





Management of asthma exacerbations in children

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- Asthma exacerbations/attacks are an emergency
- The primary goal of managing asthma exacerbations is to save lives







The normal lung









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Chronic inflammation which leads to the tendency to over-react to various agents/triggers

- Viral Upper Respiratory Tract infections (URTI)
- Air pollutants- tobacco smoke, smoke from cooking, burning rubbish, candles, car fumes, aerosols etc
- Food (allergies)
- Poor adherence to controller medications
- Seasonal changes: rains (cold), windy (dust), pollen
- Extreme of emotions- anger and excitement
- Exercise
- Extreme stress





The airway during an exacerbation

During an exacerbation,

a) Acute on chronic inflammation in response to the triggers

Features of inflammation

- Swelling
- Redness
- Pain
- Loss of function
- Heat





NORMAL AIRWAY

IRRITATED AIRWAY



Asthmatic airway







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History taking

- Cough
- Difficulty in breathing
- Chest pain/tightness
- Wheezing

A patient may have one or more of the above signs and symptoms

In addition, ask

- Timing of onset and cause
- Severity of symptoms- exercise, speech, sleep
- Any symptoms of anaphylaxis-itchy skin, eyes, swollen eyes
- All current reliever and controller medications (dose, devices, recent changes, adherence)



Examination

Remember, the primary goal is to save life. Focus on life-saving signs first.

- General condition of the patient: level of consciousness, posture, ability to talk/complete sentences
- Check airway, breathing, circulation
- Cyanosis/pulse oximetry for SpO2
- Respiratory rate
- Audible wheeze
- Signs of respiratory distress: lower chest indrawing, use of accessory muscles
- Pulse rate
- Blood pressure
- Measure Peak Expiratory Flow- degree of obstruction



Determine the level of severity



- Mild
- Moderate
- •Severe
- •Life threatening/near death

Note: Status asthmaticus is an outdated term



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Life-threatening asthma



- **Clinical signs**
- Silent chest
- Cyanosis
- Poor respiratory effort
- Hypotension, bradycardia
- Exhaustion
- Confusion or drowsiness

Measurements

■SpO₂ <90%

PEFR <33% of best or predicted





Severe asthma exacerbation

Clinical signs

- Talks in words (Unable to complete sentences)
- Agitation
- Sits hunched forward
- Use of accessory muscles
- Tachycardia: PR >140/min in <5yrs;</p>

PR >125/min in <5yrs

Tachypnoea: RR >40/min in < 5yrs; >30/min in >5yrs

Measurements

- ► SpO₂ <90%
- PERF ≤50% of predicted or best



Moderate asthma exacerbation

Clinical signs

- Able to talk in phrases
- Prefers sitting to lying down
- Not agitated.
- Accessory muscles not used
- Tachypnoea
- Mild tachycardia: 100-120b/min
- Reduced air entry

Measurements

- ► SpO₂ 90-95%
- PERF ≥50%



Mild asthma exacerbation



Clinical signs

- Able to talk in sentences
- Not agitated
- Pulse rate not increased
- Respiratory rate may be increased
- Mild wheeze

Measurements

- SpO₂ >94%
- PERF ≥70%









Remember, the primary goal is to save life, so focus on managing life-threatening problems.

- 1. Low SpO2 (<90%) if present
- 2. Relieve the obstruction and then

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- 3. Prevent progression of the exacerbation
 - Give corticosteroids
 - Remove/withdraw from the trigger as applicable





Medication

Relievers- to relieve the obstruction Short-acting beta agonists (SABA)



Inhaled Salbutamol

- Use metered-dose inhaler using a spacer 4-10 puffs every 15-20 minutes X 3 doses
- Nebulised Salbutamol
 - ≻Children less than 5 years -2.5mg in 5mls of NS
 - ≻Older children and adolescents- 5mg in 5-10mls of NS



Metered-dose inhalers and spacers









Where there is no spacer: you can make one









How to use a metered dose inhaler with a spacer

Spacer with a facemask ≤ 5years)

Spacer with a mouthpiece > 5 years)



Use of spacer device and face mask to give bronchodilator treatment. A spacer can be made locally from a plastic soft-drink bottle.

Source: Guidelines for the management of common childhood illnesses (WHO 2013)





If no improvement

Step 2: Salbutamol +Ipratropium bromide

Dose: <2yrs 0.125mg; >2 yrs 0.25mg per dose Give every 20 min x 1-2 hrs, then 4 – 6 hrly and wean off OR

Salbutamol +Atropine 0.03-0.05mg/kg (Max 2.5mg/dose)

<u>Step 3</u>: **IV Magnesium Sulphate** Dose 25-50mg/kg/dose (max 2g)

Step 4: IV Aminophylline (ICU) Avoid sedatives





- Prednisone or prednisolone, oral, 1-
 - 2mg/kg/day; max 40mg/day for 3-5 days. No need to taper

OR

• Hydrocortisone (IV), 5mg/kg 6hrly, if unable

to take orally





Complications

Respiratory failure or arrest.

- CNS injury
- Pneumothorax
- Pneumomediastinum
- Cardiac arrest
- Toxicity from medications-especially SABA





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Antibiotics – not necessary except if there is evidence of a bacterial infection (19% of cases, Nantanda et.al 2013)

Ensure adequate hydration

Plan discharge and follow up care (1-2 weeks)







- Assess need for controller medication- daily inhaled corticosteroids
- Continue with medication at home
- Train on inhaler technique
- Educate on trigger avoidance
- Review in 7-14 days







- 3 years old boy.
- Runny nose for 2days
- Cough 2 days
- Breathing difficulties 1 day
- Mild fever.
- 4th time in 6 months that he has got such symptoms.
- Home treatment: Amoxicillin, but he is no improvement





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Assessment

- Feeding well
- Had wheezing
- Triggers -- it had rained that day
- Other symptoms- itchy eyes
- No visible cyanosis but SpO2 =88% T=37.2 C Wt-14kg
- Agitated/irritable
- RR=66 breaths/minute
- Pulse rate=146 beats/minute
- Sub-costal and intercostal recession

Conclusion: Severe acute asthma exacerbation 25



Oxygen therapy 2L/minute Inhaled Salbutamol 3 puffs using a spacer with a mask X3 in one hour

Tab Prednisolone 15mg (3 tablets)

By the end of the 3rd dose of Salbutamol SpO2- 97% RR=46 breaths/minute **HR=152** No subcostal or intercostal recession







- Comprehensive assessment for possible asthma
- Discharge on Salbutamol inhaler 3 puffs every 6-8 hours for 3 days
- Tab Prednisolone 15 mg once a day for 2 days
- Inhaled Beclomethasone 50micrograms twice a day
- Trained on how to make a bottle spacer and use
- Educated on trigger avoidance

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Review in 7 days (come with all the medicines and devices)



