



# Management of an acute asthma attack



**BACKGROUND** Despite a more proactive approach to asthma management, which includes an increased range of drugs, wide dissemination of guidelines, and the use of asthma action plans, an acute severe asthma attack is one of the most common emergencies a general practitioner will encounter.

**OBJECTIVE** This article discusses the management of an acute asthma attack in the general practice setting.

**DISCUSSION** Assessment of severity is vital and can be ascertained quite quickly with a brief history and rapid physical examination. It is important to remember that wheeze is an unreliable indicator of the severity of attack and may be absent in severe asthma. The cornerstones of treatment are oxygen and inhaled beta 2 agonists. Beta 2 agonists can be given continuously in severe life threatening asthma. Early administration of systemic steroids is important. Patients discharged to home after treatment of an asthma attack require close follow up including beta 2 agonists for symptom control, review of medications including a consideration of a short course of oral steroids, a written asthma action plan and detailed advice about what to do in case of deterioration in the next 24 hours. They should be reviewed in 24–48 hours.

## Case history – Lucy

You are in the middle of a busy Monday afternoon practice. You are buzzed by the front desk – a young woman, Lucy, has just walked in very short of breath and distressed. Your normally calm receptionist sounds anxious and tells you that Lucy has just gone into the treatment room with the nurse.

An acute asthma attack is a frightening experience for the sufferer, and, in many cases, for those around them. While the aim of asthma management is to gain control of symptoms and prevent exacerbations, we are still called on to manage acute episodes of asthma both in our practices, and as visiting medical officers, in our hospitals.

Despite an increased range of drugs, wide dissemination of guidelines and plans for proactive care, an acute severe asthma attack is one of the most common emergencies general practitioners encounter. We need to have a clear and simple plan and a systems approach for our staff to deal with the acute situation. But as GPs, we also need to be proactive and have an awareness of who is more likely to present in an emergency situation, and to have careful follow up plans negotiated for those who do present acutely.

The death rate for asthma in Australia peaked in 1989, and has fallen since; 314 Australians died from asthma in 2003, a fall of 21% from 2002.<sup>1</sup> Most asthma deaths occur in the elderly, but there is often diagnostic uncertainty in this age group. There is increased asthma mortality in rural areas.<sup>2</sup> Some deaths are probably preventable, with patients – and doctors – not recognising the severity of their asthma and the attack.

## The ‘at risk’ patient

- Frequent visits to the GP or emergency department with acute asthma or hospital admission in past 12 months
- previous life threatening attack or admission to an intensive care unit
- no preventive medications/excessive reliance on inhaled bronchodilators
- patient denial
- poor adherence/insight
- failure to perceive asthma symptoms



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- immediate hypersensitivity to foods, especially nuts
- asthma triggered by aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs)
- poor access to health services.

There are other factors affecting those patients who re-attend at an emergency department with asthma. A recent Australian study identified preventable issues in about a third of patients who recurrently presented to emergency departments for treatment. These included poor asthma knowledge and financial and other barriers to medication use.<sup>3</sup>

#### Case history – Lucy, continued

Lucy is quite distressed and anxious. She is talking in phrases, has a pulse of 120 and a widespread moderately loud wheeze throughout her chest. Lucy says she has used her puffer frequently today and it's not really helping.

Your team is well prepared, and Lucy has a pulse oximeter on, with a reading of 94%. She is given oxygen and inhaled beta 2 agonist.

#### Assessing severity

Severity is initially directed to two points – is this asthma (and not another cause of acute respiratory obstruction) and is it life threatening? A brief history and a rapid physical examination will answer these questions. If the patient is acutely distressed, give oxygen and an inhaled short acting beta 2 agonist immediately, and if severe and life threatening, call an ambulance. Remember that wheeze is an unreliable indicator of the severity of an asthma attack and may be absent in severe asthma.

