



MDI = Metered Dose Inhaler

Multidose = 10 x 100micrograms Salbutamol all ages

Guidelines for the management of acute asthma in children

Mild 9.8.2	
<ul style="list-style-type: none"> • Not distressed • Subtle accessory muscle use • Mild retraction • End-expiratory wheeze • O₂ saturation > 94% in air • Peak flow > 80% predicted 	<p>Salbutamol MDI + Spacer, up to 10 puffs over 10 minutes, increase by 1 puff every minute until symptoms improve. Oral Prednisolone</p> <hr/> <p>Complete response – discharge on regular β₂-agonist Start oral steroids Ensure device/technique appropriate Written advice on what to do if symptoms worsen, Personalised Asthma Action Plan Consider overall control and family's knowledge Arrange follow-up with GP or asthma clinic as appropriate</p>

Moderate 9.7.1	
<ul style="list-style-type: none"> • Distressed • Obvious accessory muscle use • Moderate retraction • Continuous wheeze • O₂ saturation 91-95% in air • Peak flow 50-80% predicted 	<p>Give 1000 mcg Salbutamol MDI + Spacer Repeat Salbutamol multi-dosing as necessary Assess the child for response after each multi-dose Give O₂ between inhalers if saturation is < 92%, maintain saturations 94-98% in oxygen Give oral steroid early</p> <hr/> <p>The few children of moderate severity who can go home should be discussed with the consultant and should not leave A&E or the ward until at least one hour after their last multi-dose Salbutamol. Arrange follow up and home treatment (including written advice) as above</p>

Children who show any of the “danger signs” below or no sustained improvement should be discussed with the consultant

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| <ul style="list-style-type: none"> • Rising pulse rate (a fall in heart rate in life threatening asthma is a pre-terminal event) • Silent chest • Rising PaCO₂ • Restlessness | <ul style="list-style-type: none"> • Poor respiratory effort • Exhaustion • Chest Pain • Confusion • Coma • Cyanosis |
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Severe 9.7.1	
<ul style="list-style-type: none"> • Marked distress or exhaustion • Maximal accessory muscle use • Retraction marked • Silent chest or markedly reduced air entry • Retraction and wheeze may lessen with tiring • Pulsus paradoxus • O₂ saturation < 92% • Peak flow < 50% predicted • PCO₂ > 6 kPa 	<p>Involve Senior Staff – Consultant & Anaesthetist (SBAR)</p> <p>Always administer O₂ – at high flow</p> <p>Give salbutamol + Ipratropium + Magnesium sulphate in same nebuliser, 3 times hourly for the first 1 hour, Salbutamol and ipratropium combined 3 times hourly for the second hour, followed by salbutamol nebulisers as frequently as indicated by response (may be required continuously)</p> <p>Check Capillary blood gas to assess acid base balance</p> <p>Give IV hydrocortisone only if not tolerating oral prednisolone</p> <p>Consider IV Aminophylline or IV Salbutamol ± IV Magnesium with poor nebuliser response – Discuss with consultant before initiating this (Patient will require twice daily electrolyte monitoring)</p>

