

## Asthma in the elderly

By Professor Gregory Peterson and Dr Mark Naunton

### Case study

Mrs GH is a 74-year-old lady who was diagnosed with asthma four years ago after having an upper respiratory infection. She had a hospital admission due to asthma about 18 months ago. She is having her prescriptions dispensed at the pharmacy; these include *Seretide* MDI 125/25 and *Ventolin* inhaler. You notice from her dispensing history that she only obtains her asthma medication sporadically. You ask Mrs GH how she is going with her puffers and asthma in general. She replies that she is 'OK'. Upon further probing, Mrs GH reveals that she does not think she gets 'that much benefit out of the puffers' and she has trouble using them with her arthritic hands. She says that she does not get wheezy that often (only every two to three days) and is not sure whether she really needs to keep using the inhalers.

*'Asthma is under-recognised and undertreated in older populations.'*<sup>1,2</sup>

### Background

The prevalence of asthma overall in Australia is relatively high – it occurs in 14-16% of children and 10-12% of adults.<sup>3</sup> It is not so well known that asthma in elderly people is also common and is often undertreated.<sup>1-9</sup> An Australian study found a large proportion of those aged over 55 years had undiagnosed asthma and that the prevalence of asthma in older people may be as high as 15%,<sup>5</sup> while overseas studies have similarly indicated that the prevalence of asthma in elderly patients may be as high as 17%.<sup>2</sup> This is perhaps not surprising given that the elderly reportedly complain about breathlessness often. A UK survey of older people living in the community found that 33% of those aged above 70 years became breathless when walking on the flat in company with people their own age.<sup>10</sup> A population-based study of 6,000 men and women aged 65 years and over, performed in 21 general practices in Bristol, south west England, found an untreated asthma prevalence of approximately 2.5%, with most subjects (84%) with untreated asthma having moderate or severe disease.<sup>11</sup>

*'Despite the frequent occurrence of asthma in the elderly, it is a diagnosis that has been frequently overlooked and even when discovered it is often undertreated.'*<sup>12</sup>

Although overall deaths from asthma are declining, this has been most noticeable in younger people and children. The majority of deaths in Australia in which asthma is listed as the underlying cause are now in people greater than 65 years



*An Australian study found a large proportion of those aged over 55 years had undiagnosed asthma*

of age.<sup>3,12</sup> Older patients with asthma have also been shown to deteriorate for longer periods before being admitted to hospital with severe acute asthma than younger patients.<sup>4</sup> Underestimation of the severity of an acute exacerbation of asthma by both patient and doctor has been suggested as a contributory factor to poor outcome in older people.<sup>13</sup>

*'Death due to asthma occurs mostly in elderly patients.'*<sup>2</sup>

### Asthma definition

Asthma is a chronic inflammatory disorder of the airways with an array of cells, including mast cells, eosinophils, T lymphocytes, macrophages and neutrophils, playing a role in its pathophysiology. In susceptible individuals, this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night and in the early morning. These episodes usually involve airflow obstruction that is often reversible, either spontaneously or with treatment.<sup>3</sup> The airflow obstruction in asthma is a result of contraction of the airway smooth muscle and swelling of the airway wall due to a combination of inflammatory cell infiltration, oedema, smooth muscle hypertrophy, and mucous hypersecretion.

Potential triggers for the inflammatory process include allergy, respiratory infections, gastro-oesophageal reflux disease,

Table 1. Comparison of asthma in the younger versus elderly patient (modified from Braman<sup>4</sup>)

	Young	Elderly
<b>Symptoms</b>	Mostly intermittent and mild; allergic rhinitis common	Commonly persistent, moderate to severe
<b>Pathophysiology</b>	Atopy common	Mainly intrinsic (non-atopic); begins with viral infection
<b>Treatment</b>	Intermittent for symptoms; side effects uncommon	Need continuous treatment; side effects more common
<b>Prognosis</b>	Remission common (60-70%)	Remission uncommon (20%)

irritants (e.g. tobacco or air pollution), cold air exposure, exercise, stress, and some drugs (e.g. NSAIDs,  $\beta$ -blockers, ACE inhibitors).<sup>14</sup> The majority of elderly patients who develop asthma after age 65 have their first asthmatic symptom preceded immediately by, or concomitant with, an upper respiratory tract infection.<sup>4</sup>

### Diagnosis

*'Objective measures of lung function such as spirometry and peak flow measurements are generally underutilised in elderly patients, and this also contributes to the delay or absence of diagnosis.'*<sup>14</sup>

