A 49 year old woman presents to her general practitioner for the second time with a cough. She first presented a week ago with a four day history of cough with purulent sputum. She reported fever but had no haemoptysis, chest pain, or recent weight loss. She had never smoked. Clinical examination was unremarkable. She was prescribed a painkiller and antibiotics for the second time with a cough. She first presented a week ago with a four day history of cough with purulent sputum. She reported fever but had no haemoptysis, chest pain, or recent weight loss. She had never smoked. Clinical examination was unremarkable. She was prescribed a painkiller and antibiotics for the second time with a cough. She first presented a week ago with a four day history of cough with purulent sputum. She reported fever but had no haemoptysis, chest pain, or recent weight loss. She had never smoked. Clinical examination was unremarkable. She was prescribed a painkiller and antibiotics for the second time with a cough.

**What is the next investigation?**

**The problem**

Lower respiratory tract infections managed in primary care comprise a spectrum of disorders including acute bronchitis, community acquired pneumonia, and exacerbations of airflow disease. Most lower respiratory tract infections are self limiting, and several studies in the United Kingdom and internationally suggest that antibiotic treatment does not significantly reduce recovery time.¹ ² Historically, sputum purulence was regarded as an indicator of bacterial infection and an indication for antibiotic treatment. Recent data from over 3000 patients with acute cough in primary care showed that general practitioners were much more likely to prescribe antibiotics to patients with purulent sputum (odds ratio 3.2, 95% confidence interval 2.1-5.0) but that antibiotic treatment was of no benefit in terms of symptomatic improvement, regardless of sputum colour.³ Current data suggest that 50-70% of patients presenting in primary care with acute cough will receive an antibiotic at first presentation.³ ⁴

A major clinical problem is what to do when a patient presents again with symptoms of lower respiratory tract infections that are not responding to the initial antibiotic. Evidence suggests that 20-25% of patients will return within four weeks of the initial consultation⁵ and that 60% of such patients will receive a further course of antibiotics.⁶ In many cases the patient will expect to undergo investigation and receive a further antibiotic course.⁷

Symptoms of lower respiratory tract infections are often slow to resolve, with the elderly and patients with chronic lung diseases often having the slowest recovery. Methods of assessing symptom recovery vary, but most suggest that the symptoms can be expected to last for two to three weeks. In a recent randomised controlled trial the median time to clinical recovery was 22 days from first consultation.⁸ In a large observational study the median time to patients feeling recovered was 11 days and the median time to normalisation of symptom scores was 15 days.⁹ Questionnaire studies suggest that 90% of patients still have symptoms of cough at two weeks and that 80% still have some symptoms at three weeks after consultation.¹⁰ Antibiotic treatment has not been shown to reduce this duration of symptoms.¹¹ ¹²

It is therefore not surprising that our patient has persistently presented again with her symptoms one week after her consultation. It is therefore not surprising that our patient has persistently presented again with her symptoms one week after her consultation.

**LEARNING POINTS**

Among patients prescribed an antibiotic for lower respiratory tract infection in primary care, 20-25% will present again within four weeks. Symptoms of lower respiratory tract infection usually resolve without specific treatment or investigation in a median of three weeks from first consultation. In most patients laboratory and other investigations are unlikely to be helpful and should be guided by specific risk factors. Microbiology testing is of little value in most patients. Sputum culture is recommended for patients with chronic lung disease with sputum production and for patients with suspected pneumonia who are not responding to initial therapy. Chest radiography is most useful if an alternative diagnosis (such as malignancy) is being considered.

**Recommended investigations**

The first priority in assessment is to exclude community acquired pneumonia requiring hospital admission. The most important assessments can be made without laboratory or radiological investigations. Clinical history plus physical examination, pulse oximetry, and blood pressure measurement can identify most of the “alarm” signs and symptoms that might need further investigation or hospital admission (box 1). The British Thoracic Society recommends reassessment of patients with suspected pneumonia managed in the community, or hospitalised for pneumonia, within 48 hours of starting antibiotics. The patient is therefore not surprising that our patient has persistently presented again with her symptoms one week after her consultation.

This series of occasional articles provides an update on the best use of key diagnostic tests in the initial investigation of common or important clinical presentations. The series advisers are Steve Atkin, professor, head of department of academic endocrinology, diabetes, and metabolism, Hull York Medical School; and Eric Kilpatrick, honorary professor, department of clinical biochemistry, Hull Royal Infirmary, Hull York Medical School. To suggest a topic for this series, please email us at practice@bmj.com.
Box 1. "Alarm" signs and symptoms indicating need for further investigation or admission to hospital

British Thoracic Society CRB65 score

- Confusion
- Respiratory rate ≥30 breaths/min
- Hypotension (systolic blood pressure <90 mm Hg and/or diastolic blood pressure ≤60 mm Hg
- Age ≥65

In patients with pneumonia, one or more of the above features suggest the need for hospital admission

