THORAX

Editorials

After pneumonia. . .

> "Recurrence is more common in pneumonia than in any other acute disease." Sir William Osler (1901)[1]

Recurrent pneumonia is now generally considered to be uncommon except where there is appropriate underlying chronic lung disease such as bronchiectasis or endobronchial obstruction such as that caused by a tumour.[2] Until recently there have been few studies of this; indeed, the whole subject of recovery from pneumonia is one that has been largely neglected. Some studies have investigated what happens to the patient immediately after leaving hospital, but none have assessed what happens after discharge from medical follow up.

A group from Sweden have studied the course of events after pneumonia in a cohort of 241 patients admitted to the infectious diseases unit in Stockholm over a 10 month period in 1987 using three end points: recurrent pneumonia, death from any cause, and death from pneumonia.[3] In comparison with a control group with non-respiratory infection admitted in the same period, the patients with pneumonia were five times more likely to suffer from recurrent pneumonia needing hospital admission, twice as likely to die from any cause, and three times more likely to die from pneumonia over the three year period of follow up.

In this issue of *Thorax* (pp 785–789) the same authors report a further analysis of these patients in an attempt to identify predictive factors for pneumonia recurrence and death. Eighteen variables determined during the index admission for pneumonia were selected in an age adjusted univariate analysis. Few of these variables were found to be significantly associated with the end points used: corticosteroid treatment was significantly associated with pneumonia recurrence and death from any cause, non-lung malignancies with death from any cause and hypoalbuminaemia, and airway colonisation with Gram negative enterobacteria with death from pneumonia.

What is the significance of these observations? Is pneumonia recurrence indeed as common as the authors suggest? In the absence of any similar studies this is impossible to assess accurately. However, the cohort of patients in the study is similar to that identified in other studies of community acquired pneumonia in other parts of Europe. The patients were predominantly elderly (mean age 60 years, range 18–102), three quarters had a pre-existing condition and, despite the suggestion that severely ill patients may have been preferentially referred to the unit, the overall mortality was only 6%—similar to other recent studies.[4,5] Although pneumonia recurrences were not documented or investigated in the detail of the index admission, the findings are likely to be relevant to patients with pneumonia elsewhere. It should be noted that the confidence intervals for death from any cause and death from pneumonia include unity, indicating that the association of these end points with prior pneumonia is more tenuous than that of recurrent pneumonia.[3]

Why does pneumonia recur in these patients? Is it because of a pre-existing propensity in the patient or a direct result of the index pneumonia? We know little enough about why pneumonia occurs in particular individuals at the time that it does; a better understanding of this might help determine why it recurs. A comparison of the frequency of features such as smoking habits, chronic disease, and functional activity between the two groups (those with pneumonia and those with non-respiratory infections) in the initial study might have helped to answer this. If pneumonia recurrence is a direct consequence of the index pneumonia, then the initial infection must produce changes in the host, either within the lungs or in the immune response, which make subsequent infections more likely. The spectrum of causative pathogens identified in the study did not include an excess of those which we normally associate with chronic lung damage.[4] Although temporary alterations in immune function may be associated with some of the pathogens identified,[6] there is no evidence that such infections produce chronic immune defects in other than very unusual cases. It is therefore likely that the condition of the patient before the index pneumonia was the reason for that pneumonia and for subsequent episodes. Only treatment with corticosteroids was significantly associated with recurrence of pneumonia, but this observation must be interpreted with caution since only a selected list of variables was used in the univariate analysis and 43 of the 50 patients with pneumonia recurrence had not, in fact, received steroids. The main risk factors for the index pneumonia in this cohort are likely to be mature age and high incidence of chronic disease and these factors, associated with the alterations in lung mechanics and host defences which occur in such circumstances, may be sufficient to put the patient at risk of recurrent infection. Searches for immune abnormalities leading to pneumonia have been unrewarding in the vast majority of patients who suffer from pneumonia. One study suggested a high frequency of immunoglobulin G_2 subclass deficiency in patients with community acquired pneumonia.[7] However, such patients showed a normal antibody response to polysaccharide antigen, making the significance of this observation doubtful. Hypoalbuminaemia is usually a sign of severe pneumonia. What determines the degree of hypoalbuminaemia is not known, but host factors before the infection may contribute to this. The association with Gram negative enterobacteria is interesting and tempts the suggestion that recurrent pneumonia leading to death was caused by these organisms. However, a microbial cause of pneumonia recurrences was not assessed. Why Gram negative enterobacteria colonise the upper respiratory tract is not known, but

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they are associated with chronic disease,[8] especially in those severely debilitated,[9] and with duration of time in hospital.[10] The severity of the pneumonia and treatment with aminopenicillins may also be factors.[11] The role of colonisation with Gram negative bacteria is unclear, but it may be only a marker of the less fit patient rather than specifically related to recurrence of pneumonia.

If one in five patients with pneumonia will suffer the same illness again within three years, this is a group which should be the target of preventative treatment. *Streptococcus pneumoniae* is the commonest cause of community acquired pneumonia.[5] An effective means of prevention of pneumococcal infection is now available in the form of pneumococcal vaccine. Current advice regarding the administration of this vaccine is vague and covers large groups of the population, not dissimilar to that concerning influenza vaccination.[12] The experience with the latter vaccine is that it is not received by a significant proportion of those who merit it.[13] The same is likely to be true of the pneumococcal vaccine. Identification of subgroups at especially high risk of pneumococcal infection would improve the efficiency of vaccine targeting, and patients recovering in hospital from pneumonia may be just such a group. Whether such a policy would be effective remains to be determined. We do not know whether second episodes of pneumonia are most commonly caused by this organism, whether using a polysaccharide vaccine covering 23 of the 84 pneumococcal stereotypes is likely to produce more protective immunity than that produced by a pneumococcal infection, and what should be done about the majority of patients with pneumonia who never reach hospital. Until further information is available, pneumococcal vaccine should be given to all those with chronic disease who may be at increased risk of pneumococcal infection.

There is no shortage of questions posed by these studies; hopefully the next few years will see some of them answered, with improved targeting of pneumococcal vaccine and a reduction in the incidence of pneumonia, and morbidity and death related to it.

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