Early spirometry and/or peak flow measurements will give an objective measure of airflow obstruction, but in severe attacks, early treatment takes precedence. The range of severity of adult chronic disease seen in general practice is mainly in the mild to moderate category, with about 6% of patients classified as severe in 2001.<sup>2</sup> Most of the children we see in general practice have infrequent episodic asthma, with isolated episodes of asthma often triggered by an upper respiratory tract infection, 6–8 weeks apart, and are asymptomatic in between. Within this group, there is a range of severity of acute episodes. Most are mild, but this group accounts for up to 60% of paediatric hospital admissions for asthma.<sup>4</sup>

The *Asthma management handbook* provides useful assessment tables (*Table 1*). Remember that any single features of severe or life threatening asthma means the episode must be considered severe.

#### Emergency treatment

The cornerstone of treatment is oxygen and inhaled beta 2 agonists. Beta 2 agonists can be given continuously in severe life threatening asthma.

#### Adults

**Oxygen** – Use in all but a mild attack. Use high flow of at least 8 L/min and monitor by oximetry. In an emergency department setting, with severe attack or not responding, arterial blood gas monitoring is needed.

**Nebulised beta 2 agonists** – If moderate or severe give 2 x 5 mg salbutamol nebulises or 2 mL of 0.5% salbutamol + 2 mL saline. Frequency will depend on response, but in a moderate attack this dose may be needed every 1–4 hours, and may be continuous in severe asthma not responding to the initial dose. The use of intravenous (IV) beta 2 agonists in severe and life threatening asthma has been suggested, but a Cochrane review concludes there is no evidence to support this.<sup>5</sup> In a mild or moderate attack, or if oxygen is not available to drive a nebuliser, then a spacer and metered dose inhaler may be used. A dose of 12 puffs (each separately) is equivalent to a 5 mg nebulise of salbutamol.

**Nebulised ipratropium bromide** – This is recommended for severe attacks, nebulised 500 µg with salbutamol every 2 hours.

**Steroids** – Systemic (not inhaled) steroids are needed, and early administration (within 1 hour of presentation) reduces the need for hospital admission.<sup>6</sup> Adults with moderate or severe attacks require 250 mg stat of IV hydrocortisone; in hospitalised patients this should be 250 µg every 6 hours for the first 24 hours, and then review. A patient with a moderate attack may be able to take an oral dose of 0.5–1.0 mg/kg; oral steroids should be considered in a mild attack.

**IV aminophylline** – The use of IV aminophylline in addition to maximal inhaled beta 2 agonists does not lead to increased bronchodilation. It does have adverse side effects.

**Adrenalin** – Anaphylaxis and respiratory arrest demand. For anaphylaxis, 0.5 mL adrenalin of 1:1000 solution intramuscularly. For respiratory arrest give 5 mL of 1:10 000 slow IV.

**Other therapies** – There is no clear evidence to support the use of some other emergency treatments, eg. heliox for nonintubated patients.<sup>7</sup> Further research might determine the roles of noninvasive positive pressure ventilation in patients with status asthmaticus.<sup>8</sup>

**Table 1. Initial assessment of severity of acute asthma in adults**

Symptoms	Mild	Moderate	*Severe and life threatening
Physical exhaustion	No	No	Yes, may have paradoxical chest wall movement
Talks in	Sentences	Phrases	Words
Pulse rate	<100/min	100–120/min	>120/min <sup>1</sup>
Pulsus paradoxus	Not palpable	May be palpable	Palpable <sup>2</sup>
Central cyanosis	Absent	May be present	Likely to be present
Wheeze intensity	Variable	Moderate-loud	Often quiet
Peak expiratory flow (% predicted)	>75%	50–75%	<50%, or <100 L/mm <sup>3</sup>
FEV1 (% predicted)	>75%	50–75%	<50% or <1 L <sup>3</sup>
Oximetry on presentation	>95%	92–95%	<92%, cyanosis may be present <sup>4</sup>
Arterial blood gases	Test not necessary	If initial response is poor	Yes <sup>5</sup>

