Issues at the interface between primary and secondary care in the management of common respiratory disease • 4

Series editors: W F Holmes, J Macfarlane

Providing better care for patients who may have pneumonia

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"It is not as easy to elicit abnormal physical signs in a bedroom of traditional English winter temperature as in a well heated hospital ward."[1]

Pneumonia is common throughout the world, and although its presentation to health care services will vary, many of the difficulties which physicians and patients face are common. This paper deals with meeting this challenge within the British National Health Service (NHS) but the issues discussed have implications for other health care systems.

Pneumonia accounts for 5–12% of all cases of lower respiratory tract infections which UK general practitioners (GPs) treat with antibiotics.[2] Based on prospective studies,[3] a British GP with an average list of 2000 patients would expect to see 4–12 cases of community acquired pneumonia (CAP) per year and to manage most of them at home. Annually in the UK there are some 250 000 episodes of CAP, about one third of which (approximately 83 000 patients) are admitted to hospital. These admissions account for 96% of the £440 million which CAP costs the NHS.[4] CAP is therefore an important problem.

The diagnosis of pneumonia is not always easy. Even when patients with respiratory tract infection are examined in satisfactory conditions and with ready access to radiology, experienced physicians may still find the diagnosis sufficiently uncertain as to need treatment to cover several conditions. One may therefore have some sympathy for the plight of the GP who may have to examine the patient in less than satisfactory circumstances and early in the course of what can be an unpredictable disease.

The presence of abnormal physical signs on examination of the chest in an unwell patient with cough and breathlessness usually suggests pneumonia, but confusion, coping less well at home, or being thought not to be their usual self in a residential home are less certain but equally plausible presentations. A diagnosis of pneumonia based on clinical grounds alone has to be accepted with caution for a number of reasons.

Firstly, there can be difficulties with the examination: consultants seeing patients at home on domiciliary visits will be as aware as their colleagues in general practice that the circumstances in which the patient is examined may be far from ideal and may preclude a satisfactory examination.

Secondly, it is well known that there is considerable interobserver variability in the interpretation of physical signs,[5–7] although this has not been directly tested in patients with pneumonia.

Thirdly, physical signs may be transient. In one study of CAP only 69% of 236 patients thought by the GP to have focal chest signs were considered to have those signs when subsequently examined by a hospital physician. There was a non-significant trend for an effect of time from first examination (74% for those seen within 24 hours of the GP examination compared with 58% for those seen after this time).[8]

Finally, we may be teaching undergraduates to see pneumonia in terms of too narrow a range of physical signs. The classically taught signs of pulmonary consolidation have been shown to have a high predictive value of radiographic changes,[9] but in this study such findings were actually of low frequency. Pneumonia with dullness to percussion, increased vocal fremitus, and bronchial breathing was present in only 34% of adults admitted to hospital with CAP[10] and in only 5–10% of those in the community.[1 8 11] Localised chest signs, especially crackles, remain the best predictor of underlying consolidation, with 39% of such patients found to have radiographic pneumonia in one study.[3] However, even this was not a very sensitive predictor of pneumonia for as many cases of radiographic pneumonia occurred in the 3801 adults with no focal chest signs as in the 236 in whom signs were detected.[3] To cope with this uncertainty, attempts have been made to develop algorithms to predict pneumonia. Low positive and negative predictive values mean that this approach is not successful and is also unlikely to be practical in a community setting.[12]

How do GPs currently manage pneumonia?

A significant proportion of patients with CAP are seen at home and/or out of hours. In one UK study[3 8] 50% of adults with pneumonia were first seen in the home rather than the surgery.

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However, in 1996 a small modification was made in the GPs' contract with the health authorities and this has fundamentally altered the way in which GPs provide out of hours care. For the first time GPs were allowed to determine the location in which assessment and treatment would most appropriately be made. Previously, as all patients could insist upon a home visit (and most did), there was little incentive for GPs to provide alternative and perhaps better arrangements for out of hours assessment.

This small contractual change has gone largely unnoticed outside primary care, but its effect on home visiting has been dramatic, particularly in urban areas. Nationally, only a fraction of out of hours consultations occur in the patient's home: the figure in Nottingham (13%, data from Nottingham Emergency Medical Services, personal communication) being typical of national figures. The majority of consultations now take place in better equipped locations such as health centres, at least some of which are in close proximity to Accident and Emergency departments.

Although most hospital doctors will be unfamiliar with the detail of this change in the GPs' contract, the reason for the change will be all too familiar: the pressure to develop strategies to cope with ever increasing demand for medical attention outside practice hours. Over this period hospitals, too, have had to cope with the similar problem of an escalating number of acute medical admissions. One strategy in hospital has been the development of "assessment units" where patients can be referred for a medical opinion rather than being referred directly for admission.

