The Practitioner

GPs have key role in improving outcomes in acute asthma

Grover HL, Higgins BG. GPs have key role in improving outcomes in acute asthma.
Practitioner 2016; 260(1798):15-19

Dr Helen L Grover
MB BS BMedSci
Specialist Trainee in Respiratory Medicine

Dr Bernard G Higgins
MD FRCP
Consultant Respiratory Physician

Freeman Hospital, Newcastle upon Tyne, UK

Practitioner
Medical Publishing Ltd

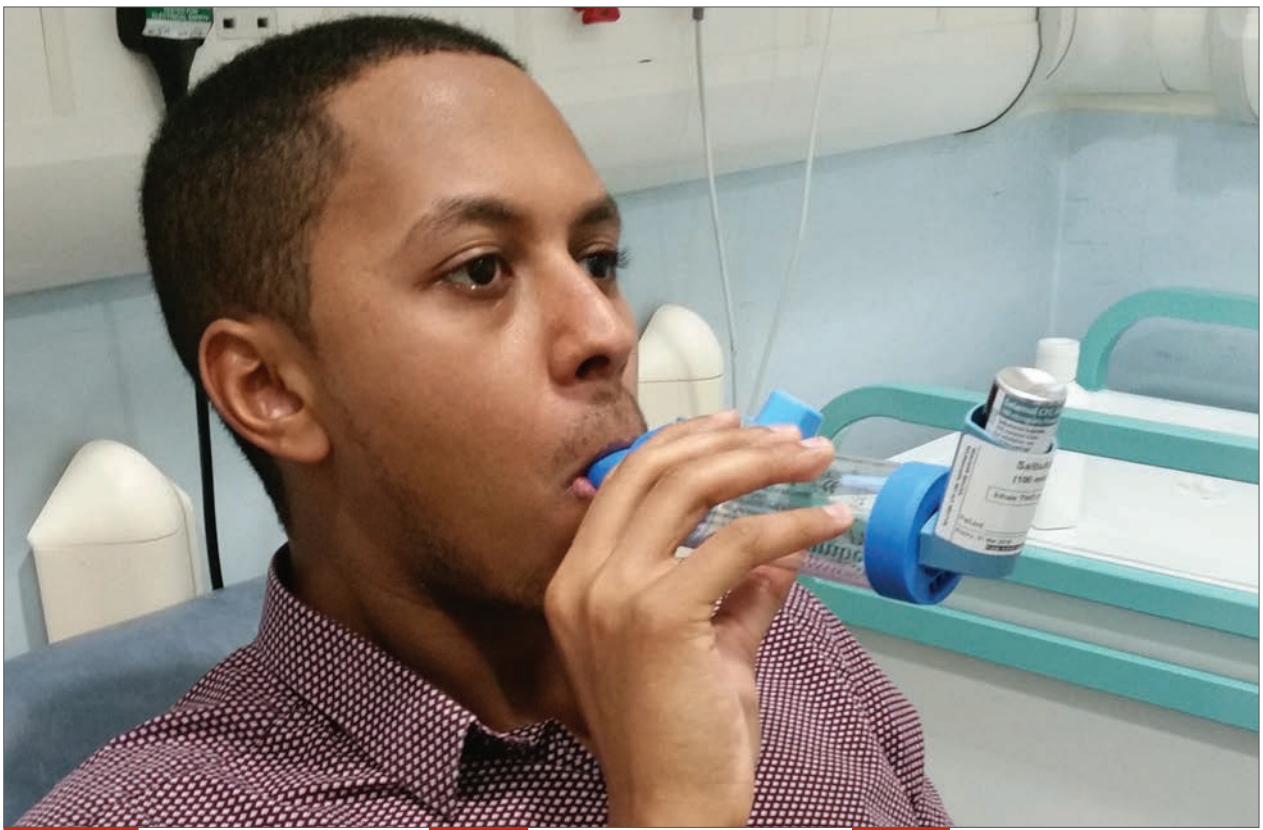
©Practitioner Medical Publishing Ltd.
Reprint orders to *The Practitioner*, 10 Fernthorpe Road, London SW16 6DR, United Kingdom. Telephone: +44 (0)20 8677 3508
www.thepractitioner.co.uk

GPs have key role in improving outcomes in acute asthma

AUTHORS
Dr Helen L Grover
MB BS BMedSci
Specialist Trainee in Respiratory Medicine

Dr Bernard G Higgins
MD FRCP
Consultant Respiratory Physician

Freeman Hospital, Newcastle upon Tyne, UK



Which patients are at greatest risk?

