



PAEDIATRIC ACUTE CARE GUIDELINE

Asthma

Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

This document should be read in conjunction with this DISCLAIMER
<http://kidshealthwa.com/about/disclaimer/>

Asthma

Asthma is a chronic inflammatory disease of the lower respiratory tract that leads to acute episodes of bronchospasm leading to cough and wheezing.

Background

General

- Around 14-16% of Australian children are currently living with asthma.
- The medical literature is changing the way we classify and treat young children with wheeze.
- This guideline applies to children around 10 months of age and older and addresses the Emergency Department Management of acute asthma in the first hour of presentation.

Recent changes in practice

- In the treatment of asthma/wheezing, the use of pressurised metered dose inhalers (pMDIs) with spacer devices has to a large extent superseded the use of nebulisers as the preferred means of delivery of inhaled aerosol solutions
- Princess Margaret Hospital uses the small volume spacer for all ages

Risk factors

Potential triggers for an acute asthma exacerbation can include:

- Allergy (there is a strong link between asthma and atopy)
- Viral upper and lower respiratory tract infections
- Environmental: cigarette smoke (including passive smoking), air pollution, cold air
- Drugs
- Exercise

Assessment

- Keep reassessing the patient's condition and their response to treatment
- A deteriorating patient needs to be identified early and treated more aggressively
- It is not necessary for all clinical criteria to be met for a patient to be considered "severe" or "critical"
- Wheeze is not an indicator of severity

History

- Asthma classification: infrequent or frequent intermittent, persistent
- Potential triggers
- Previous Paediatric Intensive Care Unit admissions
- Medications recently used: reliever, preventer, steroids
- Symptoms of a viral upper respiratory tract infection
- Symptoms such as wheezing, cough, chest tightness, dyspnoea
- Personal or family history of atopy or eczema

Examination

- Observations: pulse rate, respiratory rate, temperature, oxygen saturations
- Mental status: lethargic, drowsy
- Ability to talk in sentences, phrases or single words
- Evidence of a viral upper or lower respiratory tract infection
- Chest hyperinflation
- Work of breathing: degree and type of recession (eg: mild, moderate, severe; subcostal, intercostal, sternal, tracheal tug), and use of accessory muscles, head bobbing, nasal flaring
- Chest auscultation: air entry (normal, reduced, equal on both sides), wheeze, crackles
- Unequal air entry is often due to mucus plugging

Investigations

- Peak expiratory flow rate (PEFR) measurements are not routinely performed for children who are acutely unwell or unfamiliar with having their PEFR measured (usually older than 7 years)
- Chest X-rays are not routinely required in children with acute wheeze
- Blood gases are also not routinely done unless patients are critical and going to a Paediatric Intensive Care Unit – in this case consider a venous blood gas

Indications for a **chest X-Ray** may include:

- deteriorating clinical state
- poor response to treatment

Differential diagnoses

- Viral induced wheeze, viral pneumonitis
- Inhaled foreign body
- Recurrent cough (post viral, non specific)

Management

Asthma management flowchart



Initial management

- Please see the Asthma Flowchart
- pMDIs are used to deliver medication with a spacer
- It is reasonable to change to a nebuliser if the patient is unable to cooperate with a spacer or the patient is deteriorating clinically

Further management

- It is important to continually reassess the patient's condition and their response to treatment whilst they are in the Emergency Department
- Patients who are not responding to treatment, or who are deteriorating, need to be identified early and treated more aggressively

- Following initial treatment, the patient's response to treatment is assessed and a decision made about discharge versus the need for further treatment in hospital, either in
 - The Emergency Department Short Stay Unit provided that the patient is:
 - Deemed clinically appropriate for transfer based on the clinical picture and frequency of salbutamol administration
 - Receiving no more than 2L of oxygen via nasal prongs
 - Likely to be discharged within 24 hours

(**Note:** Seek early senior medical help with decision to admit)
 - A medical ward at PMH or peripheral hospital under the General Paediatric Team, for more prolonged treatment

Medications

Acute Dosing
<p>pMDI's: Salbutamol = 100 micrograms per actuation pMDIs are used via spacer with 1 actuation at a time, with 3 normal tidal breaths between each actuation. Protocol for salbutamol in acute asthma is:</p> <ul style="list-style-type: none"> ■ Children < 6 years: 6 puffs ■ Children > 6 years: 12 puffs <p>Ipratropium is no longer used for mild and moderate asthma³ pMDIs are given 20 minutely over 40 minutes (3 times). Then the patient should be reassessed to decide the timing for the next dose.</p>
<p>Spacers: All pMDIs must be used with a spacer Small volume spacer + mask - for all children</p>
<p>Nebulisers: Nebulisers are driven with oxygen at 8L/min</p> <p>Salbutamol:</p> <ul style="list-style-type: none"> ■ Ventolin nebules (given neat, not diluted with saline) ■ Children < 5 years: 2.5 mg/2.5mL ■ Children > 5 years: 5mg/ 2.5 mL <p>Ipratropium:</p> <ul style="list-style-type: none"> ■ Children < 5 years: 125 micrograms ■ Children > 5 years: 240 micrograms