Other markers of severity

- Hypoxaemia (oxygen saturations <92% on air)
- Inability to take oral medication, or vomiting
- Dehydration
- Presence of major comorbidities

Features suggestive of pneumonia

- Physical signs on chest examination (crackles, decreased breath sounds, or dullness to percussion)
- A short duration of symptoms (<24 hours)
- Fever >38°C
- Tachycardia >100 beats/min
- Tachypnoea >20 breaths/min
- Absence of sore throat and rhinorrhoea

*Although age is not in itself an indication for hospital admission, complications and mortality increase substantially in patients aged 65 and over, therefore a lower threshold for investigation or admission to hospital is advised

Box 2. Common indications for investigations in patients presenting again with non-resolving lower respiratory tract infections in the community

Chest radiography

- Signs and symptoms of pneumonia (box 1)
- Haemoptysis
- Pleuritic chest pain
- A history of cigarette smoking
- Symptoms suggestive of underlying malignancy, such as weight loss
- Clinical signs of pleural effusion
- Immunosuppression or risk factors for tuberculosis

Sputum culture

- Pneumonia not responding to initial antibiotic treatment
- Patients with chronic obstructive pulmonary disease, bronchiectasis, or immunodeficiency
- Patients with risk factors for tuberculosis

Testing for atypical organisms or viruses

- Most appropriate during outbreaks, such as influenza A (H1N1) virus, Mycoplasma pneumoniae

Laboratory blood testing

- Full blood count (rarely helpful)
- Urea and electrolytes (in chronic renal disease or when clinical concern exists over dehydration)
- Liver function tests (in chronic liver disease)
- C reactive protein (can be used to monitor response to treatment but unnecessary in most patients in primary care)

*For countries with a low incidence of tuberculosis. In regions or countries with a high incidence of tuberculosis, sputum examination for acid fast bacillus should be performed more frequently.

community within 48 hours, with those showing evidence of deterioration being referred to hospital.

**Chest radiography**

Chest radiography at a second consultation (after antibiotic treatment for lower respiratory tract infection in primary care) will show consolidation in 10-15% of patients. However, the presence of radiographic changes is not an indication for additional antibiotic treatment if the patient has already received an appropriate antibiotic. Radiographic changes tend to lag behind clinical and microbiological resolution and are not sensitive as a way of monitoring treatment response. The main indications for chest radiography are to exclude non-infective diagnoses in high risk groups (box 2).

**Microbiology**

In our case, is laboratory investigation necessary? Data from observational studies conducted in primary care suggest that it is unusual to grow a bacterial pathogen that will require further antibiotic treatment in patients presenting again with a lower respiratory tract infection. In one study, when extensive investigations (including sputum induction with nebulised saline, urinary antigen testing, paired serology testing, and polymerase chain reaction testing on throat swabs) were used, only 4% of patients had a “typical” bacterial pathogen grown, and the most frequent isolates were respiratory viruses, which would not prompt a change in treatment.

Most patients with a lower respiratory tract infection in the community can be managed without microbiology investigations. Little evidence exists to support the use of sputum cultures in primary care. Unless specimens can be rapidly transported to the laboratory, fastidious organisms such as *Haemophilus influenzae* may die or be overgrown by normal flora. National guidelines therefore recommend limiting the use of sputum culture to patients with suspected pneumonia who are not responding to initial antibiotic treatment. Airways of patients with chronic obstructive pulmonary disease or bronchiectasis are often colonised with pathogens such as *H influenzae* and *Pseudomonas aeruginosa*. These organisms may be resistant to first line treatment, and sputum culture is therefore recommended in these groups. In patients with chronic bacterial colonisation, these organisms may continue to be grown in sputum cultures, even when the patient is clinically stable. A positive sputum culture in the absence of symptoms of an ongoing exacerbation does not require additional antibiotic treatment.

In an area with a low incidence of tuberculosis, sputum examination for acid fast bacillus is not needed but should be considered in patients with risk factors for the disease (such as coming from countries with a high incidence of tuberculosis; homelessness; alcoholism; being elderly or immunosuppressed), particularly if there are associated symptoms such as night sweats, weight loss, or haemoptysis.

Urine antigen testing for *Streptococcus pneumoniae* is increasingly available but is unlikely to change management in our case as antibiotics effective against *S pneumoniae* have been prescribed. Throat swabs taken for polymerase chain reaction to identify respiratory viruses or atypical pathogens (such as *Mycoplasma pneumoniae*) are
not considered routine investigations but may be appropriate in the right context, such as testing for H1N1 influenza during the pandemic of 2009.

Blood tests
Full blood count and biochemistry tests are unlikely to be helpful in patients presenting again with a lower respiratory tract infection. A raised leukocyte count is non-specific and is not a reliable indicator of ongoing infection. Point of care testing for C reactive protein has been shown to be a useful adjunct to clinical decision making in primary care. However, these tests are not widely available in primary care and are not needed for most patients. Testing of renal or liver function are unnecessary in the absence of chronic organ dysfunction or dehydration.

