</td>
<td>97 (98)</td>
</tr>
<tr>
<td><strong>Not given correctly</strong></td>
<td>5 (4.8)</td>
<td>2 (2)</td>
</tr>
<tr>
<td><strong>Not given</strong></td>
<td>2 (1.9)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>
• Of 120:
  • 105 came for review on Day 2
  • 15 (12.5%) failed to come for review

• Fever
  • 60 patients on D1 (3 admitted)
  • 7 patients on D2 (5 had fever in D1 & D2, none admitted while 2 had fever on D2 and 1 of them got admitted)

• Hypoxaemia
  • 2 (0.8%) had SpO$_2$ <92%. Both admitted on D2 for severe PNA

• Chest indrawing
  • 120 had chest indrawing on D1 (criteria for selection)
  • 54 (51%) Chest indrawing on D2.

• Wheeze
  • 79 (65.8%) had wheeze on D1
  • 28 (26.7%) had wheeze on D2 (51 improved of the 79)
• Children requiring admission
  • Day 1: 3 admitted on D1 (2.5%). 2 were not feeding well and vomiting out feeds and 1 had diarrhoea while at COPD under observation.
  • Day 2: 3 patients admitted on day 2. That is out of 105 who turned up hence 2.8% admission rate. Of the 3, one was cyanosed (SpO₂ 87%) and 2 were not feeding at all and had head nodding.
  • Total admission =6, severe pneumonia 5 & 1 for moderate pneumonia with AGE; all survived and were discharged from the ward

• Final outcome
  • 99 improved (92.4%), 6 admitted (5%), 15 lost to follow up (12.5%)
  • All survived
1. **IS IT SAFE?**
Yes, only 6 admitted (5%) out of 120 patients and zero mortality

2. **IS IT EFFECTIVE?**
Yes, 97 out of 120 patients improved (92.4%) on D6 after completion of amoxicillin

3. **IS IT FEASIBLE?**
Yes, parents recognised danger signs on D1 and D2 and pulse oximeter was useful
   - 2 not feeding and vomiting feeds on D1
   - 2 not feeding and head nodding and 1 cyanosed on SD2
Discussion and conclusion

• It is feasible, safe and effective to manage children with moderate pneumonia as outpatient
• Low rates of admission (6 of 120 = 5%), and LTFU (15 of 120 = 12.5%)
• Numbers small-unable to identify any indicators
• LTFU- not sure what happen to them but no deaths from PMGH record

• **As long as safeguards are in place**
  • Excluding high risk patients (HIV, neonates)
  • Checking for danger signs and hypoxaemia
  • A protocol for education of mothers, including teaching about danger signs and when to return (use structured teaching materials and video)
  • Follow-up
  • Reassessment if a child is not improving to detect undiagnosed conditions which may look like moderate pneumonia (TB, congenital heart disease, HIV)
Discussion and conclusion

• Benefits of outpatient management:
  • Avoid hospital overcrowding
  • Avoid iatrogenic consequences of being in hospital (secondary infection)
  • Empower parents to care for their children when moderately unwell
  • Lower cost to health service and to families
Limitations / Recommendation

• Larger sample size would have been useful
• Multi-site study
• Maybe stat dose of benzyl penicillin is not necessary
References


Acknowledgement

- Professor T Duke
- Dr P Ripa
- Dr Sobi and PMGH team
- All Paediatricians
- Dr Kandelyo / family
THANK YOU