As a result of these two changes it is perhaps timely to ask whether the traditional management of pneumonia remains appropriate.

"Query pneumonia"

The label "?pneumonia" appears rather sloppy. However, it may more closely reflect the diagnostic problem facing the GP and so may be a more appropriate and useful term. Currently, when dealing with such patients, the choice for the GP is fairly clear, though perhaps not wholly satisfactory: provide empirical treatment or seek admission to hospital. Only a small proportion of GPs arrange a chest radiograph or other investigations but, as we will later discuss, this information is unlikely to impact upon immediate management.

It is certainly easy to feel uncomfortable about this limited management pathway, but there is little evidence that current practice is inappropriate for no studies have directly attempted to answer this question. Perhaps the question might be phrased more usefully in the form "what benefits might a more thorough evaluation of '?pneumonia' offer?"

ENCOURAGE APPROPRIATE ADMISSION TO HOSPITAL?

Three community based pneumonia studies found only two deaths in the 451 (0.4%) patients managed at home compared with 26 in the 336 (8%) admitted to hospital.[3 13 14] This would suggest that most seriously ill patients were correctly identified and referred for hospital admission. In an audit of CAP in Nottingham between 1987 and 1990[15] Tang and Macfarlane reported 64 deaths in 600 hospital admissions, 14 of which occurred in previously well adults aged under 65 years. GP records were available for eight of these and admission appeared to be delayed in only two.

Death from pneumonia at home is rare, occurring in one per 100 000 population in one study[8] and in 1.2 per million in previously fit adults aged 15–44 in another.[16] However, of greater concern is the fact that in these two studies 67% and 74%, respectively, of the patients who died had seen their GP during that illness, suggesting that the opportunity for hospital admission might have been missed

Death is, however, not the only outcome of importance. Patients who were managed at home might more appropriately have been managed in hospital, with such management leading to more rapid recovery and a shorter duration of morbidity. There is considerable current interest in structured severity assessment in patients with pneumonia[17 18] and it may be that such an approach might more appropriately direct the patient to the right venue for management. Current assessment tools require information available in hospital but not available to the GP—for example, blood urea and measures of gas exchange.

REDUCE INAPPROPRIATE ADMISSIONS?

Patients fit enough to be managed at home may be admitted to hospital unnecessarily. Such admissions are wasteful of resources, may place the patient at risk of complications not experienced at home and, given the choice, is probably not what most patients would wish.[19] It seems reasonable to suspect that a proportion of inappropriate admissions do occur as studies show wide variation in admission rates between countries[1 3 11 13 14 20–24] and within countries,[25] although there are no direct data from the UK.

GPs seek hospital admission for their patients for reasons other than disease or the availability of treatment, and "unnecessary" is a description far more easily applied with the benefit of hindsight. Like most clinicians, GPs deal with an ageing population, many of whom live in greater social isolation where relatives are unable or unwilling to provide a level of family support which was common a generation ago. Finding ways to address these pressures better is important.

PROVIDE MORE APPROPRIATE PRESCRIBING?

It is possible that the provision of a second medical opinion would encourage more thoughtful prescribing of antibiotics, perhaps even with lower costs. However, CAP represents only a small proportion of lower respiratory tract infections for which antibiotics are prescribed, and it is debatable whether prescribing by junior doctors is more appropriate than in general practice. One of the criticisms of the 1993 BTS pneumonia guidelines[26] has been that they were interpreted too widely to

include cases of non-pneumonic infection, and that the inaccurate application of severity criteria has led to unnecessarily frequent use of expensive high dose combination intravenous therapy.

Apart from sputum Gram stains (now sadly abandoned as a routine by many laboratories), current microbial investigations are insufficiently sensitive[27] and too slow to impact on antibiotic prescribing in anything other than a minority of those with pneumonia. New, potentially sensitive and rapid tests such as multiplex polymerase chain reaction (PCR) and DNA chips might offer the opportunity to make a rapid microbial diagnosis leading to narrow spectrum specific antimicrobial therapy, but there will be a cost.

BETTER ACCESS TO RADIOLOGY?

A chest radiograph is central to a proper evaluation of pneumonia. Although most hospitals provide GPs with open access to chest radiographs, there are almost invariably problems with arranging outpatient radiology in patients who are unwell, especially if the illness is complicated by issues such as access to transport. Most importantly, however, the value of a chest radiograph in influencing the management of an acute chest infection is almost completely lost if the result is not available for several days thereafter.

