

Diagnosis and Management of Children with Protracted Bacterial Bronchitis PBB

Reference: 1852v1
Written by: Sonal Kansra
Peer reviewer: Alison Scott
Approved: July 2018
Review Due: February 2021

Purpose

To guide practitioners in recognition, diagnosis and treatment of Protracted Bacterial Bronchitis

Intended Audience

Paediatricians, Respiratory Paediatricians, Specialist nurses

Table of Contents

1. Introduction
2. Intended Audience
3. Guideline Content
4. References

1. Introduction

Protracted Bacterial Bronchitis is one of the commonest causes of chronic cough in children (Cough >4 weeks). Protracted Bacterial bronchitis, chronic suppurative lung disease (CSLD) and bronchiectasis are a continuum of conditions characterised by bacterial infection of the airways. The condition is also referred to as endobronchial infection or wheezy bronchitis. **Protracted Bacterial Bronchitis (PBB) is the preferred terminology.** This guideline covers the management of Protracted Bacterial Bronchitis only.

Protracted Bacterial Bronchitis has been historically treated with long (6-8 weeks) of broad spectrum antibiotics. This has largely been based on expert opinion. Recent systematic review and guidelines suggest that a shorter course (2 weeks) may be enough to treat most children.

Several studies have shown that this can be a very recurrent condition. There is concern over the unintended impact of increased antibiotic use and subsequent antibiotic resistance with prolonged use. While treatment seems logical, there is insufficient evidence demonstrating benefit (disease modification) from antibiotic therapy. In the youngest children sequential viral URTI can easily mimic this condition and it is important to try and distinguish the two conditions.

2. Intended Audience

This guideline is intended for all doctors and specialist nurses who manage children with chronic cough. These children are likely to be seen as outpatients rather than as acute presentation.

3. Diagnosis and Management

PBB clinical

Children with chronic wet cough (> 4 weeks), in absence of any specific pointers of significant lung disease (see appendix 2).

X-rays show minor changes (bronchial wall thickening) only

These children should be designated as PBB (clinical) and treated with 2 weeks of antibiotics covering common respiratory pathogens *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis*. Usually this will be Co-amoxiclav. Appendix 1.

For most children a 2 week course will be needed, a further 2 weeks can be prescribed if the child has improved significantly but is not completely cough free. (Only a minority will need longer courses and have high index of suspicion in these for more severe disease i.e. CSLD or bronchiectasis).

Diagnosis and management of children with Protracted Bacterial Bronchitis PBB

For children who do not respond to 4 weeks of antibiotic treatment or have more than one episode, further investigations including baseline immunology (Full Blood Count, Immunoglobulin levels and vaccine responses to HiB, Tetanus and Prevenar serotypes) and sweat test is recommended.

Referral to tertiary Respiratory consultants should be considered and bronchoscopy discussed.

PBB (Bronchoscopy/microbiology confirmed)

Treatment

Children with Bronchoscopic evidence of PBB (Purulent secretions, heavy growth of typical bacteria, neutrophilia) should be treated with 4 weeks of antibiotics, with antibiotic choice guided by culture and sensitivity results.

If the bronchoscopy shows significant inflammation or purulent secretions then IV antibiotics will be commenced on consultant decision only.

Recurrences are common and it is reasonable to wait for 2 weeks to see if these are related to a new viral infection.

Recurrences should be treated with 2 weeks of antibiotics and it will be useful to do a cough swab for culture and sensitivities and a NPA or viral throat swab for respiratory viruses at the onset.

Prophylaxis

Antibiotic prophylaxis should be discussed for children who have more than 3 recurrences in 12 months.

Azithromycin (10mg/kg OD M/W/F) should be first line for prophylaxis because its use has good evidence in CSLD and bronchiectasis and in cystic fibrosis. The dosing is easy, it is well tolerated and has less interactions and cardiac toxicity as compared to other macrolides

Septin second choice (Use age appropriate dose once daily)

Co-amoxiclav, nebulised colistin and cephalosporins should be used as prophylaxis on consultant advice only.

A TREATMENT ALGORITHM IS SUMMARISED IN THE FLOWCHART AT THE END OF THIS GUIDELINE.

Chronic Suppurative Lung Disease

Children who do not improve with 4 weeks of antibiotics, will have further follow up with the respiratory consultant and will likely have a HRCT of chest. They will usually need more detailed immunology testing and further investigations like ciliary brushings and extended CF genetic screens. Some of these may be treated with IV antibiotics.