A major difficulty in diagnosing asthma in the elderly is that the differential diagnosis of breathlessness includes many conditions common in older people, e.g. heart failure, obesity, malignancy, infection, gastro-oesophageal reflux, aspiration, and chronic obstructive pulmonary disease (COPD). In addition, the elderly may attribute their breathlessness to 'normal ageing' and not seek help from their doctor.<sup>4,6</sup> The most common symptoms reported are cough, wheezing and dyspnoea - similar to younger asthmatics.<sup>3,4</sup>

In addition, research suggests that doctors are often reluctant to use spirometry and measurement of reversibility when investigating respiratory symptoms in old people.<sup>6,13</sup> This leads to a tendency to label breathless or wheezy elderly patients as having COPD rather than asthma. Objective measures of pulmonary function can aid in a prompt diagnosis and lead to effective treatment and improved quality of life.<sup>4</sup> A simple strategy for the investigation of breathlessness in older people should at least include a full blood count, chest radiograph, ECG, and spirometry with reversibility.<sup>1</sup>

Both men and women who develop asthma after age 40 usually have prior symptoms of cough and sputum production and often have pulmonary function abnormalities before being diagnosed with asthma. Thus, in many older patients

it is not possible to distinguish asthma from chronic bronchitis, especially in current or former cigarette smokers.<sup>4</sup> Distinguishing between asthma and COPD is difficult and may be impossible in some older patients.<sup>1-3,15,16</sup> Asthma that has been present for many years, in particular, may lead to persistent obstructive ventilatory defect and can mimic COPD.<sup>2</sup> Also, both conditions may be present.

If possible, distinguishing asthma from COPD is important to allow appropriate management of the respiratory condition and co-morbidities, and accurate prediction of treatment response. The two conditions may be differentiated by clinical features, particularly age at onset, variability of symptoms and nocturnal symptoms in asthma, supported by the results of reversibility testing. A history of heavy smoking, the presence of more prominent lung hyperinflation and chronic hypoxaemia favour the diagnosis of COPD, whereas atopy and significant bronchodilator responsiveness favour the diagnosis of asthma.<sup>15</sup>

### Management of asthma in the elderly

The therapeutic approach to asthma in the elderly is much the same as for younger asthmatics,<sup>3,5</sup> but certain aspects take on greater importance: difficulty using inhaler devices, concerns about osteoporosis with long-term corticosteroid therapy (both oral and inhaled), the risk of arrhythmias with  $\beta_2$ -agonist drugs and the significant side-effects of theophylline.<sup>16</sup>

Studies of asthma in the elderly have shown that, unlike many younger adults who often require no medications or just as-needed  $\beta_2$ -agonist therapy for occasional symptoms, most older asthmatics need continuous treatment programs to control their disease (Table 1).<sup>4</sup> In part, this may be because the bronchodilator response to inhaled  $\beta_2$ -agonists declines with age.<sup>4</sup> Even in mild disease in older adults, regular preventive treatment with inhaled corticosteroids should be considered, given the poor perception of bronchoconstriction by older asthmatic patients.<sup>1</sup> Unfortunately, despite their proven efficacy, inhaled corticosteroids are typically underused in the elderly asthmatic population.<sup>1,6,17,18</sup> A large US study showed that, among elderly patients with potentially life-threatening asthma, only 32% had used preventive therapy during the past year.<sup>19</sup>

If symptoms persist despite inhaled corticosteroids, addition of long-acting  $\beta_2$ -agonists should be considered. While the elderly with asthma have been under-represented in trials of the long-acting  $\beta_2$ -agonists, there is solid evidence that the addition of these agents improves asthma control and allows a reduction in the dosage of inhaled corticosteroids.<sup>1,17</sup> However, regular review of cardiovascular status (and monitoring of serum potassium concentration) in elderly patients taking long-acting  $\beta_2$ -agonists is important.<sup>1</sup>

There is no evidence that addition of anticholinergics improves control of asthma further if the patient does not

have co-existing COPD.<sup>1</sup> Theophylline should be prescribed with extreme caution to elderly patients with asthma, given its narrow therapeutic margin and the risk of adverse effects (including nausea and vomiting or sinus and supraventricular tachycardias), and its propensity for drug interactions.<sup>20</sup>

*'Most importantly for elderly asthmatics is a treatment regimen that is as simple as possible and is backed up by a written self-management plan that will improve outcomes.'*<sup>15</sup>

### Use of inhaled drug delivery devices

Older people may be more likely to use asthma medication and devices incorrectly because of vision and cognitive impairment.<sup>21</sup> In fact, the great majority of elderly patients are unable to properly use metered dose inhalers (MDIs), even after instruction.<sup>4,22</sup> Inadequate timing of actuation and inhalation is the most frequent error that is made. Impaired mental function, weakened or deformed hands, and motor or musculoskeletal diseases are other reasons for inadequate MDI use.<sup>4</sup> Older patients who lack dexterity and grip strength (e.g. arthritis in the hands, tremor with Parkinson's disease) may have difficulty with manipulation of an MDI or other delivery device (Table 2).<sup>23,24</sup>

