A 65-year-old woman developing dyspnoea on exercise

Commentary by **PETER FRITH** MB BS, FRACP

How should this older patient with possible mild asthma and exertional dyspnoea be investigated and managed?

Case scenario

A 65-year-old woman taking regular fluticasone and salmeterol for mild asthma reported a change in her exercise tolerance. Over the past four months, she had noticed that she became quite breathless after walking up more than about 16 to 20 steps. The breathlessness occurred after a lag of 30 to 60 seconds and persisted for a few minutes, even if she was then walking slowly on level ground. She attributed it to her asthma, but should her cardiovascular system be checked?

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Commentary

It is typical for the dyspnoea of asthma to develop after a lag beyond the end of exercise and to continue (or even to worsen) for five to 20 minutes, often with wheezing and sometimes with cough. Angina can follow a similar pattern, and sometimes the pain is obscured by the level of breathlessness. A primary differential test is therefore needed – see the discussion of the asthma exercise test below.

Asthma management

The most important treatment for asthma at all ages remains anti-inflammatory therapy, usually with inhaled corticosteroids. Insufficient anti-inflammatory therapy leads to increased exercise intolerance and other symptoms.

Therefore, this patient needs to be questioned carefully about the prescribed dosage of inhaled corticosteroid as well as her adherence to the treatment regimen. Moreover, her inhaler technique should be observed directly because complex actions are required for optimum benefit. (Concomitant therapy with a long acting beta agonist can be additionally protective for patients with exercise induced bronchoconstriction.)

Symptoms and differential diagnoses

Dyspnoea of chronic heart disease is usually more directly related to the act of exercise; this generally also applies to COPD and pulmonary hypertension. Therefore, progressive relief soon after resting is more typical in this group of

Spirometry in COPD and asthma

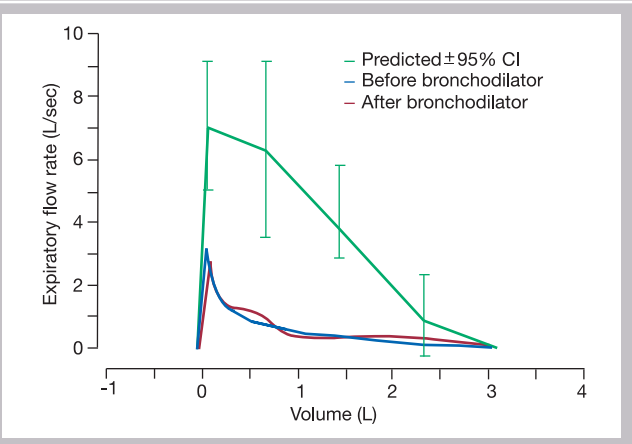

Figure 1a. Expiratory flow–volume curves for a patient with severe COPD, before and after bronchodilator use. Minimal response to bronchodilator is visible. The predicted curve with 95% confidence intervals is shown in green.

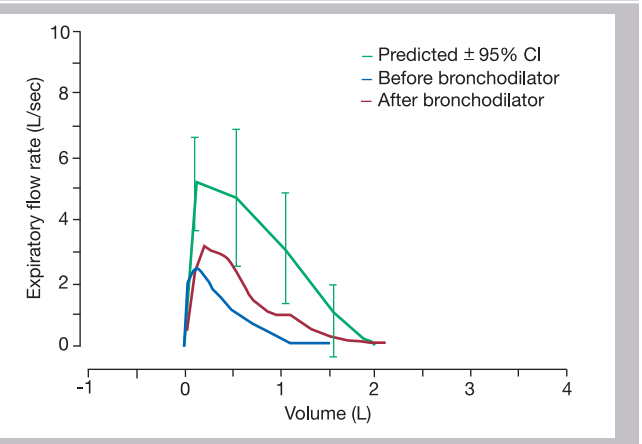

Figure 1b. Expiratory flow–volume curves for a patient with chronic asthma, before and after bronchodilator use. Incomplete but substantial reversibility of expiratory flow limitation is visible across the range of vital capacity. The predicted curve with 95% confidence intervals is shown in green.

