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Opinion

Community-Acquired Pneumonia in Adults in Primary Care

Introduction

Community-acquired pneumonia (CAP) is one of the commoner conditions presenting to primary care, with an estimated annual incidence in the UK of between 2 and 5 per 1000 population.[1] A practice comprising 10,000 patients could expect to see around 23 cases per year. The incidence is higher at extremes of age, especially <5 years and >60 years, and there is an association with male sex and socioeconomic deprivation. In the UK, 22-42% of adults with CAP are admitted to hospital. The reported mortality of adults with CAP managed in the community in the UK is less than 1%, compared to mortality rates of around 15% in hospitalised patients.[2]

Prevention of pneumonia

Smoking is an independent risk factor for the development of CAP and there is a dose-response relationship between number of cigarettes smoked and invasive pneumococcal disease.[3] In the UK, adults at risk from pneumonia (including all adults aged >65 years) are eligible for pneumococcal polysaccharide vaccination. Infant pneumococcal vaccination programmes also provide protection to adults via 'herd protection'. In the US, substantial reductions in the absolute numbers of adults admitted to hospital have been observed following a decade of infant pneumococcal conjugate vaccination.[4]

Diagnosing pneumonia

A chest x-ray (CXR) is the definitive test for the diagnosis of pneumonia. However, access to chest radiography is limited in primary care, and therefore most diagnoses are based on clinical criteria. The typical clinical features of CAP - cough, fever, breathlessness, pleuritic chest pain, and lung crackles on examination, are shared by other respiratory conditions such as:

- Non-pneumonic lower respiratory tract infections (LRTI);
- Exacerbations of chronic lung disease, such as chronic obstructive pulmonary disease (COPD);
- Respiratory viral infections, such as influenza

When confronted by a patient with symptoms of a LRTI, there are some helpful pointers in the clinical diagnosis of CAP:

- Duration of symptoms of <24 hours increases the probability of CXR-confirmed CAP.[5]
- 39% of patients treated for LRTI with new focal signs on chest examination will have CXR-confirmed CAP.[6]
- A combination of the following clinical features discriminated patients with CAP from a group of 2,820 patients presenting to primary care with LRTI:[7]
  - breathlessness
  - fever (>37.8°C);
  - crackles and diminished breath sounds on auscultation
  - absence of runny nose;
  - tachycardia >100/min
- Measurement of C-reactive protein with a level of >30mg/l improved discrimination over standard symptom- and sign-based models.[7]

Pleuritic chest pain may be a prominent symptom. It is commoner in younger patients and is not necessarily indicative of a pulmonary embolism. In elderly patients, the classic symptoms and signs of CAP are less likely. Conversely, non-specific features such as confusion and an absence of fever are recognised.

In practice, CAP diagnosed clinically by GPs accounts for 5–12% of all cases of adult LRTI treated with antibiotics. Patients with non-pneumonic LRTI should be treated according to NICE Guidelines which describe 3 antibiotic strategies – no prescribing, delayed prescribing and immediate prescribing [http://guidance.nice.org.uk/CG69]. A no antibiotic or a delayed antibiotic prescribing strategy should be agreed for patients with the common cold or acute bronchitis. If a patient with acute cough is >65 years old and has ≥2 of the following criteria, or >80 years old and has ≥1 of the following criteria, then an immediate antibiotic prescribing strategy is recommended according to NICE guidelines:

- hospitalisation in previous year
- type 1 or type 2 diabetes
- history of congestive heart failure,
- current use of oral glucocorticoids.

Severity assessment & when to refer to hospital

The first and single most important decision in the overall management of CAP is whether to manage the patient in the community or refer to hospital. This decision is best informed firstly by an accurate assessment of the severity of illness at presentation. The vast majority of patients with CAP have low severity disease and are managed effectively in the community by GPs. Strategies to increase the proportion of patients managed in the community have been shown to be both safe and acceptable.[8] Other than pneumonia severity, the commonest reasons for hospital referral/admission are:

- Presence of unstable co-morbid illness (for example, decompensated heart failure);
- Social care needs (for example, living alone);
- Patient wishes.

The clinical judgement of the GP in disease severity assessment is crucial. The British Thoracic Society CAP Guidelines recommend that patients with CAP diagnosed in the community can be classified according to clinical judgement and the CRB65 score (Box 1) into 3 severity groupings based on risk of mortality. Management may be stratified according to severity (Box 2).

Box 1: CRB65 severity assessment tool.

