RECOGNITION AND ASSESSMENT

Definition

- A chronic inflammatory disorder of the airways with reversible obstruction

In children aged <2 yr who have an initial poor response to β_2 agonists administered with adequate technique, continue treatment if severe (see definition below), but consider alternative diagnosis and other treatment options

Symptoms and signs

- Breathlessness
- Wheeze
- Cough
- Nocturnal cough
- Tight chest

- Symptoms and signs tend to be:
- variable
- intermittent
- worse at night
- provoked by triggers, including exercise

Mild/moderate

- Normal vital signs
- Mild wheeze
- Speaks in complete sentences or feeding
- No clinical features of severe asthma
- SpO_2 >92% in air
- Peak expiratory flow rate (PEFR) >50% in patient aged ≥5 yr

Severe

- Too breathless to talk/feed/eat
- Tachypnoea
- aged <5 yr: >40 breaths/min
- aged 5–12 yr: >30 breaths/min
- aged 12–18 yr: >25 breaths/min
- Tachycardia
- aged <5 yr: >140 beats/min
- aged 5–12 yr: >125 beats/min
- aged 12–18 yr: >110 beats/min
- Use of accessory muscles, recession subcostal and intercostal, flaring of alae nasi
- SpO_2 <92% in air
- ≤50% predicted/best peak expiratory flow rate (PEFR) aged ≥5 yr

Life-threatening

- Cyanosis/pallor
- Decreased air entry/silent chest
- Poor respiratory effort
- Altered conscious level
- Irritable/exhausted
- SpO_2 <92% in air
- ≤30% predicted/best PEFR aged ≥5 yr

Patients with severe or life-threatening attacks may not be distressed and may not have all these abnormalities. Presence of any one of these should alert doctor

Differential diagnosis

- Inhaled foreign body
- Pneumonia
- Pneumothorax
- Aspiration

- Cystic fibrosis
- Tracheobronchomalacia
- Gastro-oesophageal reflux
- Hyperventilation

Assessment
- Record:
- respiratory rate and effort
- recession
- heart rate
- air entry
- oxygen saturation in air
- if ≥5 yr, PEF
- conscious level
- CXR if severe and life-threatening sign/symptoms do not improve with medical management

Do not take any samples for routine blood tests or routine blood gases.
Routine CXR is unnecessary in a child with asthma

IMMEDIATE TREATMENT

- Follow algorithm **Management of acute wheezing in children**
- Prescribe oxygen on drug chart if required

Senior assessment
- If you are worried about child's conscious level or there is no response to nebulised salbutamol or poor respiratory effort:
- Call senior doctor for further assessment
- Site an IV line
- Initial bolus dose of salbutamol IV over 5 min
- aged <2 yr: 5 microgram/kg (maximum 250 microgram)
- aged >2 yr: 15 microgram/kg (maximum 250 microgram)
- Using 500 microgram/mL injection preparation dilute to a concentrate of 50 microgram/mL with sodium chloride 0.9%
- e.g. withdraw 250 microgram = 0.5 mL and make up to a total volume of 5 mL using sodium chloride 0.9% = 250 microgram in 5 mL

Not responding within 15 min
- Magnesium sulphate IV injection over 20 min (aged 2–17 yr): 40 mg/kg single dose (maximum 2 g)
- use 50% injection and dilute to a 10% concentration by diluting required volume with 4x volume of sodium chloride 0.9%

Not responding within 15 min of completion of magnesium sulphate
- Discuss with on-call paediatric consultant
- Salbutamol 1–2 microgram/kg/min continuous infusion (use 50 kg as maximum weight)
- if weight >50 kg PICU for contact dosing advice
- use 1 mg/mL solution for IV infusion, take 10 mg (10 mL) and make up to 50 mL with sodium chloride 0.9% giving a concentration of 200 microgram/mL
- If not responding increase up to 5 microgram/kg/min for 1 hr then reduce back to 2 microgram/kg/min
- If requiring >2 microgram/kg/min, admit to HDU or PICU depending on severity of illness
- Use $TcCO_2$ monitor
- Continue with oxygen and continuous salbutamol nebuliser whilst waiting for infusion to be made up

Drug doses
- Salbutamol nebulised, driven by 6–8 L/min oxygen:
- aged <5 yr: 2.5 mg
- aged >5–12 yr: 2.5–5 mg
- aged >12 yr: 5 mg

