

EDITORIAL

Antibiotics for community-acquired pneumonia: Only sometimes!

Diagnosis of pneumonia has been described by the World Health Organization (WHO) as “the presence of either fast breathing or lower chest wall indrawing where the child’s chest moves in or retracts during inhalation.”¹ The WHO also states, “Pneumonia should be treated with antibiotics.” However, Nascimento-Carvalho et al² convincingly demonstrated, in 188 children under 5 years of age, that the presence of wheezing on clinical exam highly predicted the presence of a viral infection as the etiology of the respiratory illness. They did not find that tachypnea and chest indrawing distinguished etiology of pneumonia as viral or bacterial.

These findings have serious implications for clinical decision-making regarding the diagnosis and treatment of community-acquired pneumonia in children. Moreover, the findings of Nascimento-Carvalho et al are supported by data from other recent publications. The diagnosis of pneumonia is commonly made or confirmed radiologically. While consolidation can certainly be seen radiologically, the best radiograms with the best radiologists cannot identify inflammatory cells in the lung parenchyma, nor can the various etiologic agents be distinguished radiologically. A chest x-ray is essentially a shadowgram. Areas of localized atelectasis and anatomical anomalies may all result in opacities that could be misinterpreted as a pneumonic infiltrate but do not represent parenchymal inflammation, the definition of pneumonia.

Also, there is a degree of subjectivity involved in the interpretation of chest x-rays. In an evaluation of the WHO criteria for diagnosing pneumonia from a radiograph, this subjectivity was apparent in the lack of uniformity in interpretation, particularly for patchy and perihilar changes.^{3,4} It is among children under age 6, the ages with the highest frequency of pneumonia diagnoses, that the radiologic interpretation is most likely to suffer from such variability in interpretation. A critical commentary on chest radiographs for childhood pneumonia agreed that a negative chest x-ray, ie, the absence of consolidation, excludes pneumonia, but the presence of areas of apparent consolidation alone should not dictate treatment.⁵

Overdiagnosing of pneumonia is common, especially among children under age 6. At a university hospital outpatient clinic in Turkey, 126 children initially diagnosed as pneumonia and prescribed antibiotics were subsequently reevaluated in the Pediatric Chest Disease Department of the same hospital.⁶ That re-evaluation determined that the diagnosis of pneumonia was not supported in 40% of the patients, and antibiotics were judged to be unnecessarily given in 85%. An observational study at four hospitals in India of 516 children under 6 years of age diagnosed as pneumonia based on

WHO criteria found that 43% had what was called “wheezy disease,” more consistent with asthma or bronchiolitis than pneumonia.⁷

An extensive assessment of the etiology of children with community-acquired pneumonia requiring hospitalization was performed at three US hospitals.⁸ A viral or bacterial pathogen was identified in 81% of 2222 children under the age of 6 years with radiographic evidence interpreted as pneumonia. Viral pathogens were identified as the major etiology associated with pneumonia in those children.

Because of the history of a high fatality rate from pneumonia, particularly in less developed countries, the WHO published guidelines recommending empirical treatment with antibiotics based on the clinical presentation.⁹ The value of this recommendation was examined in children less than 6 years of age with nonsevere fast-breathing pneumonia. A double-blind placebo controlled study with amoxicillin found treatment failures were only 4% and 7% in the amoxicillin and placebo groups, respectively.¹⁰ No treatment failures by day 4 occurred in 93% of the children, and there were no differences in the frequency of treatment failures or relapses by day 14 among those without treatment failures by day 4. Thus, most patients improved without antibiotics. This was consistent with the relative infrequency of pneumonia diagnoses consistent with bacterial etiology seen in the US, Turkey, and India.⁶⁻⁸

While the risks of unneeded antibiotics are minimal for an individual patient, there is increasing appreciation for the health and economic burden posed by antimicrobial overuse.¹¹ The WHO treatment guidelines for nonsevere pneumonia therefore requires reconsideration. Current data demonstrate that community-acquired pneumonia is currently of bacterial etiology in few young children. The question is not whether the child has pneumonia, as defined by radiologic imaging. The relevant question is, does the child have a pneumonia due to bacterial infection?¹²

To identify those with bacterial pneumonia from the majority with viral etiology, efforts have been made to examine the value of biomarkers as an aid to clinical assessment. White blood cell count and differential, C-reactive protein (CRP), and procalcitonin have been examined. Of those inflammatory markers, CRP values are significantly higher in the presence of bacterial infection, but some degree of overlap has been seen.¹³ There is general agreement that procalcitonin is the most useful biomarker for identifying those with bacterial infection.¹⁴

While a high fever and toxic appearance may justify immediate administration of antibiotics without further assessment. Antibiotics should generally be considered primarily after careful clinical

assessment of how sick the child appears, the presence of fever, an elevated CRP, an elevated procalcitonin, and a radiologic image of a distinct lobar or lobular infiltrate. While there may be cases where the clinical and laboratory data are equivocal, the great majority of what has been called pneumonia does not justify more than supportive treatment and observation without the use of antibiotics.

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