Drug Doses					
Drug	Route	Age Group	Dose	Frequency	
Salbutamol 9.8.2	MDI & Spacer	Up to 10 puffs of 100mcg inhaler over 10 minutes			
	Nebuliser	<5 years	2.5 mg	See flow diagram on page 1	
		>5 years	5 mg		
	IV – bolus	1 month – 2 years	5 micrograms/kg over 5 minutes		
		>2 years	15 micrograms/kg over 10 minutes 9.9.1		
IV – continuous infusion	60-300 micrograms/kg/hour, dose adjusted according to response and heart rate (doses above 120mcg/kg/hr should be given in PICU)				
Aminophylline	IV – bolus	5mg/kg (max 500mg) over at least 20 minutes; omit if already on theophylline 9.9.2			
	IV – continuous infusion	1 month – 12 years	1 mg/kg/hr adjusted according to plasma-theophylline levels		
		>12 years	500-700mcg/kg/hr adjusted according to plasma-theophylline levels		
Ipratropium Bromide 9.8.3	Nebuliser	<1 years	125 micrograms	See flow diagram on page 1	
		>1 year	See flow diagram on page 1		
		administer 4-6hrly if required following initial doses			
Prednisolone 9.8.4	Oral	All	2 mg/kg	Daily – max 40 mg unless on maintenance steroid tablets when max dose is 60mg	
Hydrocortisone (children who are unable to retain oral medication)	IV – bolus	2-12 years	4 mg/kg	4 hourly 9.8.4	
	IV – bolus	>12	100 mg	6 hourly	
Magnesium	Nebuliser	>2 years	150mg to each combi-neb in the 1 st hour – in acute severe asthma symptoms-sats <92% 9.8.7		
Magnesium	IV – infusion	All	Up to 40 mg/kg/day (max 2g) 9.9.3		

Notes

Investigations

- Monitor O₂ saturations continuously 9.7.2
- Attempt to measure peak flows on all children aged 5 years and above 9.7.3
- Record peak flow rate 4 times daily, before and (15-30 minutes) after each dose of Salbutamol (when awake) 9.4
- Blood gases should be performed in children who are in the severe group
- When inserting an IV cannula take a blood sample to measure serum electrolytes. Serum potassium levels are often low after multiple doses of β_2 agonists and should be replaced.
- Patients on IV treatment will require twice daily electrolyte monitoring & continuous ECG monitoring
- Chest x-rays should only be done if clinical signs indicate pneumonia or pneumothorax (rare)
- If the patient has had 3-4 courses of oral steroid over the year – BP, urine or blood sugar, and growth should be monitored. 7.5.3

Drug Notes

- Stop long acting β_2 agonist when starting short acting β_2 agonist at 4hourly or more frequently 9.8.2
- Repeat the dose of prednisolone in children who vomit and consider intravenous steroids in those who are unable to retain orally ingested medication 9.8.4
- **DO NOT** give sedation or antihistamines in the acute phase
- Continue inhaled steroids, if starting them do so before discharge 9.8.4
- Antibiotics should **only** be given if there is convincing evidence of bacterial infection – fever, neutrophillia, radiological changes, signs of consolidation 9.8.5
- Low oxygen saturations after initial bronchodilator treatment selects a more severe group of patients 9.7.2
- Check a baseline lactate when starting IV therapy, due to concerns about salbutamol toxicity
- If requiring IV fluids give $\frac{2}{3}$ of maintenance
- Omit loading dose of aminophylline if already on theophylline 9.9.2
- Monitor plasma-theophylline when on IV aminophylline 9.9.2
- ECG monitoring is mandatory for all intravenous treatments (KCl \pm Salbutamol/ Aminophylline/Magnesium Sulphate) 9.9.1 & 9.9.2
- When clinical signs and peak flow rates have shown sustained improvement for 6 to 12 hours intravenous treatment can be reduced gradually and withdrawn
- Tapering is unnecessary unless the course of steroids exceeds 14 days. 9.8.4

Follow up & Discharge Care 9.9.7

- Discharge when stable on 3-4 hourly inhaled bronchodilators that can be continued at home, Peak Flow should be >75% of best or predicted and SpO₂ >94% in air 9.9.7
- Asthma education for child & parents – use asthma discharge checklist
- **All families must be given a Personalised Asthma Action Plan** (management plan)
- Ensure that information is given about management for the first few days of discharge (Going home with Asthma Plan)
- Children should be followed up by GP/asthma nurse within 48 hours of discharge.
- Primary care should be notified within 24 hours of discharge.

Based on SIGN158 <https://www.sign.ac.uk/sign-158-british-guideline-on-the-management-of-asthma.html>
Numbers in red are referenced sections