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Diagnosing coughs and colds

IT is easy to dismiss coughs and colds as 'trivial'. Part of *The NHS plan* is for general practitioners to make 'better use of receptionists and practice nurses to deal with coughs, colds and minor ailments'.¹ Respiratory tract infections are so common, are generally self-limiting, and are so little amenable to effective treatment that as doctors we feel we make little difference.² But we are also aware of the amount of misery and suffering that they cause. It is estimated that acute respiratory infections result in the loss of 1.2 disability adjusted life years per person's life — in comparison, all gastroenterological and genito-urinary diseases each lead to only 2.6 disability adjusted life years; endocrine disease, excluding diabetes, 1.2; and all skin disease only 0.4.³ 'Acute bronchitis' is the fifth most common reason for presenting to general practice.⁴ Although we think of respiratory tract infections as minor ailments, 10% of patients are still troubled by symptoms after 2 months,⁵ and 20% of people have re-presented to their general practitioner within a month.⁶ Even a small change in our ability to manage these problems would make a large difference to our patients.

Despite the burden of illness that they cause, there is so much that we do not know about respiratory tract infections. What symptoms and signs differentiate viral from bacterial infection? Which patients will benefit from antibiotics — and if they do, by how much? What is the average duration of symptoms following infection? What, if anything, predicts who will develop the rare, serious complications, such as pneumonia?

In the past, in the absence of clinical research, many general practitioners developed their own decision rules or heuristics for these questions. For example, most general practitioners believe that smokers should be treated more readily,⁷ and, even now, that purulent sputum implies a bacterial aetiology and therefore is more likely to require antibiotics.^{8,9} At last, clinical research is being published to answer these questions — much of it in this *Journal*.⁹⁻¹⁵ Some of this research overturns our previously held beliefs and heuristics.

A large observational study from The Netherlands shows that the best predictors of pneumonia in patients with a lower respiratory tract infection are a dry cough, diarrhoea, nausea, a general impression of a moderate or severe illness, a temperature $\geq 38^{\circ}\text{C}$, and chills.¹⁵ Many of the textbook symptoms and signs of pneumonia — dyspnoea, thoracic pain, feeling feverish, tachypnoea, dullness to percussion, bronchial breathing and other abnormalities on auscultation — were not predictive.¹⁵ These findings are helpful but not conclusive. A similar study by Graffelman *et al* indicated that diarrhoea was a predictor of a viral rather than a bacterial lower respiratory tract infection.¹¹ Both studies disprove the belief that purulent sputum indicates a bacterial infection. And both studies showed that C-reactive protein (CRP) with a cut-off value of >20 mg/l has a high predictive value, particularly for ruling out bacterial infection or pneumonia.

New studies also elucidate the natural history of respiratory tract infections. A study of 391 patients by Holmes *et al*

showed that 58% of patients still had a cough 10 days after the initial consultation and 29% had not returned to normal activities.⁹ The systematic review by Hay *et al* used the control arm of placebo controlled trials and cohort studies to examine the natural history of pre-school children who presented in primary care with a respiratory tract infection and a cough.¹⁴ The sizes of the studies were small and there were some questions regarding the validity of some studies, but a significant proportion of children still had symptoms at 2 weeks to 1 month later, with the most common persisting symptoms being nasal discharge and cough. The overall rate of complications (including merely persistent symptoms) was 12%. A prospective cohort study of 222 pre-school children with acute cough had a similar complication rate, (10%, again mostly from persistent symptoms) and reported serious complications only rarely (two hospital admissions for bronchiolitis and one for pneumonia).¹³

One difficulty with interpreting these studies is the lack of a standard definition for conditions such as upper and lower respiratory tract infections. In one, lower respiratory tract infection was defined as 'a new cough and symptoms of shortness of breath, wheezing, chest pain or auscultation abnormalities and either fever, perspiring, headache or myalgia' — robust enough to be reproducible and reliable for research purposes, even if it strikes a slightly unfamiliar chord with many of us for clinical use.¹⁵ In another, the definition was 'any abnormality on pulmonary auscultation in combination with at least two of the following three signs and symptoms: fever $>38^{\circ}\text{C}$ or fever in the past 48 hours, dyspnoea or cough; and tachypnoea, malaise or confusion'.¹² In everyday clinical practice, we do not need to be too concerned by diagnostic labels. They are merely short cuts for predicting outcome and response to treatment. But the lack of a standard definition makes it difficult to compare and synthesise information across the studies. For example, we need to be careful interpreting the number of patients who re-present and are subsequently given diagnoses of bronchitis or pneumonia, as these may be merely labels to justify prescribing antibiotics. Pneumonia may sound like an objective diagnosis, but there may be disagreement whether infiltrate on chest X-ray is sufficient or necessary for diagnosis.¹⁵ Now we have good data on prognosis in patients defined in a relatively standard way, perhaps the clinical use of labels will change accordingly.

We also need to be careful interpreting the results of prognostic studies, which can be subject to confounding by treatment. For example, if tachypnoea is a sign that causes doctors to prescribe antibiotics more frequently, and this effectively reduces the risk of adverse outcomes, tachypnoea may not be recognised as a prognostic indicator — an example of the risk paradox.¹⁶ This can be overcome in studies large enough to examine the risk of complications in sub-groups with and without both the prognostic indicator and the treatment.

Considering how often we see patients with respiratory tract infections, it seems extraordinary that the best evidence

that we have is based on so few methodologically sound studies, containing so few patients. There are still too many questions with too few answers.

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