THERE ARE 5.4 MILLION PEOPLE WITH ASTHMA IN THE UK.[1] ATTENDANCE AT BOTH GP SURGERIES AND emergency departments is high and in 2011-12 there were more than 65,000 hospital admissions,[2] a higher admission rate than most comparable European countries.

Asthma deaths in the UK remain among the highest in Europe.[3] The 2014 National Review of Asthma Deaths (NRAD) looked at detailed data over a 12-month period, assessing 195 patients who died from asthma and highlighted the avoidable factors in patient deaths.

Although faults were found in secondary care, many of the problems related to poor management of patients in the community, both in terms of regular surveillance and of assessment and treatment at the onset of attacks.

How should patients be assessed?

In September 2016, the Scottish Intercollegiate Guidelines Network (SIGN) and the British Thoracic Society (BTS) published an updated version of the British guideline on asthma management.[4] Bearing in mind the frequency of acute attacks in the community, and the evidence of failings in managing these, it is timely to review this up to date advice on best practice in acute asthma care. This article will cover management of attacks of moderate severity or greater; all patients should possess an asthma action plan enabling them to self-manage milder attacks without intervention by a healthcare professional.

'Asthma deaths in the UK remain among the highest in Europe'

How should patients be followed up after an attack?

AWARENESS OF RISK

The majority of asthma deaths occur outside hospital and most patients who die from an asthma attack had chronic severe asthma. There are a minority who have a fatal attack on a background of mild to moderate asthma, although it is debatable whether these are genuinely severe episodes out of the blue rather than a case of underestimation of the true baseline severity. It is therefore important to be aware of patients who are particularly at risk, and this applies to all levels of staff beginning with receptionists; as the frontline in a GP »

surgery they should be made aware that an asthma attack is a medical emergency and requires urgent assessment by a GP or asthma nurse.

'Receptionists should be made aware that an asthma attack is a medical emergency and requires urgent assessment by a GP or asthma nurse'

An interesting UK study,[5] not yet replicated, showed benefit from setting up a formal risk register of patients considered to be most likely to experience severe problems from their asthma. These patients trigger an alert whenever they contact the practice, which among other things can be used to ensure that appointments are expedited.

This approach is worth exploring more widely, although there is an obvious danger that other patients could get less attention.

Features which indicate a high risk of severe attacks include:[5-7]

- Previous admission to intensive care, particularly if requiring mechanical ventilation
- Previous admission with asthma especially in the past year or repeated emergency department admissions
- History of worsening asthma in January or February
- Use of three or more classes of asthma medication
- Heavy use of beta-2 agonists
- Anxiety traits
- Marital stress

PERSONAL ASTHMA ACTION PLANS

More than 80% of patients in one case control study reported worsening symptoms in the previous 48 hours and had felt unwell at least seven days prior to hospital admission.[6] This suggests that there is a window of opportunity to assess and treat patients adequately before a near fatal or fatal attack develops.

The first step is appropriate action by the patient, and there is good evidence[8] that this is more likely if the patient possesses a personalised written action plan. This should include advice on self-administration of appropriate treatment and a clear escalation plan detailing when and how to access a healthcare professional for help. The NRAD report showed that only 23% of patients who died had an asthma action plan, see figure 1, opposite.

ASSESSMENT AND SEVERITY

Initial assessment by a healthcare professional should include a focused history and examination together with commencement of treatment.

The classic symptoms are breathlessness (how much can the patient say without stopping for breath?) and wheeze with attention to the timing and duration, especially noting whether symptoms disturb sleep. Key observations are those which have been shown to allow a grading of severity, specifically heart rate and respiratory rate (still regularly omitted, although less often than it used to be).

'Peak expiratory flow improves the recognition of severity when compared with examination alone'

Other signs, such as excessive use of accessory muscles of respiration or cyanosis indicate that an attack is severe or life-threatening, see table 1, left

Peak expiratory flow (PEF) is an extremely useful measurement and improves the recognition of severity when compared with examination alone.[9] PEF is expressed in terms of percentage of a patient's best peak flow measurement and is more accurate if this is known within the past two years.