Score one point for each feature present:

Confusion – new or worse than normal
Respiratory rate ≥ 30/minute

Blood pressure, systolic < 90 mmHg or diastolic ≤ 60 mmHg

Age ≥ **65** years

Pulse oximeters are becoming increasingly available in primary care, but their precise utility in the management of CAP has still to be decided. Hypoxaemia is associated with poorer outcomes in hospitalised patients with CAP.[9] A low oxygen saturation of <90%, especially in young patients without chronic lung disease, supports a decision to refer to hospital. However, the lack of hypoxaemia does not imply a low risk of adverse outcomes. Therefore, use of pulse oximetry should not replace clinical judgement and the CRB65 score.[10]

GPs should administer antibiotics in the community to patients who have life-threatening pneumonia providing this action does not delay transfer to hospital. Intravenous penicillin G 1.2g or oral amoxicillin 1g are the preferred agents. Concern over the potential effect on subsequent microbiological investigations is not a reason to withhold treatment in these circumstances.

GPs should also consider administering antibiotics in the community for patients with suspected high severity CAP where there are likely to be delays of over six hours in the patient being admitted and treated in hospital. Inappropriate antibiotic use is a major concern both in community and hospital settings.

Box 2. Suggested management strategies for CRB65 thresholds.

Severity group	Suggested management
Low severity (CRB65 score 0)	Hospitalisation usually not required for clinical reasons
Moderate severity (CRB65 score 1 or 2)	Hospital referral and assessment should be considered, particularly with Score 2
High severity (CRB65 score 3 or more)	High risk of death and urgent hospital admission usually required.

Therefore, the clinical likelihood of CAP needs to be taken into account when considering antibiotic treatment at the time of hospital referral.

Management in the community

Patients with suspected CAP should be advised to rest and drink plenty of fluids. This is also a good opportunity to reinforce smoking cessation advice.

Antibiotic management

An antibiotic is always indicated when a clinical diagnosis of pneumonia is made. At least 50% of CAP is caused by *Streptococcus pneumonia*,[11] and more than 90% of pneumococcal isolates remain sensitive to penicillin.[12] Hence the recommended first line empirical antibiotic is amoxicillin 500mg TDS which should be administered as soon as possible given the association between early delivery of antibiotics and improved outcome.[13] A total antibiotic duration of 7 days is usual. Patients who have a penicillin allergy may be treated with either doxycycline 200mg loading dose followed by 100mg OD or clarithromycin 500mg BD. If infection with *Legionella pneumophila* (which can cause severe pneumonia) and *Mycoplasma pneumoniae* is suspected, clarithromycin (or erythromycin) is the treatment of choice.

Other treatments

The role of corticosteroids remains controversial. One recent randomised controlled trial demonstrated a reduction in hospital length of stay with dexamethasone compared with placebo,[14] but a second showed no benefit of prednisolone to the rate of clinical cure.[15] Therefore at present the routine use of steroids in the community is not recommended. Observational studies have reported an association between statins and reduced mortality, but as yet there are no randomised controlled trials supporting their routine use.[16] Similarly, observational studies have suggested that proton pump inhibitors may increase the risk CAP, but a recent large cohort study has not shown a causal link.[17] Adequate analgesia is essential for symptomatic relief.

Complications

Development of a parapneumonic effusion is the commonest complication of CAP (36-57% of bacterial pneumonias admitted to hospital).[18] It may be the cause of persisting fever or delay in symptom resolution despite adequate antibiotic treatment.[19] Alternatively, it may present as new onset pleuritic pain some days after initiation of treatment.

Other reasons for delay in clinical resolution include:

- an unrecognised immune defect, such as myeloma or HIV;
- a resistant or unexpected pathogen causing pneumonia, for example *Legionella pneumophila* or tuberculosis;
- non-compliance with antibiotic or drug allergy;
- an alternative diagnosis to CAP, especially in the absence of CXR confirmation of the diagnosis. Occasionally, a second diagnosis is apparent, such as previously undiagnosed lung cancer.

Follow up

Patients with low severity CAP usually experience some improvement within 48 hours of appropriate treatment. A reassessment of disease severity and response to treatment at this point is therefore useful in determining further management. Referral to hospital for investigation (for example, a CXR to confirm the diagnosis of CAP or to identify complications), or for admission should be considered in patients who are failing to improve despite 48 hours of apparently appropriate antibiotics.

A follow up appointment at 6 weeks is often arranged for patients with CXR-confirmed CAP who are discharged from hospital. A repeat CXR is usually obtained at this point to confirm resolution. In these instances, radiological improvement is closely linked to resolution of symptoms.[20] For patients treated in the community, clinical review at around six weeks would enable patients who are still symptomatic to be identified. Referral for a CXR or to a specialist may be appropriate for patients with delayed clinical resolution at this stage. The main concern is the early identification of any previously unrecognised condition, such as lung cancer, that might have predisposed to pneumonia in the first instance.

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