

Acute severe asthma- Guidelines for management.

This guideline is for use by healthcare staff, at CoMET undertaking critical care retrieval, transport and stabilisation of children, and young adults.

CoMET is a Paediatric Critical Care Transport service and is hosted by the University Hospitals of Leicester NHS trust working in partnership with the Nottingham University Hospitals NHS Trust.

The guidance supports decision making by individual healthcare professionals and to make decisions in the best interest of the individual patient.

This guideline represents the view of CoMET, and is produced to be used mainly by healthcare staff working for CoMET, although, professionals, working in similar field will find it useful for easy reference at the bedside.

We are grateful to the many existing paediatric critical care transport services, whose advice and current guidelines have been referred to for preparing this document. Thank You.

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Education and Training

1. Annual Transport team update training days
2. Workshops delivered in Regional Transport Study days/ Outreach

Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Incident reporting	Review related Datix	Abi Hill – Lead Transport Nurse abi.hill@uhl-tr.nhs.uk	Monthly	CoMET Lead Governance Meeting
Documentation Compliance	Documentation Audit	Abi Hill – Lead Transport Nurse abi.hill@uhl-tr.nhs.uk	3 Monthly	CoMET Lead Governance Meeting

Acute Severe Asthma-Guidelines for Management.

Working Definition: A chronic inflammatory disease of the airways characterised by reversible airflow obstruction and bronchospasm.

Lack of improvement or reversibility: Could be due to mucous plugs or plastic bronchitis, however, little can be done to acutely improve this during stabilisation & prior to transfer. Also consider other diagnoses.

Risk factors for Death: Brittle asthma, Drug toxicity (β -Blockers), Multiple ICU admissions.

NB: Be aware of salbutamol toxicity & lactic acidosis. Salbutamol >1 mcg/kg/minute can be toxic & may not give additional improvement.

Pearls: - Asthma severity - difficult to assess
 Tachycardia- could be β_2 agonist/fever
 Slow breathing suggests fatigue
 Agitation or drowsiness is a concerning sign
 Salbutamol causes lactic acidosis
 Venous /capillary gases may be of limited use if cold or shocked (PCO₂ error is high)
 If no improvement with IV salbutamol bolus and /or deteriorating – consider early respiratory support

Assessment

Acute severe	Life threatening
<ul style="list-style-type: none"> • SpO₂ <92% in air • Severe work of breathing . • Can't complete a sentence or unable to eat • Agitation • Tachycardia (Salbutamol also causes this) 	<ul style="list-style-type: none"> • SpO₂ <92% in 15 litres facemask oxygen • Silent chest, cyanosis or poor respiratory effort • Confusion or drowsiness • Increased PCO₂ or hypotension is a pre-terminal event • Consider history; alternative diagnosis (if 1st presentation) eg. foreign body / pneumothorax • Chest X-ray can be useful at this stage or as baseline

Management

1 st line	2 nd line
<ul style="list-style-type: none"> • Oxygen to maintain saturations >94% • Nebulised salbutamol every 20 minutes • Nebulised ipratropium bromide every 20 minutes • IV steroids: hydrocortisone • IV magnesium sulphate; 40mg/kg (0.2mmols/kg) over 20 minutes, repeat 4-6 hourly • Manage fever 	<ul style="list-style-type: none"> • IV salbutamol bolus (5micrograms/kg over 20 minutes) followed by IV infusion 0.5-1microgram/kg/min with ECG monitoring (Maximum infusion rate 20micrograms/min – do not exceed max adult dose) • Discuss doses >1microgram/kg/min with the Comet Consultant • Monitor for hypokalaemia/lactic acidosis/tachycardia • Aminophylline: Please discuss with Comet Consultant (narrow therapeutic range)

Baseline chest X-ray; if indicated by non-standard presentation:
 (Look for atelectasis/consolidation/pneumothorax/alternative cause like foreign body)

Anticipation

Before intubation, the role of non-invasive support is important; NIV in asthma is very effective
 If not improving, consider intubation and mechanical ventilation. Discuss with Comet Consultant

Indications: Saturations <92% on high flow facemask oxygen + 2nd line medications
 Hypercarbia (CO₂ rising or arterial sample more than 6KPa)
 Signs of fatigue; silent chest, poor respiratory effort, not able to speak in sentences

Intubation; high risk	Ventilation: initial principles
<ul style="list-style-type: none"> • Ensure adequate help/support available (remember ventilation can get difficult after intubation) • Prepare fluid bolus/arrest drugs; BP may drop if air trapping/dynamic hyperinflation (common) • Cuffed ET tubes are preferable, use intubation checklist • Pre-oxygenate; 100% oxygen for at least 3 mins • Use Ketamine (2mg/kg) & Rocuronium (1mg/kg) (Morphine & Atracurium causes histamine release) • Remember ETCO₂ may not reflect true PCO₂ • Avoid manual decompression (risk of cardiac arrest) • Chest x-ray post intubation is mandatory 	<ul style="list-style-type: none"> • Ensure muscle relaxed (Rocuronium infusion) • Use fentanyl and ketamine for sedation • Pressure controlled preferable; enough pressure (PIP) to move the chest • PEEP 5 (don't change); measuring auto PEEP does not help • Rate 10-20 (use lower than normal for age, to avoid air trapping) • Prolonged I:E ratio; IT long enough to avoid hypoventilation • Accept high PCO₂ (9-15 KPa), this will not drop quickly (NB: blood PCO₂ poorly correlates with ETCO₂) • Ensure adequate tidal volume; may require 7-8ml/kg
<p>Persisting hypercarbia – exclude obstruction of ET tube/pneumothorax/leak around ET tube Suction and/or physiotherapy may help remove mucous plugs - discuss with Comet Consultant Patients with asthma who are intubated should be a Consultant led Comet transfer; ECMO may be needed</p>	

References- 1.STRS guidelines- march 2017, 2. KIDS clinical guideline version august 2016, 3.www.brit-thoracic.org.uk 4.UHL /LRI Asthma management guidelines –sept 2019. 5.Durward et al:- Crit care med 2004 6.Tobin:Crit care resus 2005.