\*Any of these features indicates that the episode is severe. The absence of any feature does not exclude a severe attack

1. Bradycardia may be seen when respiratory arrest is imminent.
2. Paradoxical pulse is an unreliable sign of severe obstruction. Absence suggests respiratory muscle fatigue
3. Patient may be incapable of performing test
4. Many patients look reasonably well and may not appear cyanosed despite desaturation. Measuring oxygen saturation is important
5. PaCO<sub>2</sub> >50 mmHg indicates respiratory failure. PaO<sub>2</sub> <60 mmHg indicates respiratory failure

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## Children

**Oxygen** – Monitor with oximetry, but usually not needed in a mild or moderate attack.

**Inhaled beta 2 agonists** – The use of a spacer and metered dose inhaler for paediatric acute care is now well established. Important points to note are the use of a small volume spacer and face mask in those under 6 years of age, and that the spacer is loaded one dose at a time. Six puffs is equivalent to a 2.5 mg nebule of salbutamol, and 12 to a 5 mg dose. Initial treatment is 6–12 puffs then review after 20 minutes. If the initial response is inadequate, then repeat at 20 minute intervals for two further doses (ie. three doses in first hour). Subsequent timing of further doses is every 1–4 hours in a moderate attack. In a life threatening attack, continuous nebulised salbutamol is required.

**Systemic steroids** – The dose of oral prednisolone is 1 mg/kg as a single daily dose for 3 days, with a possible need for tapering if the child is routinely on high dose inhaled corticosteroids. In a life threatening attack, IV methylprednisolone should be given in doses of 1 mg/kg every 6 hours for day one.

**Other therapies** – The value of ipratropium, even in severe attacks, is controversial. Intravenous aminophylline has no place outside an intensive care unit.

**First aid/emergency plan** – The endorsed plan for community first aiders is the 4 x 4 x 4 plan. This advises

4 puffs of reliever, one puff at a time, with 4 breaths after each puff. Wait 4 minutes then repeat (see *Patient education* this issue). In an emergency, ‘make do’ spacers, eg. paper cups, small soft drink bottles, are effective.

## Other important information

### Case history – Lucy, continued

Lucy responds to the initial treatment and you gain further information. She tells you that she had bad asthma as a child, but had been much better over the past few years. She stopped taking a preventer ‘a long time ago’, but usually uses her puffer 3 or 4 times a week. She has had a cold for the past couple of days, and hasn’t slept well for the past couple of nights. She stayed at a friend’s house last night, and says the cats there made it much worse. She has used two puffs of her puffer every 2 hours this morning, with the last dose an hour before she arrived.

Lucy says she normally only uses her puffer when she’s out at night, particularly if people are smoking. She doesn’t smoke. She says she has no trouble with exercise and ‘doesn’t often’ wake at night with a cough or wheeze. She was hospitalised twice as a child with asthma, and hasn’t seen a doctor about her asthma for a few years. Lucy says she thought she’d ‘grown out’ of her asthma. She says she is otherwise well, and takes only the oral contraceptive pill and occasionally vitamins. She hasn’t taken anything for this cold, in particular echinacea.

On further examination, Lucy has a temperature of 37.4°C, clear nasal discharge, slightly watery eyes, a red throat and slightly enlarged cervical glands.

Critical information that needs to be gathered concerns the duration of this attack and response to medication. Increasing duration of symptoms and lack of response to therapy indicates a more severe course; and exhaustion

and muscle fatigue may precipitate respiratory failure. Other important information is directed to establishing the causes of the present exacerbation, asthma medication use and adherence, and significant asthma and other history. In elderly patients there are many causes for dyspnoea and multiple morbidities are common. Remember to ask for details of other medications that may aggravate asthma, including NSAIDs and complementary medicines.

### What to do if the patient is not responding

If your patient is not responding to the initial therapy, reconsider your assessment of severity and other possible diagnoses.