FIGURES ADAPTED FROM REFERENCE 1.

Exercise testing

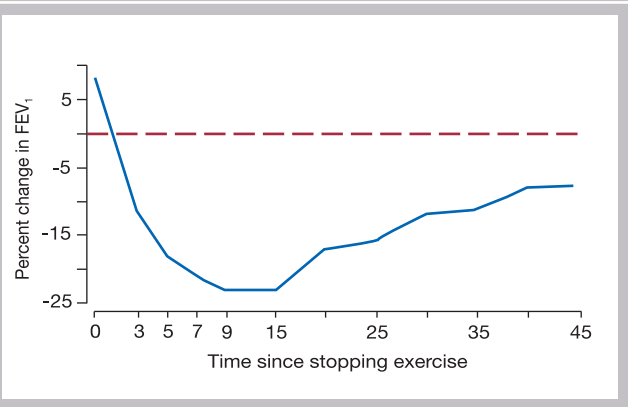

Figure 2a. Exercise lability in asthma. Following exercise, a delay of more than 5 minutes in developing progressive bronchospasm is typical of asthma (with spontaneous recovery).

FIGURE 2A ADAPTED FROM REFERENCE 2.

Figure 2b. Cardiopulmonary exercise test evaluates gas exchange, cardiac parameters, ventilation and exercise induced asthma.

disorders. Asthma that has been present for many years can progress to a form of COPD through airway remodelling, especially if the individual has smoked or has underused effective treatments.

Additional fatigue with dyspnoea may suggest anaemia or a neuromuscular disorder. Declining fitness and psychological disorders (notably hyperventilation) should also be considered, although only as final differentials.

Spirometry

Spirometry provides an objective measure of lung function that reflects airway calibre and its improvement after bronchodilator use (see Figures 1a and b). It is an essential diagnostic tool for differentiating asthma and COPD and for assessing disease severity.

Echocardiography

Echocardiography can evaluate left ventricular size and contractility at rest (or under conditions of pharmacologically or exercise induced maximum cardiac rate). It may also help to show the presence of pulmonary hypertension.

Exercise testing

An asthma exercise test may reveal the lability so typical of exercise induced bronchoconstriction in asthma and its curious timing (Figure 2a). Provocation tests such as with methacholine, hypertonic saline or hyperventilation have high sensitivity and specificity for asthma (as opposed to other respiratory conditions).

A very useful test for this patient would be an integrated cardiopulmonary exercise test, which is a cycle test with increasing workload to maximum tolerated (Figure 2b). The following parameters are monitored throughout: heart rate, ECG, blood pressure, ventilation, inhaled and exhaled gases (oxygen and carbon dioxide), airflow, oxygen saturation, and patient perceptions about effort, leg fatigue and dyspnoea. There are few contraindications or dangers – certainly no more than for cardiac stress testing. As the results provide comprehensive information about the effectiveness of ventilation, gas exchange, cardiovascular integrity and muscle metabolism – as well as patient perceptions – this test is a wonderful differential diagnostic tool. It is increasingly available in specialist respiratory laboratories.

Final comments

Dyspnoea with exercise in an older person can be caused by many conditions. Its timing (especially worsening after exercise is stopped) helps to identify asthma, but spirometry before and after bronchodilator use will usually clinch the diagnosis. MT

References

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2. Pulmonary and critical care medicine: exercise physiology. In: Rose BD, ed. UpToDate [CD-ROM]. Version 12.3. Wellesley, MA: UpToDate; 2004.

DECLARATION OF INTEREST: Professor Frith has served on Advisory Boards or has provided consulting advice for the following pharmaceutical companies: Altana Pharma, AstraZeneca, Bayer Healthcare, Boehringer Ingelheim, Pfizer, and GlaxoSmithKline. He has no ongoing commercial interest in any pharmaceutical or medical equipment companies.