Outcome
After examining the patient again, the general practitioner advised the patient about the natural course of acute cough and said that a duration of two to three weeks for acute cough to resolve was not unusual. The general practitioner explained that for people with their symptoms and signs, antibiotics had about as much chance of helping her marginally as causing her some harm.

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10 MINUTE CONSULTATION

Dyspepsia

P A Cooke, G J Gormley, A Gilliland, M E Cupples

A 35 year old woman attends with a three month history of a recurrent burning sensation in her upper abdomen. The symptom is worse at night and has no relation to exercise. The periods of discomfort have increased in frequency and they are no longer relieved by over the counter remedies.

What you should cover
This history is typical of dyspepsia. Self management before presenting to a doctor is common. Distinguishing between epigastric pain, heartburn, and acid reflux is unlikely to change management, but atypical or increasingly severe symptoms require consideration of other diagnoses such as angina, biliary colic, or pancreatitis.

Consider:
• Red flags in the history and examination (box)—these should be documented
• Possibility of pregnancy, which can affect symptoms and management
• Medical history: specifically pernicious anaemia, Barrett’s oesophagitis, intestinal dysplasia, or previous peptic ulcer surgery, as these conditions are associated with increased risk of malignancy and would lower the threshold for referral

• Explain that dyspepsia is a common condition that usually responds well to treatment
• Stop or reduce any medication that may be contributing to symptoms (if appropriate)
• Offer lifestyle advice, including smoking cessation, weight loss, reduced alcohol and caffeine intake, and regular exercise. Evidence for long term effects of lifestyle changes on dyspepsia is lacking, but consensus is that patients should avoid behaviours known to exacerbate symptoms
• Prescribe pharmacological therapy: either test and treat for Helicobacter pylori, or four weeks of acid suppression with full dose proton pump inhibitor. There is insufficient evidence to support the choice of one over the other, but if one is unsuccessful the other should be tried afterwards.

The preferred tests for H pylori are 13C urea breath test or stool antigen test, as serology is less specific and cannot confirm eradication. These tests are best done before starting proton pump inhibitor, as a two week washout is needed after taking these drugs before testing by either method. If H pylori testing is positive, prescribe eradication therapy (consult local prescribing guidelines, as patterns of resistance vary geographically). Review at four weeks and re-test if symptoms persist. If H pylori persists, prescribe an alternative eradication regimen.

If choosing full dose proton pump inhibitor acid suppression, review at four weeks to discuss effect and stop proton pump inhibitors or decrease to the lowest possible dose that controls symptoms. If the response is incomplete then a further four weeks of treatment could be tried before considering test and treat.

If symptoms remain uncontrolled reconsider diagnosis. Individual patients may respond to H2 antagonists or pro-kinetic agents but further advice could be sought. Long term use of proton pump inhibitors for recurrent symptoms without red flags is safe, but because of their cost and small associated risk of infectious complications or nutritional deficiencies they should be prescribed at the lowest dose for the shortest period necessary.

When to refer
In patients younger than 55 presenting with dyspepsia without red flags, routine endoscopy is unnecessary, because the chances of having upper gastrointestinal cancer are estimated at one in a million. Refer patients if:
• Red flags present in history or examination
• Older than 55 with new onset persistent dyspepsia despite lifestyle and drug modification and four weeks’ treatment
• Younger than 55 and symptoms unresponsive to full dose proton pump inhibitors, H pylori eradication, and lifestyle modifications where concern exists about diagnosis.

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Learning from students

Although I am used to medical students sitting in on my clinics, I was surprised recently by how many notes one particular student was taking. I found it hard to believe that the amount of knowledge dripping off my lips should have filled so many A4 sheets of paper.

When I asked what she had found so necessary to record, she replied that she was simply noting the questions that I asked and the answers that I received. She had taken an interest in consultations after a BSc in primary care. We discussed what she had seen, and the fact that her position allowed her to observe lots of different doctors in action, many of whom were seriously lacking in consultation skills.

The power of the consultation is clearly recognised in primary care, but this has yet to permeate the hospital world. While general practitioners in training have their consultations observed and discussed in hospital medicine, neither I nor my colleagues, nor, to our shame, our trainees, have ever received this kind of training.

What does this say about us? That we don’t need the patient’s input because we can use tests to find the answer? That we don’t want to talk to them in case we dig up extra problems that we won’t know how to deal with? That, as specialists, we need only to know about their livers, lungs, kidneys, hearts, or guts without really knowing them? That we don’t really care?

The consultation is, for most hospital physicians, the most important medical tool we have. It is our “sword and bow.” It is what our patients use to judge us. It is inconceivable that we would let a doctor perform an endoscopy or colposcopy without evidence of training and competence, yet we are thrown into consultations usually without any training or supervision beyond a “discuss the case when you are finished.”

Perhaps it is just that analysing our bedside manner seems too personal, and we prefer to live under the illusion that we do it well or that it is just our way of doing things. Either way, we are devaluing an essential medical skill.

As the ancient text says, “I have learnt most from my students.”

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