- Could the child have an inhaled foreign body?
- Is there an allergy or sensitivity reaction that I haven't elicited?
- In an elderly patient, could this be heart failure or an exacerbation of chronic obstructive pulmonary disease?
- What is the contribution of coexistent disease?

If it is asthma, then treat as a severe attack and consider complications such as underlying pneumonia or a pneumothorax. Chest X-rays are not indicated in either adults or children unless there are focal signs or no response to initial therapy.

### When to admit

The extremes of severity of an asthma attack are easy decisions. Patients with severe asthma need hospital admission and the emergency plan will include an early call for an ambulance. Patients with a mild acute attack who respond to first line therapy do not usually need hospital admission, although you may want to observe them in the surgery for an hour after the last administered dose. Factors that may influence the decision to admit include:

- duration of symptoms – a longer duration of the exacerbation would favour admission
- response to initial therapy
- past history of admission for asthma
- comorbidities, and
- lack of home care.

### Follow up

This is one of the most critical steps. We know there are preventable factors in patient re-presentation in emergency situations. However, we often don't know as much as we could about our patients self management practices, their social background or trigger factors.<sup>9</sup>

Patients discharged home from the practice (those with mild attack) need:

- beta 2 agonists as required for symptom control
- review of medications (consider a short course of oral steroids, addition of a long acting beta agonist)
- a written asthma action plan, and
- detailed advice about what to do if they get worse over the next 24 hours.

Commit to a review in 24–48 hours, and use this as the start of proactive care with the Asthma 3+ plan.

It is critical that patients who have been hospitalised are seen by their GP shortly after discharge, as well as any hospital appointments. A recent Canadian study showed that patients who, on discharge from an emergency department, had an appointment made with their primary care physician and at least one reminder call made to them, had higher asthma quality of life scores, fewer asthma symptoms, and were more likely to have a written asthma action plan at 6 months.<sup>10</sup> These differences had disappeared by 12 months, which seems to put the challenge of continuing asthma care back in the hands of GPs to ensure long term engagement and review. Crises may provide the chance to engage with a patient about their asthma, and form a meaningful partnership for long term asthma control.

Conflict of interest: none declared.

### References

1. National Asthma Council. Media release 21 December 2004. Available at: [www.nationalasthma.org.au](http://www.nationalasthma.org.au). Accessed 12 April 2005.
2. Australian Centre for Asthma Monitoring. Asthma in Australia 2003. Australian Institute for Health and Welfare asthma series 1. AIHW cat. No. ACM1. Canberra: AIHW, 2003.
3. Goemann DP, Aroni R, Sawyer SM, et al. Back for more: a qualitative study of emergency department re-attendance for asthma. *Med J Aust* 2004;180:113–7.
4. Asthma Management Handbook 2002. Victoria: National Asthma Council, 2002.
5. Travers A, Jones AP, Kelly K, et al. Intravenous beta 2 agonists for acute asthma in the emergency department. *The Cochrane Database of Systematic Reviews* 2002. Issue 1.
6. Rowe BH, Spooner C, Ducharme FM, et al. Early emergency department treatment of acute asthma with systemic steroids. *The Cochrane Database of Systematic Reviews* 2001. Issue 1.
7. Rodrigo G, Pollack C, Rodrigo C, et al. Heliox for nonintubated acute asthma patients. *The Cochrane Database of Systematic Reviews* 2003. Issue 2.
8. Ram FSF, Wellington SR, Rowe BH, et al. Noninvasive positive pressure ventilation for treatment of respiratory failure due to severe acute exacerbations of asthma. *The Cochrane Database of Systematic Reviews* 2005. Issue 1.
9. Abramson MJ, Bailey MJ, Forbes AB, et al. How well do doctors know their patients with severe asthma? *Int Med J* 2003;33:557–65.
10. Sin DD, Bell NR, Man SF. Effects of increased primary care access on process of care and health outcomes among patients with asthma who frequent emergency departments. *Am J Med* 2004;117:479–83.

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