It is also helpful to measure oxygen saturation to guide oxygen therapy and targets of treatment (although lack of pulse oximetry should not prevent oxygen being delivered).

Table 1

Classification of severity of asthma attack, adapted from the 2016 SIGN/BTS guideline[4]

Severity	Features
Moderate acute asthma	Increasing symptoms PEF > 50-75% best or predicted No acute features of severe asthma
Severe acute asthma	Any one of: ● PEF 33-50% best or predicted ● Respiratory rate ≥ 25/min ● Heart rate ≥ 110 bpm ● Inability to complete sentences in one breath
Life-threatening asthma	Any one of the following in a patient with severe asthma: **Clinical signs** Altered conscious level Exhaustion Arrhythmia Hypotension Cyanosis Silent chest Poor respiratory effort **Measurements** PEF < 33% SpO_2 < 92% PaO_2 < 8 kPa Normal $PaCO_2$ (4.6-6.0 kPa)
Near fatal asthma	Raised $PaCO_2$ and/or requiring mechanical ventilation with raised inflation pressures

SpO_2 = oxygen saturation; PaO_2 = partial pressure of oxygen; $PaCO_2$ = partial pressure of carbon dioxide

FIGURE 1
Asthma action plan, Asthma UK. The full template can be downloaded free from the Asthma UK website: www.asthma.org.uk

Every day asthma care:

My personal best peak flow is: ____

My **preventer** inhaler (insert name/colour): ____

I need to take my preventer inhaler every day even when I feel well

I take ____ puff(s) in the morning and ____ puff(s) at night.

My **reliever** inhaler (insert name/colour): ____

I take my reliever inhaler only if I need to

I take ____ puff(s) of my reliever inhaler if any of these things happen:

- I'm wheezing
- My chest feels tight
- I'm finding it hard to breathe
- I'm coughing.

Other medicines I take for my asthma every day:

With this daily routine I should expect/aim to have no symptoms. If I haven't had any symptoms or needed my reliever inhaler for at least 12 weeks, ask my GP or asthma nurse to review my medicines in case they can reduce the dose.

People with allergies need to be extra careful as attacks can be more severe.

When I feel worse:

- My symptoms are coming back (wheeze, tightness in my chest, feeling breathless, cough)
- I am waking up at night
- My symptoms are interfering with my usual day-to-day activities (eg at work, exercising)
- I am using my reliever inhaler ____ times a week or more
- My peak flow drops to below ____

This is what I can do straight away to get on top of my asthma:

1 **If I haven't been using my preventer inhaler, start using it regularly again or:**

Increase my preventer inhaler dose to ____ puffs ____ times a day until my symptoms have gone and my peak flow is back to normal

Take my reliever inhaler as needed (up to ____ puffs every four hours)

URGENT! If I don't improve within 24 hours make an emergency appointment to see my GP or asthma nurse.

2 **If I have been given prednisolone tablets (steroid tablets) to keep at home:**

Take ____ mg of prednisolone tablets (which is ____ x 5mg) **immediately** and again every morning for ____ days or until I am fully better.

URGENT! Contact my GP or asthma nurse today and let them know I have started taking steroids and make an appointment to be seen within 24 hours.

In an asthma attack:

- My reliever inhaler is not helping or I need it more than every ____ hours
- I find it difficult to walk or talk
- I find it difficult to breathe
- I'm wheezing a lot or I have a very tight chest or I'm coughing a lot
- My peak flow is below ____

THIS IS AN EMERGENCY TAKE ACTION NOW

1. Sit up straight — don't lie down. Try to keep calm
2. Take one puff of my reliever inhaler every 30 to 60 seconds up to a maximum of 10 puffs
3. A) If I feel worse at any point while I'm using my inhaler → CALL 999
   B) If I don't feel any better after 10 puffs → CALL 999
   C) If I feel better: make an urgent same-day appointment with my GP or asthma nurse to get advice

CALL 999 → Ambulance taking longer than 15 minutes? Repeat step 2

If I feel better, and have made my urgent same-day appointment:
- Check if I've been given rescue prednisolone tablets
- If I have these I should take them as prescribed by my doctor or asthma nurse

IMPORTANT! This asthma attack information is not designed for people on a SMART or MART medicine plan. If you're on a SMART or MART medicine plan, please speak to your GP or asthma nurse to get the correct asthma attack information.