A chest radiograph and same day result is therefore an attractive service for the acutely ill and is eminently worthy of study. Making results available more promptly will be a considerable challenge, especially as a greater effort would be required from already busy radiology departments which would themselves reap no benefit. To this end, improvements in information technology and, in particular, the linking of trusts and GPs via the NHS net will be essential.

What costs might a change in practice incur?

The junior staff who would inevitably see such patients may be less experienced than the GPs making the referrals, but they can usually provide a more confident assessment of the problem, especially when supported by the results of early investigations. This might allow early distinction of pneumonia from other or coincident pulmonary pathology such as lung cancer, leading to earlier entry into the correct treatment pathway, reducing the period of morbidity, and lessening the need for repeat GP consultation or subsequent admission. It might prevent pneumonia deaths at home, although the small numbers of these would suggest considerable effort for a small saving. It might well help GPs to manage at home patients for whom the pressure to admit arises from diagnostic uncertainty rather than clinical severity or nursing need.

It is usually easy to see the opportunities which change might provide, less easy to recognise (until too late) the strengths of current arrangements. Many GPs cope well with diagnostic uncertainty, relying upon experience and the peer support of a "wait and see" philosophy which hospital based physicians in training might find difficult to accept. There may well be shortcomings in this practice, but its one clear advantage is that it is extremely cheap. A certain consequence of any change, particularly one which increases access to hospital based evaluations, will be a considerable increase in the unit cost of the assessment. It is very unlikely that such patients would be managed without at least radiology and simple blood tests and it is likely that an increased number of admissions will follow. The practical and cost implications of recommending hospital assessment of every young woman with cough and some pleural discomfort, for example, may be very considerable.

The fears of escalating costs, however, would be a poor reason to avoid change. It may well be that at least a proportion of patients with the provisional diagnosis of "?pneumonia" would be better managed with a more comprehensive assessment earlier in the course of their disease. An evaluation in an assessment unit may be more expensive than evaluation in the community, but it will be considerably less expensive than admission to even a low dependency unit for several days.

It therefore seems reasonable to suggest that the management of the acute phase of CAP could be improved by readier access to expertise and investigations which would increase the accuracy of diagnosis and allow more appropriate therapy. However, the cost benefit analysis of such strategies is likely to be complicated. The overwhelming requirement to assess whether change is necessary or desirable is for information, including careful health economic evaluation. Lower respiratory tract infections are a group of illnesses with a wide spectrum of severity. We know something about the way GPs manage the less severe conditions both in the UK[28] and in continental Europe[24 29 30]—that is, by and large, with few investigations and even fewer admissions. Information about the management of more severe infection including CAP is much less readily available, both in the UK and in Europe.

One must be careful to avoid the pitfall of many changes in clinical practice where new management assumes an unjustified and unproven credibility. This makes the decision to manage less actively and not to refer for expert assessment more difficult. This phenomenon raises costs without any clear indication of benefit.

Consultants in the UK and probably in many other countries need no reminding that the classical model of medical firms with take days and clear lines of responsibility and follow up have gone. Admission wards with overnight stays are increasingly common. With such arrangements it may be the GP who has to provide continuity and follow up. A documented assessment and discharge without admission from a unit supported by adequate secretarial assistance may provide a more helpful model of care for the patient and their GP than a brief admission and a much delayed discharge summary.

It would be unrealistic to suggest that every GP is enthusiastic about retaining greater responsibility for acutely ill patients and assuming the burden for their follow up. As with every other area of medical activity, making facilities more freely available is likely to invite some degree of abuse. However, encouraging those who are trying to provide a better service, especially if they are willing to evaluate and audit their work, seems a better strategy than making access to hospital expertise more difficult.

There is relatively little published evidence to support or criticise current arrangements, most of which appear to have evolved as strategies for coping with local needs. The overwhelming requirement is for research to explore which provisions are associated with improved outcome and satisfaction.

When the only tools at a GP's disposal are a prescription pad and referral to hospital, it is not wholly surprising that empirical treatment is so common and admissions are increasing. Assessment units may offer, in current parlance, a "Third Way", and some evaluation of their merit seems justified. Perhaps "?pneumonia" offers a useful model to evaluate the service such units provide, and to measure whether greater choice helps to improve the quality of care GPs are able to provide.

The following three questions merit further study:

- What influence does same day reporting of chest radiographs have on the management of patients suspected of having pneumonia?
- Does the ready availability of a hospital assessment influence admission rates?
- Can rapid, near patient, microbial investigation lead to more rational, narrow spectrum antimicrobial prescribing with the potential benefit of reduced pressure for bacteria to develop antimicrobial resistance?

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