

Guidelines for the treatment of Acute Asthma on ICU: ITU Clinical Guideline

Reference No:

Introduction

These guidelines were produced in response to the new guidelines from the BTS (Thorax 2003), and an audit carried out on the ICU in October 2004. They were reviewed following the 2014 BTS guidelines.

Acute severe asthma requires prompt diagnosis and appropriate management in order to prevent mortality, the aim of these guidelines is to ensure optimal care of these patients when they are admitted to the Intensive Care Unit.

Ventilation of asthmatic patients can be difficult, the prolonged expiratory phase leaving patients prone to dynamic hyperinflation. Misguided attempts at trying to normalise ABGs by IPPV may lead to hypotension and barotrauma / volutrauma which contribute to morbidity and mortality.

Definitions

Life threatening asthma can be defined as:

- PEFr < 33% of predicted.
- SpO₂ < 92%.
- Silent chest, cyanosis or poor respiratory drive.
- Bradycardia, arrhythmia or hypertension.
- Exhaustion, confusion or coma.

Near fatal asthma:

- Raised PaCO₂
- Requiring IPPV with raised inflation pressures.

Patients with severe or life threatening asthma may not appear distressed and may not have all these abnormalities, the presence of any should arouse suspicion.

Immediate Assessment

PEFR (if possible).

Degree of respiratory distress (ability to speak, use of accessory muscles).

Vital signs (P, BP, RR, SpO₂ and presence of arrhythmias).

ABGs

CXR (only if suspicion of pneumothorax or consolidation).

Immediate Management

High flow oxygen.

Salbutamol 5mg nebulised.

Ipratropium 500mcg nebulised.

IV hydrocortisone 100mg (or prednisolone 40mg orally).

Rehydration.

If life threatening features:

- IV magnesium 2g infused over 20 minutes.
- Give salbutamol nebulised continuously.
- If no improvement or deteriorating transfer to ICU.

Transfer to ICU if:

- Exhaustion, feeble respiration, confusion or drowsiness.
- Deteriorating PEFr, worsening hypoxia or hypercapnia.
- Coma or respiratory arrest.

All patients should be transferred by an anaesthetist.

ICU management

Continuous salbutamol nebs.

4 hourly ipratropium nebs.

Humidified oxygen.

IV magnesium if not already given.

Check potassium and replace as necessary.

Continue steroids (for at least 5 days).

All patients should have IV ranitidine and SC enoxaparin prescribed.

Antibiotics only if history consistent with infection (note green sputum is normal in acute asthma).

Repeat ABGs within 2 hours.

Repeat PEFr.

If no improvement

- IV aminophylline should be considered
- 5mg/kg loading dose.
- 500mcg/kg/hour titrated to levels.

If no response to IV aminophylline IV salbutamol should be considered

- 250mcg slow IV.
- 5mcg/minute
- Consider further doses of magnesium

Indications for ventilation

- Decreased conscious level or exhaustion.
- Worsening acidosis or hypercapnia.

If requires ventilation

Induction and intubation along standard lines, but consider use of ketamine as induction agent. Avoid thiopentone

- Volume resuscitation and vasopressors available.
- Largest appropriate size ETT.
- Patients need heavy sedation and may need neuromuscular blockade.
- Consider use of inhalational agents (isoflurane or sevoflurane).
 - Isoflurane – has been used up to 5%, note side effect of hypotension.
 - Sevoflurane – has been used up to 4%.

Titrate either to lowest therapeutic level.

- Consider use of ketamine infusion.
 - 0-2.5mg/kg/hour

Muscle Relaxants

- Avoid atracurium as it causes histamine release. Rocuronium or vecuronium are suitable alternative.

Expect patients to be difficult to ventilate. Patients will need very long expiratory times. Disconnecting from the ventilator and manually squeezing the chest may be required to aid expiration

Ventilator settings

FiO₂ = 1.0

- Square wave form (ramp=0).
- I:E ratio to allow full expiration (> 1:3), avoids dynamic hyperinflation (DHI).
Intrinsic PEEP and plateau pressure predict DHI.
- Respiratory rate 4-8, Inspiratory time to allow long I:E.
- Aim for VT = 5-8ml/kg, with plateau pressure < 35cm H₂O.
- Permissive hypercapnia (providing oxygenation is maintained); maintain pH >7.15, avoids barotrauma and volutrauma, from trying to normalise ABGs.
- PEEP < intrinsic PEEP

Continuous nebulisers

Use nebuliser kit with infusion line, draw up salbutamol nebuliser liquid into a 20ml syringe (if use 2.5mg neb = 1mg/ml), attach to syringe driver and run at 5 ml/hr (5mg/hr).

Choice of IV agent

Aminophylline has been chosen as a preference for its use was shown in the audit and there is no clear therapeutic difference between it and IV salbutamol.

Use of Helium-oxygen mix

There is no shown therapeutic benefit over specific beta agonists and is hence not recommended

Mucolytics

No specific studies looking at asthma, but may be of benefit if thick secretions are a problem

Documentation Control

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Date of Approval: November 2014

Date of Review: November 2017

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Keywords: Asthma, ICU management