Asthma

Refer EARLY to KIDSNTS for advice - 0300 200 1100

Principles

Assessment of severity as per BTS guidelines

- Identify risk factors for poor outcome (e.g. previous ICU admission)
- Urgent consultant review in severe asthma
- Provide adequate oxygen, use bronchodilators, monitor for toxicity
- Consider differentials (e.g. foreign body)
- Apply full monitoring to severe cases (ECG, NIBP, SpO_2)
- Intubate and ventilate if necessary (see indications + precautions) Call KIDS if concerned (0300 200 1100)

Acute severe asthma

- SpO_2 <92%
- Too breathless to talk or eat
- Heart rate >140/min (age 1-5 yrs)
- Heart rate >125/min (Age >5 years)
- Respiratory rate >40/min (age 1-5yrs)
- Respiratory rate>30 (>5years)
- Use of accessory neck muscles.

Life-threatening asthma

SpO_2<92% plus any of:

- Silent chest, cyanosis
- Poor respiratory effort
- Exhaustion
- Confusion/agitation
- Hypotension

First line treatment

- Give high flow oxygen (aim for SpO_2 94-98%)
- Nebulised bronchodilators repeat every 20 mins "back-to-back":
- **Salbutamol** – 2.5 mg (1months -4yrs) ; 5 mg (>5yrs)
- **Ipratropium**- 250 micrograms (1months -11yrs); 500 micrograms (>11yrs)
- **Early steroids**- Oral Prednisolone 10mg (under 2 years), 20mg (2-5 years), 30-40mg (> 5 years)

(Children already receiving maintenance steroid tablets should receive 2 mg/kg prednisolone up to a maximum dose of 60 mg **OR** IV Hydrocortisone 4mg/kg to a max of 200mg).

- CXR- If suspicion of pneumothorax, consolidation, or unsatisfactory response to Bronchodilators

Second line Treatment

- High Flow nasal cannula oxygen (start at 2L/kg/min)/NIV
- **IV Salbutamol**: Bolus 15 micrograms/kg over 10 minutes (age>2 years) followed by infusion, with continuous ECG monitoring.
- Dose 1-2 micrograms/kg/min ,usual max dose 20 micrograms/min (see drug calculator)
- ***Note: May cause tachyarrythmias, hypotension, lactic acidosis.***
- Can be given alongside nebulised salbutamol.
- **IV Magnesium Sulphate**: Dose 40mg/kg (Max 2g/dose) over 20 mins. (see drug calculator)
- ***Note may cause hypotension - use continuous ECG and regular BP monitoring throughout infusion***
- **IV Aminophylline:** Bolus 5mg/kg over 20 mins. Followed by infusion with continuous ECG monitoring.
- Dose 1mg/kg/hr (1 mth-11yr) 700micrograms/kg/hr (>11years)
- ***Note: may cause tachycardia. DO NOT load if on oral theophylline. Actively consider drug interactions. Dose based on ideal body weight.***
- Salbutamol and Aminophylline may cause hypokalaemia

Intubation and ventilation

The decision to intubate and ventilate is very high risk. Please discuss with KIDS

Tracheal intubation may aggravate bronchospasm and positive pressure ventilation will greatly increase the risk of barotrauma and circulatory depression.

Indications

- Worsening hypoxemia, SaO_2 <92% despite high flow/face mask O2 after 1st / 2nd line therapy
- Poor respiratory effort, Hypercarbia $PaCO_2$> 6kPa (sign of respiratory insufficiency and fatigue)
- Inability to speak short sentences (severe airflow obstruction)
- Depressed level consciousness or progressive agitation
- Respiratory arrest
- Silent chest

Precautions

- High risk intubation - Most experienced operator should intubate and manage ventilation
- Preoxygenate with 100% oxygen for 3mins
- Prepare fluid bolus and adrenaline
- Rapid Sequence Induction – use ketamine (bronchodilator) and rocuronium / suxamethonium (see drug calculator).
- Use cuffed ETT (do not cut the ET tube shorter)

Complications

- Hypotension (poor venous return, dynamic hyperinflation)
- Hypoxia (tube malposition, ventilator failure, secretions or gas trapping)
- Pneumothorax or subcutaneous emphysema

Post intubation: Goals of treatment and troubleshooting

Low peep, low rate, long expiratory time and limit pressure.

- Mode preferred: Pressure Control
- Limit PiP < 40 cm H_2O
- Aim for tidal volumes 5-10 ml/kg
- Rate 10 - 20 bpm
- I: E ratio of at least 1:2
- PEEP of 5-8 cmH_2O (avoid zero PEEP!)
- Alter settings depending on patient response
- Consider mucous plugging, Pneumothorax, acute RV failure

Sedate with ketamine and midazolam, Muscle relax with rocuronium infusion

- Maintain normovolaemia
- If no improvement, consider low dose sevoflurane (0.5-2.0%)
- If hypotension occurs, change IV salbutamol to adrenaline
- Aim for: pH >7.2 , SpO_2 > 90%
- Watch for: worsening bronchospasm, hyperinflation (consider manual decompression

Author - BO-R - March '25. Review March '29