

QUESTION 1

ARE ORAL ANTIBIOTICS AS EFFICACIOUS AS INTRAVENOUS ANTIBIOTICS FOR THE TREATMENT OF COMMUNITY ACQUIRED PNEUMONIA?

SCENARIO

A 7-year-old boy presents to the accident and emergency department with cough, a high temperature and signs of respiratory distress. An x-ray shows pneumonia. Does this child require intravenous antibiotics, or would oral antibiotics be sufficient?

STRUCTURED CLINICAL QUESTION

In a 7-year-old boy with pneumonia [patient], are oral antibiotics [intervention] as efficacious as intravenous antibiotics [comparison] for resolution of symptoms and avoidance of complications [outcome].

SEARCH STRATEGY

Secondary sources

A search of the Cochrane Library using the search term 'antibiotics AND pneumonia' revealed 20 reviews, one of which was relevant¹ as it referred to two relevant trials.^{2 3}

Primary sources

A search of MEDLINE revealed 98 articles, two of which were relevant.^{2 4}

Of 118 papers retrieved, three were relevant (see table 1).

COMMENTARY

Pneumonia is an extremely common paediatric illness and around 40% of cases require hospitalisation.⁴ Those admitted are often initially treated with intravenous antibiotics which, however, carry the risk of pain of cannulation, extravasation, thrombophlebitis and local infection at the site of cannula insertion. If oral antibiotics were deemed to be equivalent in the management of community acquired pneumonia, patients would benefit from painless non-invasive treatment of this widespread disease.

Three randomised controlled trials were relevant. Two studies undertaken in developing countries^{2 3} both showed that there was no significant difference in treatment failure between the two groups (oral versus intravenous antibiotics). The APPIS trial² showed no difference in clinical deterioration and no difference in side effects between the two groups. Neither study reported time to recovery or length of hospitalisation. They both used the WHO classification of pneumonia. However, the applicability of these results should be viewed with caution

Table 1 Are oral antibiotics as efficacious as intravenous antibiotics for the treatment of community acquired pneumonia?

Study	Study group	Intervention	Study type	Outcome	Key results	Comments
APPIS trial ²	1702 Children in eight developing countries in Asia, Africa and South America aged 3–59 months with WHO defined severe pneumonia	Oral amoxicillin vs intravenous penicillin G	Multicentre randomised equivalency study	Treatment failure up to 48 h: appearance of danger signs, persistent lower chest in-drawing, drug reaction, needs other antibiotic or death	Treatment failure was 19% in each group. Risk difference –0.4% (95% CI –4.2 to 3.3)	Injectable penicillin and oral amoxicillin are equivalent for treatment of severe pneumonia. Concealment of allocation. Intention to treat. Non-blinded.
Campbell <i>et al</i> ³	134 Children from rural villages in the Gambia with WHO defined pneumonia	Oral co-trimoxazole vs intramuscular procaine penicillin+oral penicillin	Quasi-randomised equivalence study	Treatment failure at 1 week; persistence of lower chest in-drawing, other respiratory distress and high temperature	On day 7 treatment failure occurred in 9.1% of the co-trimoxazole group and 10.2% of the combined group. Risk difference –0.01% (95% CI –0.11 to 0.09)	No significant differences in global treatment failure between the two groups at 2-week follow-up. No concealment of allocation. Non-blinded. Intention to treat.
PIVOT trial ⁴	246 Children with community acquired pneumonia admitted to eight hospitals in Nottingham, UK	Oral amoxicillin vs intravenous benzylpenicillin	Multicentre randomised controlled equivalence study	Time for temperature to decrease to <38°C for 24 h and cessation of O ₂ requirement. Length of stay, complications	Time for temperature to decrease to <38°C for 24 h and cessation of O ₂ requirement. Length of stay, complications	Oral amoxicillin is effective for most children admitted to hospital with pneumonia. Concealment of allocation. Intention to treat. Non-blinded.

Clinical bottom line

- ▶ Oral antibiotics are as efficacious as intravenous antibiotics in the treatment of community acquired pneumonia in children. (Grade B)
- ▶ Oral antibiotics should be tried in all but the sickest children with pneumonia and observed to ensure they are tolerated and symptoms are resolving. (Grade D)

when applied to children in developed countries. Confounding factors such as malnutrition and comorbidity such as HIV and tuberculosis could impact on the external validity of these results.

The PIVOT trial⁴ was a multicentre randomised trial of children admitted to both tertiary centres and district general hospitals in the UK. The authors compared oral amoxicillin and intravenous penicillin and found no difference in time taken for fever and oxygen requirement to resolve. They also found that length of hospital stay and length of oxygen requirement were reduced in the arm randomised to oral antibiotics. Complications and treatment failure were similar in both groups. In fact, empyema only occurred in three patients who were randomised to the intravenous antibiotic arm.

All three trials agree that oral antibiotics are likely to be equivalent in clinical outcomes to intravenous antibiotics in the treatment of pneumonia in children. Children will benefit from receiving painless non-invasive treatment and will have a shorter hospital stay. This may also confer an economic advantage.

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