Respiratory System

Management of Acute Severe Asthma in Adults in A&E

SIGN 101 British Guideline on the Management of Asthma (revised Jan 2012). Algorithm adapted with permission from the British Thoracic Society

Measure Peak Expiratory Flow* and Arterial Saturations

PEF > 50 - 75% best or predicted
Moderate asthma
SpO₂ ≥ 92%
PEF > 50-75% best or predicted
No features of acute severe asthma

Give salbutamol (give 4 puffs initially and give a further 2 puffs, every 2 minutes according to response up to maximum of 10 puffs) preferably via spacer

Clinically stable AND PEF > 75%
Clinically stable AND PEF < 75%
No life-threatening features AND PEF 50 - 75%
Life-threatening features OR PEF < 50%

Repeat salbutamol 5 mg nebuliser
Give prednisolone 40 - 50 mg orally

Patient recovering AND PEF > 75%
No signs of severe asthma AND PEF 50 - 75%
Signs of severe asthma OR PEF < 50%

OBSERVE
Monitor SpO₂, heart rate and respiratory rate

Patient stable AND PEF > 50%
Signs of severe asthma OR PEF < 50%

POTENTIAL DISCHARGE
See Notes on Potential Discharge

PEF < 33% best or predicted
Life-threatening asthma:
SpO₂ < 92%.
Silent chest; cyanosis; poor respiratory effort.
Bradycardia; arrhythmia; hypotension.
Exhaustion; confusion; coma.

Obtain senior / ICU help now if any life-threatening features are present.

IMMEDIATE MANAGEMENT
Oxygen to maintain SpO₂ 94 - 98%.
Give salbutamol 5 mg plus ipratropium 0.5 mg via oxygen-driven nebuliser
AND prednisolone oral 40 - 50 mg or hydrocortisone IV 100 mg.

Measure arterial blood gases
Markers of severity:
Normal or raised PaCO₂
(PaCO₂ > 4.6 kPa; 35 mmHg)
Severe hypoxia
(PaO₂ < 8 kPa; 60 mmHg)
Low pH (or high H+°)

- Give / repeat salbutamol 5 mg with ipratropium 0.5 mg via oxygen-driven nebuliser after 15 minutes.
- Consider continuous salbutamol nebuliser 5 mg/hour.
- Consider IV magnesium sulphate 1.2 - 2 g over 20 minutes (seek senior advice).
- Correct fluid / electrolytes, especially K+ disturbances
- Chest x-ray
- Repeat ABG

ADMIT
Patient should be accompanied by a doctor or nurse at all times.
Notes on Potential Discharge from A&E

- In all patients who received nebulised Beta_2 agonists prior to presentation, consider an extended observation period prior to discharge.
- If PEF < 50% on presentation, prescribe prednisolone oral 40 - 50 mg/day for 5 days.
- In all patients ensure treatment supply of inhaled steroid and Beta_2 agonist and check inhaler technique.
- Arrange GP follow up for 2 days post discharge.
- Fax discharge letter to GP.
- Refer to asthma liaison nurse / chest clinic.

*Peak Expiratory Flow Rate – Normal Values*
Respiratory System

Management of Acute Severe Asthma in Adults in Hospital

SIGN 101 British Guideline on the Management of Asthma (revised Jan 2012). Algorithm adapted with permission from the British Thoracic Society

Features of acute severe asthma:
- Peak expiratory flow (PEF) 33 - 50% of best (use % predicted if recent best unknown).
- Can’t complete sentences in one breath.
- Respiration ≥ 25 breaths/minute.
- Pulse ≥ 110 beats/minute.

Life-threatening features:
- PEF < 33% of best or predicted.
- SpO₂ < 92%
- Silent chest, cyanosis, or feeble respiratory effort.
- Bradycardia, dysrhythmia, or hypotension.
- Exhaustion, confusion, or coma.

If patient has any life-threatening feature:
Measure arterial blood gases. No other investigations are needed for immediate management.

Blood gas markers of a life-threatening attack:
- Normal (4.6 - 6 kPa, 35 - 45 mmHg) PaCO₂
- Severe hypoxia: PaO₂ < 8 kPa (60 mmHg) irrespective of treatment with oxygen.
- A low pH (or high H⁺).

Caution: Patients with severe or life-threatening attacks may not be distressed and may not have all these abnormalities. The presence of any should alert the doctor.