CSLD describes children with clinical features of similar to PBB with wet cough, crackles but no radiological evidence of bronchiectasis. **The management of these children is not covered by the guideline.**

4. References

1. Management of children with chronic wet cough and protracted bacterial bronchitis: CHEST Guideline and Expert Panel Report, CHEST (2017), doi:10.1016/j.chest.2017.01.025.
2. Marchant JM, Masters IB, Champion A et al. Randomised controlled trial of amoxicillin-clavulanate in children with chronic wet cough. *Thorax* 2012; 67(8):689-693.
3. Donnelly DE, Critchlow A, Everard ML. Outcomes in Children Treated for Persistent Bacterial Bronchitis. *Thorax* 2007; 62(1):80-84.
4. Pritchard MG, Lenney W, Gilchrist FJ. Outcomes in children with protracted bacterial bronchitis confirmed by bronchoscopy. *Arch Dis Child* 2015; 100(1):112.
5. Chang AB, Upham JW, Masters IB et al. State of the art. Protracted bacterial bronchitis: the last decade and the road ahead. *Pediatr Pulmonol* 2016; 51(3):225-242.
6. Shields MD, Bush A, Everard ML et al. British Thoracic Society Guidelines Recommendations for the assessment and management of cough in children. *Thorax* 2008; 63 Suppl 3:iii1-iii15.
7. Goyal V, Grimwood K, Marchant JM et al. Does failed chronic wet cough response to antibiotics predict bronchiectasis? *Arch Dis Child* 2014; 99:522-525.
8. Chang AB, Robertson CF, van Asperen PP et al. A multi-centre study on chronic cough in children:burden and etiologies based on a standardized management pathway. *Chest* 2012; 142:943-950.
9. Chang AB, Oppenheimer JJ, Weinberger MM et al. Children with chronic wet or productive cough-treatment and investigations: a systematic review. *Chest* 2016; 149(1):120-142.
10. Darelid J, Lofgren S, Malmvall BE. Erythromycin treatment is beneficial for longstanding *Moraxella catarrhalis* associated cough in children. *Scand J Infect Dis* 1993; 25(3):323-329.
11. Gottfarb P, Brauner A. Children with persistent cough--outcome with treatment and role of *Moraxella catarrhalis*? *Scand J Infect Dis* 1994; 26(5):545-551
12. Asilsoy S, Bayram E, Agin H et al. Evaluation of chronic cough in children. *Chest* 2008;134(6):1122-1128.
13. Marchant JM, Masters IB, Taylor SM et al. Evaluation and outcome of young children with chronic cough. *Chest* 2006; 129(5):1132-1141.

Diagnosis and management of children with Protracted Bacterial Bronchitis PBB

Appendix 1 Doses of Antibiotics Commonly used in Protracted Bacterial Bronchitis

Drug	Dose	When to use	Additional information
Co-amoxiclav Suspension 125/31 in 5ml, 250/62 in 5ml DUO (bd dosing) 400/57 in 5ml Tabs 250/125, 500/125 Dispersible tabs 250/125	15mg/kg tds (based on amoxicillin dose) or 20mg/kg bd (based on amoxicillin dose) using duo	First choice antibiotic for most children	Occasionally doses of 30mg/kg tds of amoxicillin may be prescribed, half as co-amoxiclav and half as amoxicillin alone. Doses may be rounded by prescriber to a convenient volume
Cefixime Tabs 200mg (scored)	12mg/kg od	Alternative to co-amoxiclav	Max dose 600mg
Azithromycin (treatment) Suspension 200mg/5ml Tabs/caps 250mg	10mg/kg od for 7 days	After discussion with consultant	Max dose 500mg
Azithromycin (used as an anti-inflammatory/prophylaxis) Suspension 200mg/5ml Tabs/caps 250mg	10mg/kg three days a week (normally Mon, Wed, Fri)		Max dose 500mg
Clarithromycin Suspension 125mg/5ml Tabs 250mg, 500mg	10mg/kg bd	To treat haemophilus as alternative to Azithromycin	Max 500mg bd
Ciprofloxacin Suspension 250mg/5ml Tabs 250mg, 500mg (scored)	20mg/kg bd from 1 year	Only after discussion with respiratory or microbiology consultant	Not for children younger than 12 months Max 750mg bd

Systemic Abnormalities

Abnormal CVS examination

Digital clubbing

Failure to thrive

Neuro-developmental delay

Fever

Immune deficiency (primary or secondary)

Feeding difficulties and chronic diarrhoea

History of contact with TB

Joint swelling, autoimmune eye disease

Nasal discharge and / or polyps

Sinusitis

Family history of chronic respiratory disorder

Pulmonary Abnormalities

Haemoptysis

Chest pain

Croupy cough ,Paroxysmal Cough with/without post tussive vomiting, staccato, cough from birth