Steroids:

Oral prednisolone is given 1mg/kg once daily for 3 days

More severe patients may require intravenous hydrocortisone 4mg/kg (maximum 100mg) 6 hourly during admission

Other Medications

[Aminophylline](#)

[Magnesium Sulphate – Administration](#)

[Salbutamol – continuous nebulised](#)

[Salbutamol – intravenous](#)

Discharge Medications

Oral steroids (complete a 3 day course)

Bronchodilator as per [Asthma Action Plan](#)

Prophylaxis – usually organised by General Practitioner or General Paediatric Team at follow up appointment

Discharge criteria

Patients can be discharged when:

- Salbutamol has been stretched to > 3-4 hourly
- Parents are able to administer salbutamol at home (asthma education may be required)
- Oxygenation saturations are normal

Discharge medications:

- Complete the oral steroid course (3 days)
- Salbutamol (or other bronchodilator) as required
- Prophylaxis if required (as per the National Asthma Campaign Guidelines)

Referrals and follow-up

- ED medical and nursing staff can provide asthma/wheeze education
- Indications for consideration for referral to the **Asthma Liaison Nurse:**
 - Poorly controlled asthma
 - Over 2 years of age
 - More than two episodes of Viral Induced Wheeze
 - Under the care of a General Paediatrician

- Follow up can be with:
 - General Practitioner
 - Private Paediatrician (General or Respiratory)
 - PMH Outpatient Clinic (General Paediatrics, Respiratory)
- All patients should be offered follow up with the Asthma Foundation. To do this ask the parent to sign the consent form and send in the internal mail to the Asthma Liaison Nurse. She will forward onto the foundation. You can advise the parent that an Education Officer will then contact the family at home.
- A range of services are offered at the Foundation including:
 - Group Education sessions
 - Over-the-phone Education sessions
 - Individual Education sessions at the Asthma Foundation Centre or in certain metropolitan clinics

Health information (for carers)

Contributing factors – identify and discuss relevant environmental and allergy factors with the family:

- Tobacco smoke
- Viral infections
- Exercise
- Allergens – inhaled or ingested

Where possible give appropriate education and advice to the patient and family regarding allergen avoidance if warranted.

Management paperwork

- [Asthma Information Pack For Patients, Parents and Carers](#) – provided by the Asthma Liaison Nurse
- [Asthma Action Plan](#) – to be completed and explained by the Emergency Doctor for all patients with asthma prior to discharge – either the generic PMH Action Plan or a hand-written Action Plan can be used. Generic Action Plans are available in the Asthma Education Pack given to patients.
- Discharge letter for the General Practitioner

Nursing

Observations

- Baseline observations include heart rate, respiratory rate, oxygen saturations, temperature.
- Minimum of hourly observations should be recorded whilst in the emergency department.
- Any significant changes should be reported immediately to the medical team.

Medications

- A minimum of 4 hourly salbutamol should be given whilst the child is admitted to hospital.
- Advise the doctor when the patient has reached 3 – 4 hourly without requiring salbutamol so the patient can be reviewed with a view to discharge.

Positioning the patient

- Make sure the patient is sitting upright not lying flat to maximise respiratory function.

Tags

aminophylline, asthma, asthma action plan, asthma liaison, atrovent, hydrocortisone, ipratropium, magnesium, nebulised, nebuliser, pred, prednisolone, salbutamol, silent chest, spacer, steroids, ventolin, wheeze, wheezing


References

PMH ED Guideline : Asthma – last updated September 2014

1. National Asthma Council Australia. *Asthma Management Handbook*. 2006. Accessed online at: www.nationalasthma.org.au
2. Shultz A, Le Souef TJ, Venter A, Zhang G, Devadason SG, Le Souef PN. Aerosol Inhalation From Spacers and Valved Holding Chambers Requires Few Tidal Breaths for Children. *Pediatrics*. 2010; 126; e1493. Available from: <http://pediatrics.aappublications.org/content/126/6/e1493.full.html>
3. Watts E, Borland M, Doyle S and Geelhoed G. Metered-dose inhaler ipratropium bromide in moderate acute asthma in children: A single-blinded randomised controlled trial. *Journal of Paediatrics and Child Health*: 2015 Feb;51(2): 192-8. doi: 10.1111/jpc.12692. Epub 2014 July 14.

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