Near fatal asthma:
- Raised PaCO₂
- Requiring IPPV with raised inflation pressures.

IMMEDIATE MANAGEMENT

- Oxygen to maintain SpO₂ 94 - 98%.
  (CO₂ retention is not usually aggravated by oxygen therapy in asthma).
- Salbutamol 5 mg or terbutaline 10 mg via an oxygen-driven nebuliser.
- Ipratropium bromide 0.5 mg via an oxygen-driven nebuliser.
- Prednisolone oral 40 - 50 mg or hydrocortisone IV 100 mg or both if very ill.
- No sedatives of any kind.
- Chest radiograph only if pneumothorax or consolidation are suspected or patient requires IPPV.

If life-threatening features are present:
- Discuss with senior clinician and ICU team.
- Add IV magnesium sulphate 1.2 - 2 g infusion over 20 minutes (unless already given).
- Give nebulised Beta₂ agonist more frequently e.g. salbutamol 5 mg up to every 15 - 30 minutes or 10 mg continuously hourly.

SUBSEQUENT MANAGEMENT

If patient is improving continue:
- Oxygen to maintain SpO₂ 94 - 98%.
- Prednisolone oral 40 - 50 mg each day or hydrocortisone IV 100 mg or both if very ill.
- No sedatives of any kind.
- Nebulised Beta₂ agonist and ipratropium 4 - 6 hourly.

If patient not improving after 15 - 30 minutes:
- Continue oxygen and steroids.
- Give nebulised Beta₂ agonist more frequently e.g. salbutamol 5 mg up to every 15 - 30 minutes
- Continue ipratropium 0.5 mg 4 - 6 hourly until patient is improving.

If patient is still not improving:
- Discuss patient with senior clinician and ICU team.
- IV magnesium sulphate 1.2 - 2 g over 20 minutes (unless already given).
- Senior clinician may consider use of IV Salbutamol* or IV aminophylline or progression to IPPV.

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**MONITORING**

- Repeat measurement of PEF 15 - 30 minutes after starting treatment.
- Oximetry: maintain $\text{SpO}_2$ 94-98%.
- Repeat blood gas measurements within 1 hour of starting treatment if:
  - initial $\text{PaO}_2 < 8$ kPa (60 mmHg) unless subsequent $\text{SpO}_2 > 92%$
  - $\text{PaCO}_2$ normal or raised
  - patient deteriorates.
- Chart PEF before and after giving Beta$_2$ agonists and at least 4 times daily during hospital stay.

*Transfer to ICU accompanied by doctor prepared to intubate if:*

- Deteriorating PEF, worsening or persisting hypoxia, or hypercapnea.
- Exhaustion, feeble respirations, confusion or drowsiness.
- Coma or respiratory arrest.

**DISCHARGE**

When discharged from hospital, patients should have:

- Been on discharge medication for 24 hours and *have had inhaler technique checked and recorded.*
- PEF > 75% of best or predicted and PEF diurnal variability < 25% *unless discharge is agreed with respiratory physician.*
- Treatment with *oral and inhaled steroids* in addition to bronchodilators.
- Own PEF meter and written asthma action plan.
- GP follow up arranged *within 2 working days.*
- Follow up appointment in respiratory clinic *within 4 weeks.*

Patients with severe asthma (*indicated by need for admission*) and adverse behavioural or psychological features are at risk of further severe or fatal attacks:

- Determine reason(s) for exacerbation and admission.
- Send details of admission, discharge and potential best PEF to GP.

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**Salbutamol (Infusion solution 5 mg/5 ml)**

**N.B.** There are two formulations of salbutamol available for parenteral use. The infusion formulation, NOT the IV injection formulation, should be used to prepare infusions.

**Dose** – Initially 5 microgram/minute adjusted according to response and heart rate, usually in the range 3 - 20 microgram/minute.

**Administration** – Dilute 5 ml of solution with 500 ml glucose 5% or sodium chloride 0.9% to give a concentration of 10 microgram/ml

**Table 1 – Infusion rates for salbutamol**

<table>
<thead>
<tr>
<th>Dose (microgram/minute)</th>
<th>Infusion Rate (ml/hour)</th>
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<tbody>
<tr>
<td>3</td>
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<td>5</td>
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<td>120</td>
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Please refer all patients admitted with a new diagnosis or exacerbation of asthma to the respiratory nurse specialists for education and inhaler technique prior to discharge.