In general, patients with cognitive impairment (dementia) will have most difficulty learning to use the MDI, followed in order by the MDI with spacer, then breath-actuated inhalers – i.e. breath-actuated inhalers are preferred.<sup>25</sup> In addition, the elderly may experience difficulties with maintaining an adequate seal with their mouth on the inhaler device (e.g. post-stroke or paralysis). Furthermore, the elderly may not have a sufficient inspiratory flow rate which is required to deliver a dose of medication from a dry powder inhaler.<sup>23</sup> Patients' perception of their own inhaler skills often correlates poorly with their actual use, highlighting the need to regularly assess inhaler technique.<sup>26,27</sup> However, inhaler technique is often not checked in older patients. For a more detailed discussion on asthma devices, readers are directed to a previous paper written by one of the authors (Naunton M, Doggrell S. I must see the pharmacist: asthma devices. *Aust Pharm* 2007;26(4):302-4).

The delivery device should be selected individually, based on ease of use and cost. Dry powder inhalers may be easier for older patients to use.<sup>3</sup> When an MDI is chosen, a spacer should be used.<sup>3</sup> The *Australian Medicines Handbook* has detailed descriptions of how each inhalation device should be correctly used. In addition, pharmacists can view how to use an MDI and spacer device in the following links, which might also be useful for patients or carers:

- [www.youtube.com/watch?v=51Zjwcx7Zbs&feature=related](http://www.youtube.com/watch?v=51Zjwcx7Zbs&feature=related) (MDI technique)
- [www.youtube.com/watch?v=OubDEsal7Gw&feature=related](http://www.youtube.com/watch?v=OubDEsal7Gw&feature=related) (animated 3D on how to use MDI)

- [www.youtube.com/watch?v=CEUm--zy8xY&feature=related](http://www.youtube.com/watch?v=CEUm--zy8xY&feature=related) (MDI with spacer)
- [www.youtube.com/watch?v=oHRTiytvuow&feature=related](http://www.youtube.com/watch?v=oHRTiytvuow&feature=related) (peak flow meter)

Steps may need to be taken to simplify inhaler regimens for some older people and, where possible, the same inhaler device should be prescribed for all the patient's inhaled medications. Although currently available inhaled corticosteroids are more effective when used twice-daily (with the exception of ciclesonide [*Alvesco*], which can be used once-daily), taking the total inhaled corticosteroid dose once a day may be an option to aid adherence in stable patients with mild/moderate disease.<sup>28</sup> For example, this might be advantageous to those patients with dementia who rely on assistance with medications at home by family or carers.

*'Elderly people and children have specific problems with inhaler use and require both targeted and appropriate help in order to improve their inhaler technique and minimise waste of inhaled medication and therefore lack of therapeutic effect.'*<sup>29</sup>

### Adherence with asthma therapy

Adherence with asthma therapy is frequently poor in elderly patients.<sup>6,21,23,30</sup> Reasons include forgetfulness or misunderstanding the correct treatment regimen, and the perceived risk of side-effects of inhaled corticosteroids (Table 3). Patients are less likely to take their medications as prescribed when they think that their asthma symptoms are not as severe as the doctor believes them to be. The intermittent nature of asthma may lead patients to view the disease as an acute condition, rather than a chronic illness, resulting in poor adherence to preventive therapy. For

Table 2. Patient-related factors to consider when choosing a delivery system<sup>3</sup>

Aspects to consider	Delivery system notes
Strength to operate the device	MDI versus breath-activated devices
Inspiratory flow rate	Spacers
Coordination	
Agility	
Visual acuity	Dose counters require good eyesight
Strength and function of hands	Halteraids for patients with arthritis or disability
Cognitive status	Where possible, don't mix inhaler types within a treatment regimen
Understanding of the roles of each medication	Reinforce when each medication should be taken Reinforce role of nebulisers

example, patients often cease their regular preventive therapy once their symptoms have diminished, feeling that they no longer require treatment.

### Guided self-management of asthma in the elderly

Optimal asthma treatment has adopted the principle of 'guided self-management', which emphasises recognition of worsening symptoms by the patient and self-initiated steps to escalate therapy as appropriate and seek emergency care if necessary.<sup>23</sup> Guided self-management in asthma involves the health professional and the patient establishing an asthma management plan which is then written down and given to the patient for future reference: a written action plan.<sup>23</sup> The use of guided self-management plans has been associated with improved asthma outcomes.<sup>31</sup> Unfortunately, Australian studies have shown that written action plans are less likely to be provided to older people.<sup>32</sup> This is despite studies demonstrating that older people can and do appreciate self-management.<sup>33</sup> More details on Asthma Management Plans, Asthma Cycle of Care, and Asthma Action Plans are briefly reviewed by Bereznicki *et al.* in the current issue of *Australian Pharmacist* (page 410).

