LIFE-THREATENING ASTHMA.

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Recognition of Life-threatening Asthma

• Deterioration despite maximal therapy on severe asthma pathway
• Respiratory – cyanosis/exhaustion
• Neurological – confusion/drowsiness.
• Cardiovascular – pulsus paradoxus
• Consider diagnoses other than asthma, especially in infants with poorly responsive respiratory distress. No infant (< 1 year) should be started on intravenous bronchodilators without discussion with a consultant.

Management

If the patient’s condition is improving therapy can be de-escalated at any stage - see 'Severe' section of Asthma Guideline.

1. Call for assistance - request urgent review with PICU/CED Senior
2. OXYGEN – use high flow oxygen via mask (e.g. 15L/min).
3. IV access
4. Give Hydrocortisone 4 mg/kg IV as soon as possible.
5. Nebulised bronchodilators - Continuous nebulised salbutamol 5 mg/dose for all ages. Add ipratropium bromide 0.25 mg to the second nebuliser, if there is inadequate response to the first salbutamol nebul. Repeat ipratropium every 20 minutes for 3 doses, then every 4 hours.
6. IV salbutamol bolus Give 10 micrograms/kg (single dose maximum 500 micrograms). Over 2 minutes. Give in a minimum volume of 5ml (can be diluted with 0.9% Saline). Repeat dose at 10 minutes if still not improving
7. IV magnesium sulphate bolus. Use magnesium sulphate 49.3% (493mg/ml). Give 0.1 ml/kg (approx 50mg/kg) over 20 minutes (dilute to 20mls with normal saline and infuse via syringe driver). Maximum dose 5 mls (2.5 g).
8. IV aminophylline bolus. Give 10 mg/kg IV (maximum dose 500 mg) over 1 hour (dilute to 1mg/ml – the total volume will be 10ml/kg, compatible with fluid containing sodium chloride and/or Dextrose and/or Potassium). If the child is already on oral theophylline, do not give IV aminophylline unless you have obtained a baseline serum level and can calculate a reduced loading dose. If patient is on any other medications you must check for potential interactions and adjust dose accordingly (see below).
9. If inadequate response to bolus therapy then start further IV therapy in form of salbutamol +/- aminophylline infusion(s). These children require admission to PICU.

Remember if child is improving therapy can be de-escalated at any stage

**Salbutamol Infusion**

**Dose**

5 - 10 microgram/kg/min for 1 hour then reduce to 1 - 2 microgram/kg/min

**If Patient Weight < 16kg**

Add 3 mg/kg of IV salbutamol solution (1 mg/ml) to a 50 ml syringe and make up to 50 ml with 5% dextrose

Then 1 ml/hr = 1 microgram/kg/min

**If Patient Weight > 16kg**

Draw up neat IV salbutamol solution (1 mg/ml) into a 50ml syringe (i.e. not diluted)

Then rate (ml/hr) = 0.06 x weight (kg) x dose (microgram/kg/min)

For example if you have a 20 kg child and want to infuse salbutamol at 5 microgram/kg/min then set rate at 0.06 x 20 x 5 = 6 ml/hr

<table>
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<th>Wt(kg)</th>
<th>1 microgram/kg/min</th>
<th>2 microgram/kg/min</th>
<th>5 microgram/kg/min</th>
<th>10 microgram/kg/min</th>
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Aminophylline Infusion

Dose if patient aged 1 – 9 years
- 1.1 mg/kg/hour
- Add 55 mg/kg of IV aminophylline solution (25 mg/ml) to a 50 ml syringe and make up to 50 ml with 5% dextrose
- Then infuse at 1 ml/hr
- If weight is between 23 – 30kg (50th centile for 9 year old) then use neat IV aminophylline solution (25mg/ml) in a 50ml syringe and run at 1 ml/hr.

Dose if patient aged 10 – 15 years and weight < 35 kg
- 0.7 mg/kg/hour
- Add 35 mg/kg of IV aminophylline solution (25 mg/ml) to a 50 ml syringe and make up to 50 ml with 5% dextrose
- Then infuse at 1 ml/hr

Dose if patient aged 10 – 15 years and weight > 35 kg
- 0.7 mg/kg/hour
- Draw up neat IV Aminophylline solution (25 mg/ml) into a 50 ml syringe
- Then infuse at 0.028 ml/kg/hr
  
  For example if you have a 40 kg child then infusion rate will be 40 x 0.028 = 1.12 ml/hr

Dose adjustment for obesity
  Use 50th percentile of expected weight for age

Factors increasing Aminophylline clearance
- Tobacco
- Phenytoin
- Carbamazepine
- Phenobarbitone

Factors decreasing Aminophylline clearance
- Influenza vaccination
- Pulmonary oedema
- Hepatic or renal dysfunction
• Cimetidine
• Erythromycin
• Ciprofloxacin

References

British Guideline on the Management of Asthma
(http://www.sign.ac.uk/guidelines/published/support/guideline63/download.html)

Advanced Paediatric Life Support, BMJ Book - Third Edition


Cheuk DKL, Chau TCH, Lee SL. A meta-analysis on intravenous magnesium sulphate for treating acute asthma. Arch Dis Child 2005; 90: 74-77