Symptoms, signs, and prescribing for acute lower respiratory tract illness

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Introduction

There is no consistent definition in routine clinical use for patients presenting to their general practitioner (GP) with an acute episode of cough. The diagnostic labels that GPs use are extremely variable, and show little consistency between observers. Studies of ‘acute bronchitis’ and ‘lower respiratory tract infection (LRTI)’ have used widely differing definitions. We have previously suggested a term that may be more helpful – acute LRTI (Box 1) – being practical, consistent, and intuitive to GP researchers. It approximates to the clinical term, ‘acute bronchitis’ and is definable, reproducible, and readily usable within a routine general practice consultation.

GPs prescribe antibiotics to about three-quarters of patients with acute cough in Europe, Japan, and the United States of America. Some studies include patients with underlying chronic disease where antibiotic prescribing is higher; however, even in LRTI (whose definition limits recruitment to previously well patients) the typical rate of prescribing is still about 70%. Controlled trials show that antibiotics confer little benefit in acute bronchitis and GPs doubt the value of their own prescriptions.

The majority of patients with acute respiratory infection are managed without investigations. Prescribing decisions are made on the basis of history and simple physical signs and are influenced by the patient’s beliefs and demands. We have previously shown that underlying chronic illness influences the GP’s prescribing for acute cough. This study is limited to previously well patients; that is, without chronic illnesses, such as asthma, chronic obstructive pulmonary disease, diabetes or hypertension. This group constitutes about 80% of an adult practice population consulting with acute cough.

We have examined the frequency of physical signs, their relationship to the decision to prescribe antibiotics, the rate

Lower respiratory tract illness (LRTI)

An illness:

• where cough is a cardinal feature;
• accompanied by at least one other lower respiratory tract symptom, including sputum production, dyspnoea, wheeze, chest pain/discomfort;
• in which the symptoms are acute, having been present for 21 days or fewer; and
• where there is no obvious alternative explanation for the symptoms (e.g. not sinusitis, a cardiac illness, asthma etc.).

Previously well adults

Patients aged 16 years and over who are not under supervision or management for an underlying disease (i.e. patients with asthma, chronic obstructive pulmonary disease, heart disease or diabetes were excluded).

Box 1. Definitions.
at which symptoms resolve and activities return to normal, and the relationship of these factors to reconsultation. We used a standard clinical data collection form with which the participating doctors were familiar.

Method
Forty GPs who are members of the ‘Community Respiratory Infection Interest Group’, an informal group of GPs who have expressed an interest in participating in studies of respiratory symptoms, documented the management of up to 16 consecutive consultations for acute LRTi, a condition they were confident to identify having previously participated in similar studies. The management of the episode of LRTi was left entirely to the GP’s discretion.

Information was collected in a structured manner on pulse, oral temperature (measured with a TempaDot™ strip), respiratory rate, and any abnormalities on auscultation. Details of any antibiotic prescription and the certainty of the decision to prescribe were recorded on purpose designed data sheets. The GPs then invited the patients to complete a symptom diary card for the following 10 days. Patients were informed that their diaries were confidential and that their GP would be unaware of their individual responses.

Patients were provided with a sealed envelope that contained a pen, a diary card, and a pre-paid reply envelope addressed to the research office. Four days after consultation the patients received by post a simple reminder and encouragement to complete and return their diary card.

To determine the influence of abnormal findings on the prescribing of antibiotics we applied logistic regression using STATA software. The effect of age was modelled in 10-year bands; temperature was modelled as every increase in degrees centigrade above 38°C; respiratory rate was modelled as every increase in breaths per minute above 20; and pulse was modelled as every increase in beats per minute above 90. The effect of each variable was assessed separately in a series of univariate analyses and a final multivariate model was constructed to include age and sex (a priori confounders) and all other variables with P<0.1 in the univariate analysis.

Results
Forty GPs recruited 391 patients, of whom 312 (80%) completed and returned a diary card. The profile of those who did and did not return data was similar (Table 1).

Prescribing
Two hundred and seventy-three patients (71%) received antibiotics: 83% received beta lactams (mostly amoxycillin) and 7% received macrolides (mostly erythromycin). Few quinolones (1%), cephalosporins (3%) or tetracyclines (3%) were used. The GPs were often uncertain of the value of their own prescriptions: in 99/278 (36%) of those patients who were given antibiotics the prescribing GP felt that the prescription was probably or definitely not clinically indicated.

