Management of life-threatening asthma

Recognise life-threatening asthma

- Silent chest
- Poor respiratory effort
- Worsening hypoxia
- Hypotension
- Agitation **or** drowsiness
- $PaCO_2$ "normal" (4.6-6kPa)

Call SORT

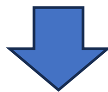
Mimics to consider

- Anaphylaxis
- Bronchiolitis/viral wheeze
- Foreign body
- Heart failure
- Mediastinal mass
- Pneumothorax
- Pneumonia

Treatment options may vary significantly and be life-threatening if missed

First line treatment

Oxygen	Maintain SpO_2 >94% • High flow nasal 2L/kg/min flow • Non-rebreathe mask 15L/min If FiO_2 consistently >50%, **SORT referral required**
Nebulised bronchodilators Give both drugs simultaneously	Salbutamol – 3x doses then every 30 mins • 2.5mg (1-4 years) • 2.5-5mg (≥5 years) Ipratropium – 3x doses then 4-6 hourly • 250micrograms (≤11 years) • 500 micrograms (12-17 years)
IV Steroids	Hydrocortisone sodium succinate 4mg/kg (max. 100mg) 6 hourly
IV Magnesium	Bolus 40mg/kg (max. 2g) over 20 mins Dose equivalence = 0.4ml/kg 10% magnesium sulfate Consider 2nd dose if inadequate clinical response



If improving, do not escalate treatment

Second line treatment

IV Salbutamol	**STOP** salbutamol nebulisers Bolus dose over 10 mins + assess response • 5 micrograms/kg (<2 years) • 15 micrograms/kg (2-17 years, max. 250micrograms) **If** responsive, start infusion 1-2micrograms/kg/min (max. 20micrograms/min)
IV Aminophylline	Loading dose 5mg/kg over 20 mins (max. 500mg) Start maintenance infusion • 1mg/kg/hr (≤11 years) • 0.5-0.7mg/kg/hr (12-17 years) Monitor theophylline level 4-6 hours after initiation Therapeutic level = 10-20mg/L

Consider Salbutamol toxicity

Tachycardia + arrhythmia, high BM, high lactate, low K^+

Management of life-threatening asthma

Indications for intubation

SpO_2 ≤92% despite FiO_2 >60%
Poor respiratory effort
Hypercarbia + acidosis (pH <7.3)
Hypotension
Worsening agitation or drowsiness

Call SORT

Intubation preparation

Senior ICU/anaesthetic presence
Ketamine + Rocuronium induction
Anticipate instability – refer to SORT 'Anaesthesia for emergencies' guideline
Team brief – refer to SORT 'Intubation checklist' guideline
Ensure cuffed + adequately sized ETT

Emergency hypotension management

Disconnect patient from ventilator + manually decompress chest
CXR or POCUS to exclude pneumothorax
Fluid ± vasopressor bolus (Adrenaline first-line)
Manage arrhythmia if present

Initial ventilator management

Mode	PCV – may need high PIP to enable chest movement Beware excessively high pressures with hand ventilation
PEEP	Keep at 5
Vt **RR** **I:E ratio**	Adjust PIP to achieve Vt 6-8ml/kg Slow RR - adjust RR + I:E ratio to ensure ventilator flow trace returns to baseline prior to onset of next inspiration Target plateau pressure (Pplat) <25cmH_2O Permissive hypercapnia strategy (target pH >7.2)
Sedation	Morphine + Midazolam 20-80microgams/kg/hr Keep patient paralysed
Secretion clearance	Essential after intubation Refer to SORT 'Secretion clearance in the intubated child' guideline Pause + restabilise patient if hypoxia develops