

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 $\geq$ 50% of best or predicted.

O₂ saturations $>$ 92% in air.

Moderate tachycardia.

HR $\leq$ 125 min⁻¹ ($>$ 5 years)

HR $\leq$ 140 min⁻¹ (2–5 years)

RR $\leq$ 30 min⁻¹ ($>$ 5 years)

RR $\leq$ 40 min⁻¹ (2–5 years)

Management

Continuous O₂ saturation monitoring.

High-flow O₂ via face mask titrated to achieve O₂ saturations 94–98%.

β 2 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 β 2 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.

Cannot complete sentences in one breath, or too breathless to talk or feed.

Moderate to marked accessory muscle use.

PEF 33–50% of best or predicted.

O₂ 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 O₂ saturation monitoring.

High-flow O₂ via face mask titrated to achieve O₂ saturations 94–98%.

β 2 agonist nebulised (salbutamol 2.5–5 mg) every 20 min with Ipratropium bromide (250 mcg) for first 2 h; review frequently.

Consider adding **magnesium sulfate** to each nebulised **salbutamol** and **ipratropium bromide** in the first hour.

Oral steroids: 20 mg prednisolone for children aged 2 to 5 years; 30 to 40 mg for children $>$ 5 year.

Consider intravenous **magnesium** and **aminophylline** 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

SpO₂ $<$ 92%, plus any one of the following in a child with severe asthma:

- Silent chest
- Cyanosis
- Poor respiratory effort
- Hypotension
- Exhaustion
- Confusion
- PEF $<$ 33% best or predicted

Management

Continuous O₂ saturation monitoring.

High-flow O₂ via face mask titrated to achieve O₂ saturations 94–98%.

Refer to PICU.

β 2 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.

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. Based on the British Thoracic Society, Scottish Intercollegiate Guidelines Network, British guideline on the management of asthma, revised November 2024