

CLINICAL SIGNIFICANCE OF INFLAMMATORY MARKERS AND RADIOLOGICAL FEATURES IN PREDICTING THE AETIOLOGY OF COMMUNITY-ACQUIRED PNEUMONIA IN CHILDREN

M.A. Elemraid^{1,2}, G. Eltringham³, A.D. Sails³, J. Perry⁴, M.F. Thomas^{5,6}, D.A. Spencer⁶, K.M. Eastham⁷, M.D. Shirley⁵, S.P. Rushton⁵, F. Hampton⁸, R. Gorton⁹, A.R. Gennery^{1,2}, J.E. Clark^{1,2}, North East of England Paediatric Respiratory Infection Study Group

¹Department of Paediatric Infectious Disease and Immunology, Hospitals NHS Trust, ²Institute of Cellular Medicine, Newcastle University, ³Health Protection Agency Newcastle Laboratory, Institute of Pathology, ⁴Department of Microbiology, Hospitals NHS Trust, ⁵School of Biology, Newcastle University, ⁶Department of Respiratory Paediatrics, Hospitals NHS Trust, Newcastle Upon Tyne, ⁷Department of Paediatrics, Sunderland Royal Hospital, Sunderland, ⁸Department of Paediatrics, James Cook University Hospital, Middlesbrough, ⁹Regional Epidemiology Unit, Health Protection Agency North East, Newcastle Upon Tyne, UK

Background: Community-acquired pneumonia (CAP) is a common childhood infection. Inflammatory markers and radiological features have not previously been found useful in distinguishing bacterial from viral aetiology. Predicting the causative pathogens would help provide targeted management.

Aim: To investigate clinical significance of inflammatory markers and radiological features in predicting the aetiology of childhood CAP.

Methods: A prospective study of children with CAP seen in hospital in North East England from August 2000 to July 2001. Chest x-rays were reported by Radiologists according to the WHO criteria of lobar, patchy or perihilar infiltrates. Aetiology was decided by definite diagnostic criteria. Inflammatory markers included C-reactive protein (CRP), total white cell count (WCC) and neutrophil count. A discriminate analysis approach was used to classify cases on the basis of age, CRP and WCC for different chest x-ray categories forming the basis of a model for prediction of aetiology.

Results: A total of 404 subjects aged 0-15 years were enrolled. Definite infections were 16.6% bacterial, 15.1% viral and 3.5% mixed viral-bacterial. Compared to viral, bacterial infections had higher mean values of CRP ($p < 0.001$), total WCC ($p = 0.002$) and neutrophil count ($p = 0.001$). The discriminate models using lobar, patchy and perihilar features had a respective accuracy rate of 95.8%, 85.5% and 91% in predicting if CAP is caused by bacterial or viral pathogens when used to reclassify the raw data.

Conclusion: Children with bacterial pneumonia had higher inflammatory markers. This discriminate prediction model is a potentially useful tool in clinical management and epidemiological studies of childhood pneumonia.