Clinical features present at consultation
A minority of patients had abnormal signs on physical examination. An oral temperature greater than 38°C was present in 16/384 (4.2%, seven not known); a pulse rate greater than 90 bpm was present in 64/389 (16.5%, two not known); and a respiratory rate greater than 20 breaths per minute was present in 59/385 (15.3%, six not known). Abnormal auscultation was present in 97/382 (25.3%, nine not known); focal chest signs were present in 37, and general chest signs were present in 60. The numbers of patients with more than one abnormal physical sign was small: 41 patients had two signs, 11 patients had three signs, and two patients had four signs.

The influence of abnormal findings on antibiotic prescribing (Table 2)
By far the strongest determinant of antibiotic prescribing was the presence of abnormal chest signs. Prescribing antibiotics was significantly more common when auscultation was abnormal (94%) than when it was normal (64%) (adjusted odds ratio = 11.17, 95% confidence interval = 4.56–27.35). The presence of discoloured sputum also increased prescribing (OR = 3.5, 95% CI = 1.94–6.66). There was no significant relationship between antibiotic prescribing rates and the individual presence of an oral temperature greater than 38°C, a radial pulse greater than 90 beats per minute, or a respiratory rate greater than 20 breaths per minute. Antibiotic prescribing increased when more than one physical sign was present. However, of the 264 patients who were prescribed antibiotics and in whom examination data was complete, 131 (64%) had no abnormality on physical examination.

Resolution of symptoms and recovery of normal function (Figure 1)
To determine which factors were associated with resolution of cough we used diary card data and a Cox regression model, with a series of univariate and then a final multivariate model, as for our logistic regression model. The proportional hazards assumption was tested using the pH test within STATA.

Missing diary card data increased over the data collection period from less than 1% to 8.3%. Figure 1 illustrates a gradual resolution of cough and a return to normal activities. At 10 days, cough was still present in 58% of patients and 29% had not resumed normal activities. Abnormal physical signs at presentation were no more common in patients with persisting cough or persisting restricted activities at 10 days (Table 4).
Issues related to reconsultation

Sixty-one (16%) patients reconsulted for the same symptoms within the following month (data available for 387/391 patients [99%]). Reconsultation was more common in those with persisting cough (adjusted OR = 2.62, 95% CI = 1.31–5.24) and functional impairment (OR = 2.13, 95% CI = 1.14–4.00) at 10 days (Table 3).

Expressed levels of satisfaction with the index consultations was very high (greater than 98%), whether antibiotics were prescribed or not.

Discussion

Limitations of the study

There are difficulties in extrapolating research in acute respiratory infection to typical clinical practice, as there are no agreed case definitions for clusters of symptoms.1 Some authors limit the terms ‘acute bronchitis’ or ‘lower respiratory tract infection’ to patients who have auscultatory abnormalities.2 In this study, restricting recruitment to patients with chest signs excludes some 75% of patients, 64% of whom still received antibiotics. The expression ‘lower respiratory tract illness’ is not a synonym for lower respiratory tract infection, nor a separate clinical entity. It simply avoids the assumption and label of infection and excludes patients in whom the GP makes an alternative clinical diagnosis; for example, acute sinusitis. It is likely to include some patients who may eventually prove to have illnesses other than infection; for example, undiagnosed asthma; however, we believe it better reflects the features of a group of patients who commonly present to GPs.

Acute LRTi is a common and benign illness that nonetheless distresses patients and interferes with their normal activities. In 59% of our study group, cough was still present at 19 days from onset of symptoms: a mean of nine days prior to consultation and 10 days thereafter.

The benefit of antibiotics in acute respiratory infection has been questioned13 and it seems clear that the resolution of cough and resumption of normal activities lags considerably behind the usual duration of prescribed treatment. In the current study antibiotics were prescribed for either five or seven days to 93% of patients and antibiotics had no influence on resolution of symptoms or outcome. Most patients will therefore continue to be bothered by their symptoms.
after cessation of therapy, although evidence of active infection at this stage is very unusual. 14

The prescribing and reconsultation rates that we found are typical of other studies. 15 The GPs prescribed a range of antibiotics but reported being uncertain of the need for many of their prescriptions. Sixteen per cent of patients reconsulted within the following month.

The observation that cough and limitation on normal activity both recover slowly is consistent with other studies. Verheij et al 16 showed that symptoms two weeks prior to consultation were common, as was delayed return to normal activities. Half of the patients in Williamson’s study reported cough three weeks after their consultation.17

As most of the management of LRTi in primary care takes place without investigations,10 it would help GPs to know that clinical signs at presentation predicted those patients most likely to have a prolonged illness or at greater risk of reconsulting. Unfortunately, our findings suggest that, in this regard, physical signs at consultation appear largely unhelpful, although increasing age is associated with slow recovery.

