Medical Emergencies – Asthma

Core Subject

Aims:
• To give an overview of asthma including its aetiology, risk factors and prevalence.
• To give an overview of dental considerations that need to be taken into account when treating a patient who has asthma.
• To give an outline of how to manage a patient who has an asthma attack in the dental surgery.

Objectives: On completion of this verifiable CPD article the participant will be able to demonstrate, through completion of a questionnaire, the ability to:
• Identify the prevalence of asthma.
• Identify some dental considerations that need to be taken into account when treating a patient who has asthma.
• Identify the drugs that are used to treat and manage asthma.
• Know how to deal with an acute asthma attack should one occur in the dental practice.

Introduction

Asthma is a condition which affects a person’s airways, the tubes that carry air into and out of their lungs (bronchi or bronchioles). People who suffer from this medical condition are sensitive to certain triggers or substances which can cause their bronchioles to become inflamed and swollen which reduces the amount of air that can pass through them. Sticky mucous or phlegm may also be produced resulting in the person coughing, wheezing and being unable to breathe. During asthma attack the patient suffers from constriction of the bronchioles of the lungs.¹

Asthma has been described as a “serious global health problem that has steadily increased in prevalence during the past two decades.”² In the UK, there are currently 5.4 million people receiving treatment for asthma. That is 1 in every 12 adults and 1 in every 11 children. Asthma in adults is more common in women than men. There were 1,131 deaths from asthma in the UK in 2009.³

An estimated 75% of hospital admissions for asthma are avoidable and as many as 90% of the deaths from asthma are preventable.⁴ The statistics for the prevalence of asthma indicate that it is likely that the dental care professional will be frequently dealing with patients who suffer from this potentially serious medical condition. It is
therefore important that the dental team are fully aware of this medical condition, how to avoid potential triggers, and how to cope with an asthmatic patient if they should have an asthma attack in the surgery.

**Aetiology (cause) of Asthma**

There are many potential contributing factors to the development of asthma which include the following:

- Asthma is more likely in individuals who have a family history of eczema or other allergies or a family history of asthma.
- Research has demonstrated that smoking during pregnancy can be a contributing factor.
- Passive smoking.
- Environmental pollution.
- Lower respiratory infections.
- Early sensitivity to airborne allergens.

**Medications Used to Treat Asthma**

Asthma medicines are usually given by inhalers, which are devices that deliver the drug directly into the airways through the mouth when air is breathed in. Inhaling a drug is an effective way of taking an asthma medicine as it goes straight to the lungs. This means that very little of the medication ends up in other areas of the body.

The drug classes used to treat asthma can be identified by their colour:

1) **Blue: Reliever – Short-Acting Beta-Agonist.**

The reliever inhaler is often blue and works by relaxing the muscles that surround the narrow airways (Figure 1). This enables the airways to open wider, making it easier to breathe again. Some examples of reliever inhalers are Salbutamol and Terbutaline.
2) Brown/Orange/Burgundy - Preventer Corticosteroid

The preventer inhalers usually contain a small amount of steroid (Figure 2). Taken over a period of time, these inhalers help to prevent acute asthma attacks occurring by reducing the amount of inflammation in the airways. Not all asthmatics will be prescribed a preventer inhaler as it depends on the frequency that the preventer inhaler is required. Examples of preventer inhalers are Budesonide, Fluticasone and Mometasone.⁶

3) Purple/Red and White/Maroon - Long acting Beta-Agonist

If the above therapies do not control an individual's asthma, a long acting reliever may be prescribed or an inhaler which contains combined inhaled steroid and a long-acting bronchodilator in one device (combination inhaler. Figure 3). Examples of long acting relievers are Flormoterol and Salmeterol. Combination inhalers are usually purple, red and white or maroon and examples include Seratide, Symbicort and Fostair.⁶

The long acting relieving inhaler is only used in combination with the preventer inhaler.⁶
4) Preventer Medicines

NHS Choices state "If the above treatments for asthma are still not successful, additional preventer medicines will be tried. Two possible alternatives include:

- Leukotriene receptor antagonists (Montelukast): tablets that block part of the chemical reaction involved in inflammation of the airways
- Theophyllines: tablets that help widen the airways by relaxing the muscles around them."

If asthma is still uncontrolled, regular oral steroids may be prescribed.

