

Case 2 A 9-year-old asthmatic child

You are the duty (on-call) doctor for the surgery and are informed by the receptionists that there is an emergency home visit request for a 9-year-old boy, Jake, who is short of breath. He is a known asthmatic. You are in the middle of morning surgery.

What is your immediate reaction?

You need to triage the call and decide whether to call for an ambulance, visit the child at home immediately, visit the child after morning surgery or ask whoever is looking after the child to bring him in.

What information do you need to decide which option is most appropriate?

- What is the clinical state of the child?
- What is the past medical history – does Jake have a past diagnosis of asthma and/or a history of previous similar episodes and/or admissions to hospital?
- Who is with the child and what are their fears and concerns?
- Are they at home and have they any transport?
- Have they any prescription medicines, in particular asthma inhalers?

To find out this information you need to look at the medical notes and speak to whoever is looking after Jake.

His mother is worried and says that he has been unwell for a couple of days with a runny nose and a temperature. He has asthma and it is normally well controlled with him rarely needing to use his inhaler. In contrast, he has needed his inhaler several times during the last couple of days to control his wheeziness and cough. This morning he has already needed his inhaler four times and on each occasion the effects did not last long. He is on the sofa wrapped in a blanket.

His medical notes state that he is prescribed a salbutamol metered dose inhaler. He has not had any admissions to hospital.

Do you have enough information? What further questions would you ask to help assess his clinical state?

- Is he awake or asleep? Is he rousable if asleep?
- Is he talking? If so, is he able to speak full sentences or just single words?
- Is his breathing noisy or quiet?
- What is his colour?
- How long has he been like this?

You find out that he is sitting on the sofa and is able to talk short sentences. He sounds wheezy and looks flushed. He has been like this most of the morning.

You decide that his condition is not immediately life-threatening but could deteriorate quickly and so instruct the mother that you will attend, leaving surgery immediately.

Should she do anything while she is waiting?

Give him more puffs of his salbutamol inhaler via the spacer (up to 10 puffs). She should dial 999 if he suddenly deteriorates before you arrive.

What do you need to do before you leave the surgery?

- Tell the receptionists that you are leaving and ask them to inform the patients who are waiting
- Get a printout of your patient's summarized medical records
- Take your mobile phone so that you can be contacted and so that you can contact others
- Make sure that you know where you are going

What should you take with you?

Along with the routine items that you would expect to see in a doctor's bag you should take, as a minimum, a bronchodilator (e.g. salbutamol metered dose inhaler) and a spacer device. Some GPs also have access to portable nebulizers but evidence has shown that metered dose

inhalers with spacers are as effective as nebulizers in delivering β_2 -agonists (Closa *et al.* 1998). A peak flow meter would also be useful as it will help you to assess the severity of the episode.

On arrival at the house what are the most important things to do?

You need to assess Jake rapidly while putting him and his mother at ease. Anxiety will only make his condition worse.

How would you assess him?

You should assess the severity of his symptoms and clinical signs (Table 4), but it should be remembered that the signs can correlate poorly with the degree of airway obstruction (BTS, SIGN 2005). Normal values for respiratory rate and pulse rate can be found in the Appendix.

- Pulse rate
- Respiratory rate and degree of breathlessness
- Use of accessory muscles of respiration
- Amount of wheezing
- Degree of agitation and conscious level

A measurement of less than 50% of predicted or best peak flow with poor response after initial bronchodilator

is predictive of a prolonged asthma attack. The national guidelines suggest that peak flow should be attempted in all children aged over 5 years and the best of three readings taken but in practice, particularly if the child is unwell, this is not practical (BTS, SIGN 2005).

He has an audible wheeze and cough. He is fully conscious and able to talk in short sentences. He is slightly anxious. His respiratory rate is 27 breaths/min, pulse rate is 116 beats/min and he is not using any accessory muscles of respiration. His peak flow is 54% of predicted.

Why is it important to classify how severe this asthma attack is?

By classifying the severity you can then decide on the correct treatment using the *BNF for Children* (2007) (Box 2). It can also be used as a prognostic indicator.

This attack is of moderate severity and so after checking your BNF you give him a further 10 puffs of salbutamol via his spacer. He becomes less wheezy and breathless, his respiratory rate drops to 22 breaths/min and his pulse rate is 98 beats/min. After only a few minutes his symptoms return and Jake and his mother are becoming more upset.

Table 4 Clinical signs. [After *BNF for Children* 2007.]

	Mild	Moderate	Severe	Life-threatening
Under 2 years	Cough, wheeze, no distress No cyanosis Normal respiration rate Speaking normally	Oxygen saturation >92% Audible wheezing Using accessory muscles to breathe Still feeding	Oxygen saturation <92% Cyanosis Marked respiratory distress Too breathless to feed	
2–5 years	Cough, wheeze, no distress No cyanosis Normal respiration rate Speaking normally	Oxygen saturation >92% No clinical features of severe asthma	Oxygen saturation <92% Too breathless to talk or eat Heart rate >130 beats/min Respiratory rate >50 breaths/min Use of accessory muscles of breathing	Oxygen saturation <92% Silent chest Poor respiratory effort Agitation or altered consciousness Cyanosis
5–18 years	Cough, wheeze, no distress No cyanosis Normal respiration rate Speaking normally	Oxygen saturation >92% Peak flow >50% best or predicted No clinical features of severe asthma	Oxygen saturation <92% Peak flow <50% best or predicted Too breathless to talk Heart rate >120 beats/min Respiratory rate >30 breaths/min Use of accessory muscles of breathing	Oxygen saturation <92% Peak flow <33% best or predicted Silent chest Poor respiratory effort Altered consciousness or cyanosis

Box 2 Treatment

Only the age group appropriate for Jake is included here. (After *BNF for Children* 2007.)

