Acute asthma in children

Acute asthma in children aged 2–12 years

These clinical features increase the probability of a diagnosis of asthma:

- More than one of the following: wheeze, cough, difficulty breathing and chest tightness. The risk is increased if these symptoms are recurrent, worse at night or in the early morning, occur during or after exercise or trigger dependent (e.g. with exposure to pets, cold, humidity, heightened emotions or occurring independent of upper respiratory tract infections).
- Personal history of atopic disorder.
- Family history of atopic disorder and/or asthma.
- Widespread wheeze heard on auscultation.
- History of improvement in symptoms or lung function in response to adequate therapy.

Acute asthma in children under 2 years

The assessment of acute asthma in early childhood can be difficult.

- Intermittent wheezing attacks are usually due to viral infection and the response to asthma medication is inconsistent.
- Prematurity and low birth weight are risk factors for recurrent wheezing.
- The differential diagnosis of symptoms includes: aspiration pneumonitis, pneumonia, bronchiolitis, tracheomalacia, complications of underlying conditions such as congenital anomalies and cystic fibrosis.

Classification of severity of acute presentation

Moderate asthma
Normal mental state
Ability to talk in sentences or vocalise as normal
Some accessory muscle use
PEF ≥ 50% of best or predicted
O_2 saturations > 92% in air
Moderate tachycardia
HR ≤ 125 min^{-1} (> 5 years)
HR ≤ 140 min^{-1} (2–5 years)
RR ≤ 30 min^{-1} (> 5 years)
RR ≤ 40 min^{-1} (2–5 years)
Management
Continuous O_2 saturation monitoring
High-flow O_2 via NRB mask titrated to achieve O_2 saturations 94–98%
ß2 agonist 2–10 puffs via pMDI + spacer
+/-face mask, repeat dose every 20 min reviewing effect; no improvement in 1 h treat as acute severe
Ipratropium bromide given early via pMDI
+ spacer +/- face mask, particularly if poorly responsive to ß2 agonist
Oral steroids: prednisolone 20 mg for children aged 2 to 5 years; 30 to 40 mg for children > 5 years

Acute severe asthma
Agitated, distressed
Can't complete sentences in one breath
Moderate to marked accessory muscle use
PEF 33–50% of best or predicted
O_2 saturations < 92% in air
HR > 125 min^{-1} (> 5 years)
HR > 140 min^{-1} (2–5 years)
RR > 30 min^{-1} (> 5 years)
RR > 40 min^{-1} (2–5 years)
Management
Continuous O_2 saturation monitoring
High-flow O_2 via NRB mask titrated to achieve O_2 saturations 94–98%
ß2 agonist nebulised (salbutamol 2.5–5 mg) every 20 min with Ipratropium bromide (250 mcg) for first 2 h; review frequently
Oral steroids: 20 mg prednisolone for children aged 2 to 5 years; 30 to 40 mg for children > 5 years
Consider intravenous magnesium and aminophylline if if the child is unresponsive to maximal doses of bronchodilators and steroids
Consider ABG if poor response to early treatment
Refer to PICU

Life-threatening asthma
Confused, drowsy, exhausted
Unable to talk
Maximal accessory muscle use (poor respiratory effort is **pre-terminal**)
Marked tachycardia (sudden fall in HR is **pre-terminal**)
PEF < 33% of best or predicted
O_2 saturations < 92% in air
Silent chest
Cyanosis
Hypotension
Management
Continuous O_2 saturation monitoring
High-flow O_2 via NRB mask titrated to achieve O_2 saturations 94–98%
Refer to PICU
ß2 agonist nebulised (salbutamol 2.5–5 mg) every 20 min with Ipratropium bromide (250 mcg) for first 2 h; review frequently
Oral steroids: 20 mg prednisolone (2–5 years); 30 to 40 mg (> 5 years). Repeat dose if vomiting or consider intravenous steroids (hydrocortisone 4 mg kg^{-1} every 4 h)
Give bolus of intravenous magnesium.
Consider early single bolus dose of IV salbutamol where child has responded poorly to inhaled therapy followed by an infusion
Consider aminophylline if child unresponsive to maximal doses of bronchodilators and steroids
Consider ABG if poor response to early treatment.

NRB – non-rebreather mask with reservoir

pMDI – pressurised metered-dose inhalers

Note: Evidence is unclear which of intravenous salbutamol, aminophylline or magnesium should be the first line in severe asthma.

Early management of asthma – September 2019. Based on the British Thoracic Society, Scottish Intercollegiate Guidelines Network, British guideline on the management of asthma revised 2019