The infrequency of abnormal physical signs in this study suggests that most patients with LRTi do not have features typical of significant infection but are treated as though they did. Tachycardia, fever, and tachypnoea were relatively uncommon and antibiotic prescribing rates were the same whether these findings were present or not.

Reconsultation

Reconsultation is a common outcome of LRTi.15 This study shows that, while reconsultation is not related to signs at presentation, it does relate to persisting cough and continuing impairment of activities at 10 days. Advice given to patients at their first consultation should emphasise the long natural history of LRTi.

Measuring the outcome of acute respiratory illness is difficult and a clinically relevant, easily measured endpoint is important for research. As reconsultation reflects prolonged symptoms it may be a useful surrogate marker for outcome, of interest not least because the data are easy to obtain — 99% complete in this study.

We have reported a strong association between reconsultation and previous consulting behaviour in previously well patients18 and that it can be reduced using a simple patient information leaflet.19 This leaflet advised that patients should not be unduly concerned about cough that is resolving and that cough is likely to take several weeks to fully settle. The data obtained in this study lends support to that message.

It therefore seems sensible to advise patients at their initial consultation that, whether they receive treatment or not, they can expect their cough to persist for two to three weeks. In the longer term this may contribute to a modification of patient expectation of antibiotics for self-limiting respiratory illness.

Conclusion

Most episodes of acute LRTi are associated with few signs of significant infection but are treated with antibiotics. Cough is the cardinal symptom and in many patients this persists for several weeks.

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Table 3. Factors related to reconsultation within a month (overall reconsultation 16%).

<table>
<thead>
<tr>
<th>Factor</th>
<th>Univariate analysis</th>
<th>Multivariate analysis</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Odds ratio</td>
<td>95% CI</td>
</tr>
<tr>
<td>Features at presentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral temperature &gt;38ºC</td>
<td>1.51</td>
<td>0.32–7.17</td>
</tr>
<tr>
<td>Pulse &gt;90 bpm</td>
<td>1.00</td>
<td>0.96–1.04</td>
</tr>
<tr>
<td>Respiratory rate &gt;20 breaths per minute</td>
<td>1.01</td>
<td>0.91–1.12</td>
</tr>
<tr>
<td>Abnormal chest signs</td>
<td>1.66</td>
<td>0.95–2.91</td>
</tr>
<tr>
<td>URTI symptoms</td>
<td>0.47</td>
<td>0.29–0.78</td>
</tr>
<tr>
<td>Recovery at 10 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Still coughing</td>
<td>2.66</td>
<td>1.39–5.09</td>
</tr>
<tr>
<td>Not back to normal activities</td>
<td>2.59</td>
<td>1.53–4.38</td>
</tr>
<tr>
<td>Prescribed antibiotics</td>
<td>1.63</td>
<td>0.89–2.98</td>
</tr>
<tr>
<td>Consultations in previous two years (increase per quartile)</td>
<td>1.01</td>
<td>0.98–1.05</td>
</tr>
</tbody>
</table>

Table 4. Cox regression model for reported resolution of cough and reported return to normal activities in the 10 days following consultation for LRTI.

<table>
<thead>
<tr>
<th></th>
<th>Cough resolution</th>
<th></th>
<th>Return to normal activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
<td>OR</td>
</tr>
<tr>
<td>Age</td>
<td>1.09</td>
<td>0.95–1.24</td>
<td>0.85</td>
</tr>
<tr>
<td>Sex</td>
<td>0.89</td>
<td>0.63–1.24</td>
<td>1.06</td>
</tr>
<tr>
<td>Current smoker</td>
<td>0.81</td>
<td>0.51–1.28</td>
<td>1.08</td>
</tr>
<tr>
<td>Chest signs</td>
<td>1.03</td>
<td>0.69–1.51</td>
<td>0.93</td>
</tr>
<tr>
<td>Temperature &gt;38ºC</td>
<td>0.39</td>
<td>0.60–2.53</td>
<td>0.55</td>
</tr>
<tr>
<td>Pulse &gt;90 bpm</td>
<td>1.01</td>
<td>0.98–1.04</td>
<td>0.99</td>
</tr>
<tr>
<td>Respiratory rate &gt;20 breaths per minute</td>
<td>1.02</td>
<td>0.96–1.09</td>
<td>0.99</td>
</tr>
<tr>
<td>Receiving antibiotics</td>
<td>1.37</td>
<td>0.92–2.05</td>
<td>1.01</td>
</tr>
</tbody>
</table>
GPs need to be familiar with the natural history of LRTI, so as to be more confident in reducing the prescription of antibiotics that they consider inappropriate and to be enthusiastic in educating patients of the rate of improvement they can reasonably expect.

Acknowledgements
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References