



Primary management of acute asthma

Dr Do-a-lot discusses asthma treatment with her students.

Inflammation characterises **chronic asthma**. The treatment, usually with inhaled glucocorticosteroids, aims to control inflammation. Bronchodilators are used only when necessary.

In an **acute asthma attack**, treatment is aimed at providing oxygen and relieving airflow obstruction with bronchodilators as quickly as possible. Glucocorticosteroids are given early in treatment, but they take time to have a clinical effect.

Dr Do-a-lot goes on to remind her students of the **physiology** of respiration, pointing out the central fact that oxygen is essential for life.

She draws a simple sketch to illustrate the cardio-respiratory system, where the heart and lungs function as a pump and bellows to make oxygen (O_2) available to cells so that they can metabolise (tissue respiration), simultaneously expelling carbon dioxide (CO_2) as a waste product.



Sketch depicting the cardio-respiratory system and tissue respiration.

What is an asthma exacerbation?

An acute asthma attack, or asthma exacerbation, may be described as a progressive or abrupt worsening of asthma symptoms including shortness of breath, coughing, wheezing or chest tightness associated with a decrease in airflow that can be quantified and monitored by measurement of lung function by means of peak expiratory flow (PEF) or spirometry, and requiring emergency room treatment or systemic glucocorticosteroids for management.

References:

1. Guideline for the management of acute severe asthma in adults: 2012 update. SAMJ March 2013, Volume 103, No. 3
2. Guidelines for the management of chronic asthma in adolescents and adults. Laloo, Ainslie, Wong, Abdool-Gaffar, Irusen, Mash, Feldman, O'Brien and Jack. Working group of the South African Thoracic Society. SA Family practice 2007;49(5):19-31

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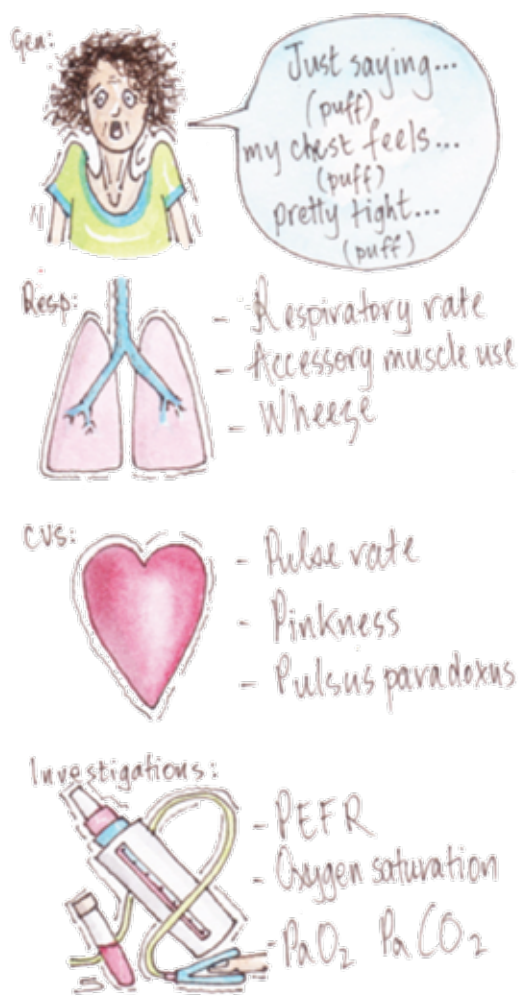
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Signs and symptoms of an asthma exacerbation:

Disruption of the balance of the exquisitely sensitive cardio-respiratory system is potentially life-threatening and results in immediate physiological responses.

In an asthma exacerbation there is obstruction of airflow at the bellows end of the system that results in decreased oxygen availability (**hypoxaemia**) and decreased excretion of CO_2 . It follows that the **symptoms of acute asthma include cough, a tight chest, wheeze and shortness of breath**, as airflow is obstructed due to airway narrowing as a result of inflammation and bronchoconstriction. As the body responds to restore the balance, it stands to reason that the signs of an acute exacerbation involve the lungs and the cardiovascular system. It is important to be able to recognize the signs in order to be able to assess the severity of an exacerbation as well as to gauge the response to treatment. Dr Do-a-lot describes how a patient with an asthma exacerbation can be assessed using the following headings: 'general'(gen), 'respiratory' (resp), 'cardiovascular' (CVS) and 'investigations'. She provides them with a sketch (below) as a reminder.