Recurrent pneumonia

Hypoxia/cyanosis

History of previous lung disease or predisposing causes (e.g. neonatal lung disease, foreign body aspiration)

Dyspnoea or tachypnoea at rest

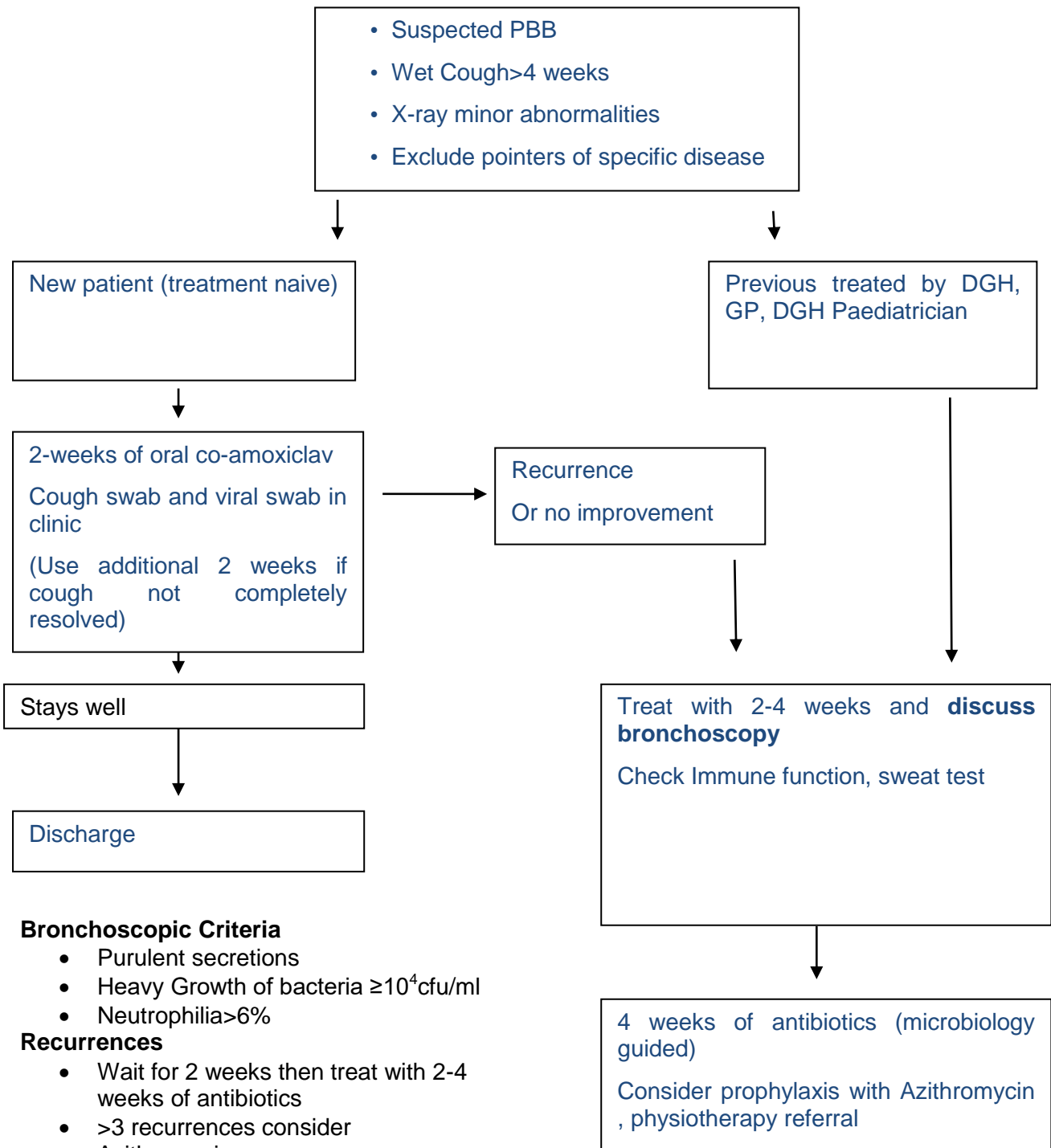
Chest wall deformity

Auscultatory findings (e.g. stridor, wheeze, crackles)

Chest Xray abnormalities

Lung function test abnormalities

Algorithm for treatment of Protracted Bacterial Bronchitis



Bronchoscopic Criteria

- Purulent secretions
- Heavy Growth of bacteria $\geq 10^4$ cfu/ml
- Neutrophilia $> 6\%$

Recurrences

- Wait for 2 weeks then treat with 2-4 weeks of antibiotics
- > 3 recurrences consider Azithromycin
- Colistin, Cefixime or Co-amoxiclav prophylaxis on consultant advice only