Reproduced by kind permission of Asthma UK

key points

SELECTED BY

Dr Peter Savill
GP, Hampshire

Asthma deaths in the UK remain among the highest in Europe. The 2014 National Review of Asthma Deaths looked at detailed data over a 12-month period assessing 195 patients who died from asthma and highlighted the avoidable factors in patient deaths. Although faults were found in secondary care, many of the problems related to poor management of patients in the community, both in terms of regular surveillance and assessment and treatment at the onset of attacks.

Features which indicate a high risk of severe attacks include: previous admission to intensive care, particularly if requiring mechanical ventilation; previous admission with asthma especially in the past year or repeated emergency admissions; history of worsening asthma in January or February; use of three or more classes of asthma medication; heavy use of beta-2 agonists; anxiety traits; and marital stress.

More than 80% of patients in one case control study reported worsening symptoms in the previous 48 hours and had felt unwell at least seven days prior to hospital admission. This suggests that there is a window of opportunity to assess and treat patients adequately before a near fatal or fatal attack develops.

Peak expiratory flow improves the recognition of severity when compared with examination alone. Oxygen should be used to maintain oxygen saturation of 94-98% and it is recommended that GP surgeries have oxygen and an oximeter available. For anything other than life-threatening asthma, a standard metered dose inhaler administered with repeated actuations via a large volume spacer is as effective as a nebuliser. If a nebuliser is used it should ideally be driven with oxygen but nebulisers should not be withheld if oxygen is not available.

Oral steroids are required for all patients experiencing attacks of moderate severity or worse as they improve symptoms and reduce mortality, hospital admissions and the need for beta-2 agonists. The earlier steroids are administered the better the outcome. Admission is critical for patients with features of life-threatening asthma. If infection is present in asthma attacks it is usually caused by a virus and antibiotics are not appropriate. Good antibiotic stewardship is vital and antibiotics should be reserved for the minority of cases with a likely bacterial cause.

FIGURE 2
Metered dose inhaler (MDI) with large volume chamber. For anything other than life-threatening asthma a standard MDI administered with repeated actuations via a large volume spacer is as effective as a nebuliser



TREATMENT

Treatment should be implemented alongside the initial assessment of the patient. Oxygen should be used to maintain oxygen saturation of 94-98% and it is recommended that GP surgeries have oxygen and an oximeter available.

> ‘The earlier steroids are given the better the outcome’

Short-acting beta-2 agonists are quickly effective and easily administered. For anything other than life-threatening asthma a standard metered dose inhaler (MDI) administered with repeated actuations via a large volume spacer, is as effective as a nebuliser, see figure 2, above.[10] It is particularly useful to be aware of this in primary care when staff on duty may be less practised in setting up a nebuliser. The latest SIGN/BTS guideline recommends giving four separate puffs of beta-2 agonist initially, followed by two further puffs at two-minute intervals depending on response, up to a maximum of ten puffs. If a nebuliser is used it should ideally be driven by oxygen, but do not withhold nebulisers if oxygen is not available.

Oral steroids are required for all patients experiencing attacks of moderate severity or worse as they improve symptoms and reduce mortality, hospital admissions and the need for beta-2 agonists. The earlier steroids are administered the better the outcome.[11] Prednisolone 40-50 mg daily should be given for at least five days or until the patient has recovered.

REFERRAL TO HOSPITAL

Admission is critical for patients with features of life-threatening asthma. Patients with a severe asthma attack who have persisting symptoms despite treatment should also be admitted. Judgement should be applied for patients with moderate asthma attacks but with recent hospital admission, previous severe attacks or concern regarding social circumstances. These patients may still require admission to hospital. Patients being reviewed in the afternoon or evening or those with recent worsening of nocturnal symptoms may also require admission as these patients can often deteriorate again following initial assessment.

OTHER CONSIDERATIONS

The course of asthma in pregnancy is very variable but some patients experience deterioration in symptoms and have more frequent asthma attacks. A review of pregnant women with asthma attacks showed that they are often undertreated particularly with regard to steroid therapy, and

this resulted in poorer outcomes.[12] It is recommended that pregnant patients receive the same treatment for acute asthma as their counterparts who are not pregnant.

