

GUIDELINE UPDATE

Community-acquired pneumonia in children: what's new?

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ABSTRACT

The community-acquired pneumonia in children guidelines have just been updated with new evidence on incidence, aetiology and management. This guidance should improve patient care.

The British Thoracic Society (BTS) guidelines have recently been updated, reflecting 10 years of new evidence.¹ What have we learned in that time? The past decade has brought new diagnostic techniques, the introduction of universal infant pneumococcal vaccination and new information on antibiotic delivery.

Community-acquired pneumonia (CAP) is common and most is seen and treated in the community. The guideline confirms that no diagnostic tests are necessary in the community but emphasises the importance of providing families with information, including advice on management, identifying any deterioration and the importance of reassessment.

The incidence of children admitted to hospital with CAP (defined as fever, clinical signs and chest radiograph infiltrate) in the prepneumococcal vaccine era was 33/10 000 aged 0–5 years and 14.5/10 000 aged 0–16 years evidenced from remarkably consistent prospective studies in Norway and the UK.^{2,3} Infant vaccination with PCV 7 (seven-valent pneumococcal conjugate vaccination) started in the UK in 2007, and a national time trends study has shown a 19% decrease in admission rates between 2006 and 2008.⁴ In countries such as the USA where PCV 7 has been available for longer, a decrease in hospital admissions of ~30% is reported.

When establishing aetiology, new PCR techniques have improved diagnostic yield so that a pathogen can be detected in 65–86% of cases. This careful work has identified mixed viral–bacterial infection in 23–33% of CAP cases. *Streptococcus pneumoniae* remains by far the most common bacterial cause and is found in 30–40% of cases as a single or co-pathogen. Group A *Streptococcus* contributes 1–7% of cases. *Mycoplasma* and *Chlamydia pneumoniae* are found with variable frequency and are not uncommon in the preschool child. The common winter viruses respiratory syncytial virus (RSV), parainfluenza and influenza are frequent pathogens, but the newer identified viruses such as human metapneumovirus and human bocavirus are found in 8–12% and ~5%, respectively. Overall viruses account for 30–67% of cases and are most frequent in children <1 year of

age.^{5,6} In the 2002 guidance, clinicians were encouraged to search for a pathogen in all cases, but this has been revised to more practical guidance that aetiological investigation be restricted to those with either severe or complicated disease.

Clinical features of pneumonia are not specific for aetiology, and the evidence is that chest radiograph findings do not help in this respect. The WHO produced a method for standardising the interpretation of chest radiographs in children, but, even using this, the concordance rate between trained reviewers was only 48%.⁷ Little wonder that chest radiograph interpretation can create heated discussions on ward rounds! Investigation of the use of acute phase reactants as a means of differentiating aetiology and/or severity of CAP has continued over the past 10 years. There have been many publications and much heat, but no light. The outcome is simply to reinforce the guidance that they are not of clinical utility in distinguishing viral from bacterial infections and should not be a routine test.

Oxygen saturation <92% is an indicator of severity and the need for oxygen therapy. No new studies on oxygen delivery were identified. Similarly, there were no new studies on physiotherapy, but good quality evidence already exists that it is not beneficial and should not be performed in children with pneumonia. The BTS paediatric pneumonia audit data from 2010 showed that 15% (of 2209 cases reported) were nevertheless receiving it.

So how does this evidence help us decide who should receive antibiotics? We know that viruses are the most common cause of lower respiratory tract infection (LRTI) in young children. In a vaccine probe study, only 6% of children <2 years old with a clinical diagnosis of pneumonia had *Pneumococcus* identified.⁸ With the introduction of PCV 13 the likelihood of bacterial pneumonia in a fully vaccinated child will fall further. Fully vaccinated children <2 years old presenting with mild symptoms of LRTI need not be treated with antibiotics, but should be reviewed if symptoms persist. The evidence is that bacterial and viral pneumonia cannot reliably be distinguished and therefore all other children with a clear clinical diagnosis of pneumonia should receive antibiotics.

Which antibiotic should be used? On the basis of the known common bacterial pathogens in children and available randomised controlled trials of different antibiotics, amoxicillin is effective, well tolerated and cheap. In the past some paediatricians have been anxious that *Mycoplasma pneumoniae* be covered, and have in addition used macrolide

antibiotics. However, a Cochrane review did not find enough evidence to indicate that antibiotics improved outcomes in children with *M pneumoniae* LRTI.⁹ Studies using only amoxicillin have had very low failure rates. Macrolide antibiotics should not be first line but can be added at any age if there is no response to first-line empirical therapy.

There is important new evidence on how those antibiotics should be given. The PIVOT trial randomised UK children over the age of 6 months to either oral amoxicillin or intravenous penicillin, and the outcomes were equivalent (with a shorter duration of hospital stay in the oral group).¹⁰ Similar results have been reported in the developing world. Oral amoxicillin is therefore the antibiotic of choice both in the community and in hospital. Intravenous antibiotics should be reserved for children unable to absorb oral drugs or those presenting with septicaemia or complicated pneumonia.

These recommendations should result in significant changes to practice and be welcomed in these financially challenged times as they should decrease costs with no change in effectiveness of treatment. Junior doctors are creatures of habit and feel (rightly or wrongly) that they are more likely to be criticised for underinvestigation than overinvestigation and usually send laboratory tests when inserting an intravenous line. Now: no intravenous line, no tests, no physiotherapy. Simple oral antibiotics and supportive care will be effective for the majority of children with CAP, who will also escape from hospital faster.

Competing interests None.

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