Mild to moderate exacerbation

Salbutamol aerosol inhaler 100 µg/inhalation

Child 2–18 years

- 1 puff every 15–30 s through a spacer up to max 10 puffs. Repeat after 20–30 min if necessary
- Short course of prednisolone should also be prescribed
- If response is poor or if a relapse occurs within 3–4 h send child to hospital

Severe or life-threatening

Send immediately to hospital. While waiting for transfer give either salbutamol as above or nebulized solution.

Child 2–18 years

- 2.5 mg every 20–30 min if necessary, or terbutaline 5 mg every 20–30 min if necessary
- If response to β_2 -agonist is poor (while awaiting transfer to hospital) ipratropium nebulized solution 125–250 µg every 20–30 min if necessary
- Oxygen should be administered if you have it
- Prednisolone tablets or hydrocortisone injection also form part of the treatment regime although it is likely that these would not be administered in the community prior to admission

What do you do next?

His symptoms have returned quickly, reinforcing the instability of his condition. His mother is also having difficulty coping and so you calmly inform Jake and his mother that it would be best if he goes to hospital for further assessment and treatment.

Jake's mother starts crying and says that she has no car to get there. You calm her down saying that it is the best place for him. You explain that you will arrange for an ambulance and ask if there is anyone that she could call for support. She calls Jake's father who says that he will meet them at the hospital.

Jake stays in hospital for 48 h. During this time the diagnosis is confirmed and he is stabilized with oral steroids and regular bronchodilator nebulizers. He is discharged with no change to his medications from those that he had on admission.

Why should you arrange for a follow-up appointment?

To ensure that the family:

- Are happy with his current condition
- Understand his treatment plan, including triggers and their avoidance (e.g. infection, allergy, airborne chemicals, passive smoking, exercise)

- Know what to do if another attack occurs and when to seek medical help

Outcome. Unfortunately, this episode heralds the start of a deterioration in his condition and he requires the addition of inhaled steroids within a couple of months because he requires bronchodilators on a daily basis. He has another admission to hospital with an acute attack within 6 months and the paediatricians decide to follow him up as an outpatient.

References and further reading

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CASE REVIEW

Asthma is a chronic inflammatory disease affecting the lower airways manifesting as reversible airway obstruction and mucosal inflammation resulting in bronchoconstriction. It has a prevalence of 10–23% in England, with the number of cases being diagnosed rising year on year (NICE 2002).

Asthma is a very serious condition with acute asthma causing approximately 1000 deaths in the UK per year (Currie *et al.* 2005). 'Regard each emergency consultation as being for acute severe asthma. Failure to respond adequately at any time requires immediate transfer to hospital.' (BNF for Children 2007, p. 165).

We know that diagnosis is not always simple but it should be suspected in any child with an audible wheeze, recurrent cough and breathlessness with acute exacerbations. The diagnosis can be confirmed in schoolchildren by peak flow variability or tests of bronchial hyper-reactivity (BTS, SIGN 2005).

Throughout this case different guidelines have been mentioned. National guidelines are developed by experts to help clinicians to diagnose and manage conditions using the best evidence available. Asthma guidelines are

readily available in the BNF helping the clinician to assess the severity of the condition and to give the appropriate acute and long-term treatment.

In this case Jake's follow-up after discharge was mentioned. This is to ensure:

- 1 That the parents and child have a good understanding of the illness and the medication. Good education will result in improved symptom control, self-management and re-attendance rates (BTS, SIGN 2005). Education should include discussion of the avoidance of precipitants. These include infection, allergy, passive smoking and exercise (NICE 2002)
- 2 The correct type of inhaler is assessed so that the dose of drug entering the lungs is maximized (NICE 2002)
- 3 Action plans are written. They improve health outcomes and they should be focused on individual needs (BTS, SIGN 2005)

The National Service Framework flow chart for acute illness (Department of Health 2004) summarizes the actions for different stages of asthma (Fig. 2).

KEY POINTS

- Asthma is a chronic inflammatory disease affecting the lower airways resulting in bronchoconstriction
- It has a prevalence of 10–23% in England
- Acute asthma causes approximately 1000 deaths in the UK per year
- Asthma should be suspected in any child with an audible wheeze, recurrent cough and breathlessness with acute exacerbations
- Triggers include infection, allergy, airborne chemicals, passive smoking and exercise
- Signs, symptoms and treatment regimes are categorized by age
- Treatment for acute exacerbations will include bronchodilators and steroids ± oxygen and hospital admission

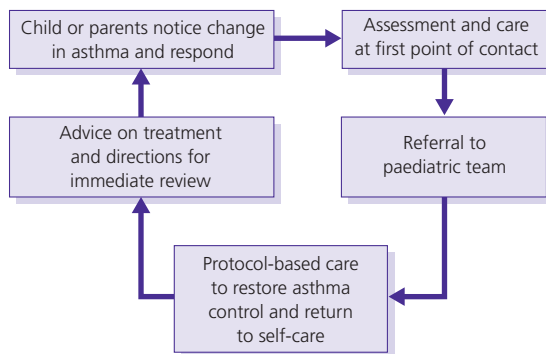


Figure 2 The National Service Framework flow chart for acute illness (Department of Health 2004).

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