Assessment of a patient with an asthma exacerbation

Management of an asthma exacerbation:

Considering that the symptoms and signs of an acute asthma attack are a direct response to a decrease in oxygen supply, it follows that the best way to start treatment of an asthma exacerbation is by **sitting** the patient in a chair to allow them to breathe comfortably, and providing with them **oxygen** to inhale through a 40% face mask or nasal cannula (if oxygen is available).

Take an initial **history**, and **examine** the patient. Always consider a **differential diagnosis** and **asthma complications** (like pneumonia, atelectasis, pneumomediastinum or pneumothorax) when making an assessment.

The patient requires immediate **bronchodilation** to open the narrowed airways. Prepare a nebuliser or metered dose inhaler with a spacer. A short-acting beta-2-agonist (SABA) like salbutamol or fenoterol is first-line treatment. An anticholinergic agent like ipratropium bromide may be added.

Narrowed airways in asthma are not only the result of smooth muscle spasm causing bronchoconstriction. The mucous membrane lining the inner aspect of the airway becomes inflamed and swollen and produces mucous.

Give systemic **glucocorticosteroids** to treat inflammation, and prevent a relapse of the exacerbation. Glucocorticosteroids may be given orally depending on the condition of the patient.

Antibiotics are only indicated if there is evidence of a bacterial infection.

Once the patient is seated with oxygen, a bronchodilator and a dose of glucocorticosteroids **reassess** their condition every 15 to 30 minutes.

If there is a good response to treatment and the patient is stable you may consider **discharging** them. They should not leave the clinic without a **course of oral glucocorticosteroids**, **review of their current controller and reliever medications**, **education regarding technique, adherence, triggers, peak flow and self-management**, a written asthma management plan, and a referral for follow up.

If the response is poor refer or transfer the patient. They may require admission to an **intensive care** unit. Further treatment may include the following: **intravenous magnesium sulphate**, **intravenous aminophylline** and **intravenous salbutamol**.

Dr Do-a-lot sets the students the task of making a simple, illustrated chart of the stepwise first-line treatment of an asthma exacerbation in an adult which might be placed in pharmacies or primary care clinics to assist healthcare workers should they need to manage an acute asthma attack.

She refers them to the referenced adult acute asthma guidelines. Some of the important tables and algorithms from the guidelines are reproduced below.

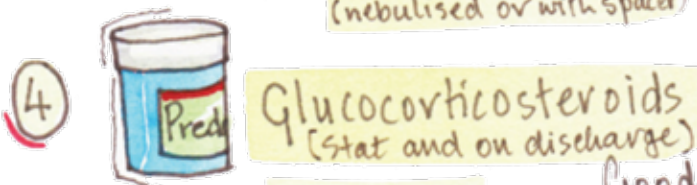
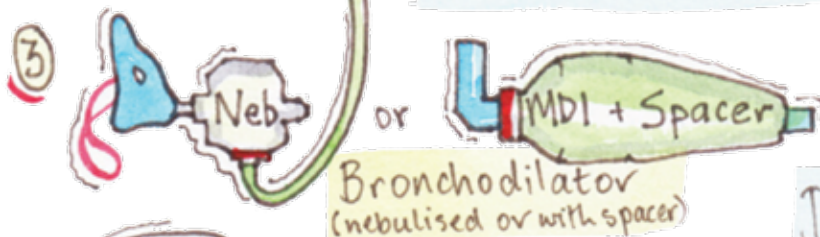
Management of Acute Asthma



+ Initial history + Examination

Assess:

- General
 - Alertness
 - Position
 - Speaking
- Respiratory
 - Respiratory rate
 - Accessory muscle use
 - Wheeze
- Cardiovascular
 - Pulse rate
 - Pinkness
 - Pulsus Paradoxus
- Investigations
 - PEFR
 - SaO₂
 - PaO₂ PaCO₂



Discharge

- Check medications
- Check technique
- Check adherence
- Educate
- Refer for followup

Good response

Poor response

Refer or
Call ambulance

Poster for the management of an asthma exacerbation.