*'Patient education can be a powerful tool in asthma control. Family members also can be helpful, especially with elderly adults. Active participation by a patient in monitoring lung function, avoidance of provocative agents, and decisions regarding medications provide asthma management skills that give patients the confidence to control their own disease.'*

### Pharmacists and asthma management in elderly

*'Elderly people are less likely to actively seek out information about their medication and management.'*<sup>34</sup>

Pharmacists are in a pivotal position to contribute to the overall management of asthma, given the importance of quality use of medicines in preventing morbidity and mortality in asthma. Pharmacists should make certain that patients or their carers understand the purpose and correct use of the medication/inhaler device. Simple and clear messages are required when counselling all patients with asthma. A quiet location (counselling room) is ideal to ensure the correct messages are received. In addition, written instructions should be given to supplement any discussion.

Some important points to consider during initial and follow-up discussion are as follows.

- Establish what knowledge about asthma and its therapy the patient already possesses.

Table 3. Reasons for non-adherence to asthma medication treatment in elderly patients (modified from Goeman and Douglass<sup>23</sup>)

- Comorbidities (deteriorating mental health status, depression, vision/hearing loss)
- Problems with device use (stroke, paralysis, arthritis, tremor, poor inspiratory flow)
- Difficulty accessing medical care
- No carer or family help
- Refusal to accept help
- Poor health literacy
- Concern for adverse effects from medication or actual adverse effects from medication (e.g. oral thrush, dysphonia, cataracts, glaucoma, osteoporosis)
- Concerns over tolerance, dependence and addiction to medication
- Cost of medication
- Lack of belief in effectiveness or necessity of medication
- Preference for non-pharmacological treatment/medication.

- Ensure that the prescribed therapy (and device) is suitable and can be used by the patient.
- Regular assessment is required – encourage regular review by doctor.
- Environmental influences such as pollution, airborne dust, smoke, and fumes can induce airway narrowing in patients with asthma. Avoidance is not always possible; however, ensuring the home and workplace are relatively free of environmental triggers may be useful.
- Encourage the patient to cease smoking.
- Ensure patient understands signs of poorly controlled asthma.
- Offer written fact sheets on the principles of asthma management, including information about medications and potential side effects, ways to minimise asthma triggers, and correct device technique.
- A practical demonstration should ALWAYS supplement any written information.
- Ask pharmaceutical representatives for demonstration models of their products to help patients become familiar with drug delivery systems.
- Enquire if the patient has an asthma action plan – if not, suggest they discuss this on their next scheduled visit to their doctor.
- Highlight availability of new treatments and/or new developments in asthma management, if appropriate.

- Encourage annual influenza vaccination and five-yearly pneumococcal vaccination in all elderly patients with asthma, even in those with mild asthma.
- Attempt to check inhaler technique at *every possible opportunity*.

Ongoing follow-up of patients with persistent asthma by the pharmacist also enables demonstrating and checking inhaler technique, re-evaluating the most convenient delivery device, making sure that the written action plan is understood, and ensuring that any emergency medication (such as a short course of oral corticosteroids) is not out of date or lost. A number of studies, including several from Australia, have demonstrated that community pharmacist-delivered asthma care programs can produce beneficial results, with improved patient outcomes.<sup>34-36</sup> Pharmacists can also request home medication review (HMR) referrals from GPs for those patients they think would benefit from an educational intervention on asthma and a management review.

When non-adherence is inevitably encountered, it is important that pharmacists do not blame patients for non-adherence because they can and do make reasoned decisions; rather, they should openly discuss the reasons for non-adherence. In addition, pharmacists should ensure that any concerns regarding drug side effects are discussed in a manner that is not alarming.

## Case study

Returning to our case study, you should provide Mrs GH with further information about asthma, emphasising that it is a chronic condition that generally requires continuous preventive therapy. You suggest that there are other forms of respiratory devices available if she is having trouble with the inhalers, and offer to discuss this issue with her doctor. You could also provide some information about HMRs and suggest that she discusses this further with her doctor. Finally, it would be worthwhile to ascertain whether she has had her annual influenza vaccine.

*‘Patient education in self-management techniques and attention to the problems of adherence are essential for long-term management. All health care professionals have an important role in controlling this common disease.’<sup>37</sup>*

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