If infection is present in asthma attacks it is usually caused by a virus, and antibiotics are not appropriate. Good antibiotic stewardship is vital and antibiotics should be reserved for the minority of cases with a likely bacterial cause. Unfortunately, this advice is widely ignored. The recent AZALEA trial did not find any benefit in the use of macrolide treatment with azithromycin in asthma attacks, but a standout feature of this study was the extreme difficulty of recruiting patients because so many had already been given unnecessary antibiotic treatment.[13]

FOLLOW-UP

SIGN/BTS recommend that on discharge from hospital patients should be seen within two days by their GP or asthma nurse and that they should be seen in a specialist clinic in one month. This advice is sensible but tricky to adhere to. It will certainly never happen unless the hospital sends discharge information out promptly and GP surgeries are organised to react appropriately when they receive this. Follow-up provides a key time to check adherence to treatment, inhaler technique and to construct or amend personal asthma action plans.

'Those who have had a near fatal attack should be under specialist follow-up indefinitely'

Those patients who have had a severe attack should be followed up by an asthma specialist for at least a year afterwards, and those with a near fatal attack should be under specialist follow-up indefinitely.

It is advisable that patients who are admitted to hospital with a mild to moderate asthma attack should be followed up in primary care every six months and all other patients seen on an annual basis.

CONCLUSIONS

Asthma attacks remain a common presentation in both primary and secondary care. All patients should recover and most do, but the NRAD report is an important warning against complacency in managing this medical emergency. The updated SIGN/BTS guideline is a valuable reminder of current best practice for acute asthma management.

REFERENCES

1 Asthma UK. Number of people treated for asthma in the United Kingdom. 2013. www.asthma.org.uk/about/media/asthma-facts-and-statistics

2 Royal College of Physicians. Why asthma still kills: the National Review of Asthma Deaths (NRAD) Confidential Enquiry report. RCP. London. 2014

3 Department of Health. An outcomes strategy for people with chronic obstructive pulmonary disease (COPD) and asthma in England. DH. London. 2011 www.gov.uk/government/publications/an-outcomes-strategy-for-people-with-chronic-obstructive-pulmonary-disease-copd-and-asthma-in-england

4 British Thoracic Society/Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma. SIGN. Edinburgh. 2016 www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-2016/

5 Smith JR, Noble MJ, Musgrove S et al. The at-risk registers in severe asthma (ARRISA) study: a cluster-randomised controlled trial examining effectiveness and costs in primary care. *Thorax* 2012;67(12):1052-60

6 Turner MO, Noertjojo K, Vedal S et al. Risk factors for near fatal asthma. A case-control study in hospitalised patients with asthma. *Am J Respir Crit Care Med* 1998;157(6 pt 1): 1804-09

7 Vázquez I, Romero-Frais E, Blanco-Aparicio M et al. Psychological and self-management factors in near-fatal asthma. *J Psychosom Res* 2010;68(2):175-81

8 Gibson PG, Powell H. Written action plans for asthma: an evidence based review of the key components. *Thorax* 2003;59:94-99

9 Emerman CL, Cydulka RK. Effect of pulmonary function testing on the management of acute asthma. *Arch Intern Med* 1995;155(20):2225-28

10 Cates CJ, Walsh EJ, Rowe BH. Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma. *Cochrane Database Syst Rev* 2013 Sep 13;(9):CD000052.pub3

11 Rowe BH, Spooner C, Ducharme F et al. Early emergency department treatment of acute asthma with systemic corticosteroids. *Cochrane Database Syst Rev* 2001;(1):CD002178

12 Cydulka RK, Emerman CL, Schreiber D et al. Acute asthma among pregnant women presenting to the emergency department. *Am J Respir Crit Care Med* 1999;160(3):887-92

13 Johnston SL, Szigeti M, Cross M et al. Azithromycin for acute exacerbations of asthma. The AZALEA randomized clinical trial. *JAMA Intern Med* 2016; 176(11):1630-37

Useful information

Asthma UK
www.asthma.org.uk

The British guideline on asthma management. SIGN 153
Copies of the full guideline and quick reference guide can be downloaded from: www.sign.ac.uk

We welcome your feedback

If you wish to comment on this article or have a question for the authors, write to:
editor@thepractitioner.co.uk