UK HEMS

Clinical Excellence in Helicopter Medicine

Status Asthmaticus

Aims:

- To define the degrees of severity of acute presentations of asthma
- To identify special considerations in the pre-hospital care of the patient with acute severe and life-threatening exacerbations of asthma

Background:

Acute severe and life-threatening exacerbations of asthma have a mortality rate of up to 10%. Most deaths or near-deaths due to asthma occur during or before the pre-hospital phase of treatment. Certain disease-related, social, and behavioural factors increase the likelihood of a life-threatening asthma attack. The HEMS team may be called to treat a patient with severe respiratory distress or may be called upon to transport a patient from a remote location.

Policy:

Patient Assessment

- Following a focused history and examination, the patient should be classified according to severity as per the British Thoracic Society (BTS) guidelines
- Patients will therefore fall into one of four groups:
    1. Mild exacerbation of asthma
    2. Moderate exacerbation of asthma
    3. Acute severe asthma
    4. Life-threatening asthma
- This SOP relates primarily to the pre-hospital management of acute severe asthma and life-threatening asthma. Mild and moderate exacerbations are less likely to generate a HEMS response and should be managed according to BTS guidelines

Special management considerations

- Treatment should follow the BTS guidelines for acute severe and life-threatening asthma
- The patient should remain monitored, with particular attention paid to the respiratory rate, the oxygen saturations and the heart rate. In addition to the overall clinical state of the patient, it is these parameters that will most reflect the response to treatment
- Nebulised bronchodilators should be administered via an oxygen-driven nebuliser. Back-to-back doses can be administered, or the dose repeated every 10-15 minutes to effect
- Intravenous access should be secured and consideration given to the early use of intravenous corticosteroids such as hydrocortisone
- Magnesium sulphate has been shown to provide some benefit in status asthmaticus in adults. A typical dose would be 8mmol given as a slow intravenous infusion
- The early addition of a bolus dose of intravenous salbutamol (15mcg/kg) can be an effective adjunct to treatment in children
- Because of the possibility of deterioration following initial treatment all patients with asthma who are transported by HEMS should be taken to a hospital with ICU (or PICU) facilities

RSI for status asthmaticus

Every effort should be made to avoid RSI for acute life-threatening asthma. The HEMS indication would usually be 'ventilatory failure' as evidenced by exhaustion, confusion, feeble respiratory effort and worsening physiology. Post-RSI management of these patients is extremely challenging in the pre-hospital setting. If pre-hospital intubation is judged to be unavoidable then the following points should be considered

Induction and intubation

- Ketamine is a bronchodilator and the induction agent of choice
- The patient is likely to de-saturate rapidly after induction, particularly when lying flat

Sedation and paralysis

- Boluses of ketamine may be considered as an acceptable alternative to more usual forms of ongoing sedation and may have theoretical benefits in terms of bronchodilatation
- Morphine and midazolam cause histamine release and can theoretically worsen the situation.
- Propofol is a bronchodilator but may also cause histamine release
- A long-acting non-depolarising muscle relaxant which does not cause histamine release is preferable. Atracurium and rocuronium both can cause histamine release. Histamine release is not typically associated with vecuronium and pancuronium

Ventilation

- Ventilation of an acute asthmatic is often nearly impossible due to intense bronchoconstriction, and very high pressures will be required to generate the tidal volumes that are usually considered normal
- Ventilator settings should be chosen to reflect a strategy of 'permissive hypercapnia' – appropriately low pressures, tidal volumes and respiratory rates should be chosen to maintain oxygen saturations of 88-92% with less emphasis on reducing high ETCO2 levels
- Should the ventilator function exist, the I:E ratio should be increased to facilitate complete exhalation and prevent breath stacking

Complications

- Bilateral tension pneumothorax – a decreased cardiac output or cardiac arrest should be presumed to be the result of bilateral tension pneumothoraces, and thoracostomies performed immediately
- Breath stacking (gas trapping, auto-PEEP, dynamic hyperinflation) – may also cause reduced cardiac output and mimic bilateral tension pneumothoraces. If thoracostomies do not improve cardiac output, the ventilator circuit should be disconnected from the endotracheal tube and the chest manually compressed to aid exhalation of trapped gas from the lungs
- Failure to ventilate to achieve appropriate oxygenation – intense bronchoconstriction may be eased by the administration of adrenaline down the endotracheal tube. Adrenaline and other nebulised bronchodilators can continue in the ventilated patient through the addition of a t-piece to the ventilator circuit

Additional Information

British Thoracic Society. British Guideline on the Management of Asthma. 2008