Severe Asthma Management

Modified to avoid nebulised therapy unless life threatening

Superscript[numbers] - see "Severe Asthma Notes"

Continuous O2 sats monitoring, heart and resp rate monitoring & assessment
Oxygen Saturation ≤ 92%: **Give oxygen via nasal prongs** at 2-3 liters per minute

Initial Assessment

Life threatening asthma

Give nebulised salbutamol PLUS ipratropium together THREE TIMES IN 1st HOUR[1]

Oxygen flow rate >6L/min
Make up to a volume of 4 mls. No saline needed[2]

All ages		
Salbutamol 5mg/ml 10mg (2 ml)	OR	Fenoterol 1mg/ml 2mg (2 ml)
PLUS		
Ipratropium 0.25mg/ml 500ug (2 ml)		

Not Improving

Continuous nebulisation[5] for 1hr
Start with 6ml of either salbutamol 5mg/ml solution or fenoterol 1mg/ml solution
AND proceed directly to next step

For all patients, while above in progress:
Establish IV access
Oral **prednisone** (2mg/kg, max dose 40mg).
If vomiting or unable to take oral: IVI dexamethasone 0.6mg/kg
AND
Single dose IVI $MgSO_4$ 50% solution (2mmol/ml)
0.1ml/kg (50mg/kg) (max 2g) in 20mls saline[3] over 20 minutes[4]

Continuous assessment.
If category of asthma changes, move between inhaled therapies

Not improving but not life threatening

Severe Asthma

Multi-dosing

With salbutamol Metered Dose Inhaler (MDI) + spacer

REPEAT THREE TIMES IN 1st HOUR

All ages: 10 puffs
Administer 1 puff at a time via spacer allowing at least 6 breaths per puff.
Shake inhaler between each puff.

Good response

Continue salbutamol metered dose inhaler + spacer multi-dose (10 puffs) up to hourly

Single dose intravenous salbutamol 15ug/kg in 10mls saline[6] over 10 minutes. Review diagnosis. Consider pneumothorax. Blood gas

Not improving
CO_2 > 4.5
OR CO_2 rising

Salbutamol load[7] 5-10 ug/kg/min.
1mg/ml solution at 0.3-0.6ml/kg/hour for 1 hour
Then
Salbutamol infusion[8] 1-5 ug/kg/min.
1mg/ml solution at 0.06-0.3ml/kg/hour

Further ICU treatment[9, 10]

SEVERITY OF ASTHMA:

Life threatening asthma: *1 or more of following features*:

- Cyanosis, O_2 saturation <80% or PaO2 < 8 kPa
- Impaired speech or feeding
- Peak Expiratory Flow (PEF) < 33%
- Feeble respiratory effort or silent chest
- Bradycardia, dysrhythmia or hypotension
- Exhaustion, confusion or coma
- Normal PaCO2 (4.6–6.0 kPa)

Severe asthma: 1 or more of following features:

- O_2 saturation <90%
- Marked tachycardia
- Pulsus paradoxus
- Impaired speech or feeding
- Peak Expiratory Flow (PEF) < 60%
- Reduced air entry
- Previous ICU admission

Mild-moderate asthma: *All of the features below*:

- ✓ No cyanosis AND O_2 saturation >90% AND
- ✓ Normal conscious level AND
- ✓ Good air entry AND
- ✓ No marked tachycardia AND
- ✓ No pulsus paradoxus AND
- ✓ Normal speech & feeding AND
- ✓ PEF > 60%
- ✓ No previous ICU admission AND

GUIDES TO ASSESSING TREATMENT RESPONSE

GOOD response features include:	**INCOMPLETE/POOR response** features include:
No tachypnoea, minimal wheeze, reduced/no recessions, reduced work of breathing, able to speak and feed, PEF > 80%, O_2 saturation > 94% in room air	Tachypnoea, wheeze, recessions, increased work of breathing, impaired speech or feeding, PEF < 80%, O_2 saturation < 94% in room air

Severe Asthma Notes

1. If nebulization is needed this should be done in a single bed cubicle preferably with negative pressure ventilation and with staff wearing appropriate PPE for aerosol generating procedures.
2. A higher dose of active nebulisation than usual is possible with minimal air entry, as very little of the medication is reaching the lungs. Use salbutamol 5mg/ml: 10 mg (2ml) (or fenoterol 1mg/ml: 2mg; 2 ml) + Ipratropium 0.25mg/ml: 500ug (2ml) without the addition of any saline.
3. Make up to a total volume of 20mls and give through syringe driver at 60 ml/hr.
4. If IV magnesium has good effect a continuous infusion can be continued. Use $MgSO_4$ 50% solution (2mmol/ml) at 0.06ml/kg/hour (30mg/kg/hour) to keep Mg between 1.5 and 2.3 mmol/L.
5. Continuous nebulised salbutamol can be best achieved by refilling the nebuliser well using a cut feeding tube to prevent any disconnection of continuous oxygen delivery. Refill contents up to 6ml when 2ml remains.
6. Make up to a total volume of 10mls and give through syringe driver at 60 ml/hr.
7. Load children with salbutamol even if they have already received the smaller single dose IV salbutamol over 10 minutes.
8. A patient must be closely monitored during salbutamol infusion with K^+ and lactic acidosis measured 6 hourly.
9. High flow oxygen and CPAP are considered high risk for aerosolization of secretions that may spread SARS-Coronavirus-2 and should be avoided if possible.
10. There is no role for aminophylline outside ICU. In ICU it may occasionally have a role to prevent intubation if all other measures have failed.