- Ipratropium bromide (Atrovent®) nebulised:
- aged <12 yr: 250 microgram
- aged >12 yr: 500 microgram

- Prednisolone 1 mg/kg oral (round up to nearest 5 mg):
- aged <2 yr: maximum 10 mg once daily
- aged 2–5 yr: maximum 20 mg once daily
- aged >5 yr: maximum 30 mg once daily
- aged ≥12 yr: maximum 40 mg once daily
- if already on maintenance oral corticosteroids prednisolone 1–2 mg/kg (maximum 60 mg) and discuss weaning plan with respiratory consultant
- consider if weaning plan required

- Hydrocortisone [preferably sodium succinate (until conversion to oral prednisolone possible)] slow IV injection
- **EITHER** 4 mg/kg 6-hrly (maximum per dose 100 mg)
- **OR**:
- aged 1 month –1 yr: 25 mg 6-hrly
- aged 2–4 yr: 50 mg 6-hrly
- aged 5–18 yr: 100 mg 6-hrly
- Do not give antibiotics routinely
- If high prevalence of influenza with fever, coryza, generalised symptoms (headache, malaise, myalgia, arthralgia) give oseltamivir

Monitoring

If treated with nebulised or IV salbutamol:

- Record heart rate and respiratory rate every 10 min
- Continuous SpO_2
- Cardiac monitoring
- Baseline U&E
- Capillary blood gas and lactate
- 12-hrly potassium for hypokalaemia

If treated with IV magnesium sulphate:

- Record heart rate, respiratory rate and blood pressure every 5 min
- Continuous SpO_2
- Cardiac monitoring
- Baseline U&E
- Capillary blood gas and lactate

SUBSEQUENT MANAGEMENT

- Follow algorithm **Management of acute wheezing in children**

Previous history

- When recovering, ask about:
- previous episodes of wheeze, similar episodes
- triggering factors, seasonal variation
- nocturnal cough
- family history of asthma, hay fever, eczema, other atopy
- smokers in the family (including child)
- days off school because of asthma
- number of courses of prednisolone used in last year
- pets
- drug history (device and dose) especially any bronchodilators/inhaled corticosteroids and their effect, particularly need to use beta-agonists

DISCHARGE AND FOLLOW-UP

Discharge criteria

- SpO_2 in air ≥94%
- Respiratory rate:
- aged <5 yr: <40 breaths/min
- aged 5–12 yr: <30 breaths/min
- aged 12–18 yr: <25 breaths/min
- Heart rate:

- aged <5 yr: <140 beats/min
- aged 5–12 yr: <125 beats/min
- aged 12–18 yr: <110 beats/min
- Peak flow: ≥75% predicted/best (aged >5 yr)
- Stable on 4-hrly treatment

Discharge home same day if:

- Child has made a significant improvement and has remained stable for 4 hr
- Parents:
  - understand use of inhalers
  - have a written personal asthma action plan (PAAP)
  - have a written discharge/weaning salbutamol information leaflet
  - know how to recognise signs of deterioration and the actions to take

Discharge treatment

- Prescribe beta-agonist with spacer
  - aged ≤3 yr with mask
  - aged >3 yr without mask (e.g. Volumatic or aerochamber)
- Give prednisolone daily for 3–5 days (if already on oral prednisolone maintenance therapy speak to respiratory consultant/nurse and discuss weaning plan)
- Educate on use of PEF meter if aged ≥5 yr
- Prescribe preventer as appropriate – see **Chronic management**
- Inhaled corticosteroids generally not required for recurrent viral induced wheeze
- Discuss follow-up in either the community, nurse-led asthma clinic or consultant clinic
- If there have been life-threatening features refer to paediatric respiratory specialist
- Advise follow-up with GP within 2 working days
- Refer smokers to smoking cessation services
- Identify trigger of acute attack and discuss future management plan for exposure

Chronic management

- Commence inhaled corticosteroid or escalate preventer treatment if any of following:
  - frequent episodes
  - bronchodilators used most days (>3 days/week)
  - nocturnal and/or exercise-induced symptoms
  - other atopic symptoms and strong family history of atopy
- If recurrent upper respiratory tract problems or allergic rhinitis triggering attacks, give oral antihistamines +/- steroid nasal spray

ASTHMA ● 5/5

- Algorithm: Management of acute wheezing in children