Nebulisers

A nebuliser is usually used in an emergency situation to administer a high dose of reliever medication through a mist of medication, which is then breathed in through a mask or a mouthpiece. Some asthmatics may have their own nebulisers at home.
Dental Considerations

Medical History

Patients with asthma should be identified by the medical history questionnaire and the frequency and type of medication will give the clinician an indication to the degree of risk that the patient is under. The Resuscitation Guidelines Council (2006, revised 2012) states “Those at highest risk of having an emergency in the dental surgery include those taking oral medications in addition to inhaled medication and those who regularly use a nebuliser at home. Those who have required oral steroids for their asthma within the last year and those admitted to hospital with asthma within the last year represent high risk patients.”

Patients can be asked to make their reliever inhaler available in case of an onset of asthmatic symptoms during dental treatment. The appointment times should not interfere with the patients medication times.

Potential Triggers in the Dental Surgery

An individual's asthma may be triggered by internal or external sources. If exposed to a trigger, the airways become irritated, which can lead to the onset of asthma symptoms. Examples of potential triggers are:

- pollens
- dustmites
- cockroaches
- pet fur
- mould
- products containing sulfites
- cold air
- exercise
- tobacco smoke
- excitement, stress, anxiety
- anti inflammatory drugs
- viral infections.

Patients should be questioned about potential triggers as dentifrices, fissure sealants, tooth enamel dust, methyl methacrylate, fluoride trays and cotton rolls have been known to trigger attacks. It is therefore important that the dental team are aware of any previous history of attacks being triggered in the dental surgery. In addition, the patient may be allergic to sulfites which are widely used as a preservative in the food and beverage industry. Sulfites are also used as an antioxidant in local anaesthetics containing vasoconstrictors and therefore those local anaesthetics may be contraindicated. Ibuprofen and other anti inflammatory drugs have also been known to trigger attacks.

Stress and anxiety can precipitate an asthma attack. It is therefore important that patients are kept as calm as possible and that waiting times are kept to a minimum. For very nervous patients conscious sedation may prove helpful.
Oral Health

The patient should be advised in preventative oral care which will include oral hygiene instruction and dietary advice. If the patient uses a steroid inhaler they may be more at risk from oral candidiasis (thrush). If the patient suffers from a dry mouth as a result of their asthma or medication they may be more at risk from dental caries. The patient may be advised to rinse after the use of the inhaler.

Dealing with a Medical Emergency

During an asthma attack breathing becomes difficult for the patient and they become distressed. The diagram below shows the difference between a normal and an asthmatic bronchiole (Figure 5). The attack may be mild, moderate or severe. If the attack is severe cyanosis may occur with the lips becoming blue.

Signs and Symptoms

The signs and symptoms of a patient who is suffering from an asthma attack could include:

- Breathlessness
- Complaining of a tight chest
- Wheezing or coughing
- Agitated
- Increased pulse
- Talking may become difficult
- Lips and fingernails can turn blue
- Skin around neck and chest may appear tightened
- Nostrils may flare as patient attempts to breathe

Clinical features of **acute severe asthma** in adults include:

- Inability to complete sentences in one breath.
- Respiratory rate > 25 per minute.
- Tachycardia (heart rate > 110 per minute).

Clinical features of **life threatening asthma** in adults include:

- Cyanosis or respiratory rate < 8 per minute.
- Bradycardia (heart rate < 50 per minute).
- Exhaustion, confusion, decreased conscious level.

If a patient suffers from an asthma attack the following steps should be taken:

- Offer them their reliever inhaler (usually blue). Most attacks will respond after a few activations. If the patient does not have their inhaler the Salbutamol inhaler (100micrograms/dose) should be used from the emergency drug kit.
- Loosen any tight clothing.
- Allow the patient to sit down but do not lie them down.\(^{17}\)
- If the patient is unable to use the inhaler effectively, additional doses should be given through a large-volume spacer device.
- If the patient does not respond rapidly, or any of the features of severe asthma are present, an ambulance should be called.
- If bronchospasm is part of a more generalised anaphylactic reaction and there are 'life-threatening' signs, an intramuscular injection of adrenaline should be given.
- Whilst awaiting ambulance transfer, oxygen (15 litres per minute) should be given.
- If the patient becomes unresponsive be ready to start CPR procedures as necessary.

The Resuscitation Council state that "The perceived risk of giving patients with chronic obstructive pulmonary disease too much oxygen is often quoted but this should not distract from the reality that ALL sick, cyanosed patients with respiratory difficulty should be given high flow oxygen until the arrival of the ambulance."\(^{13}\)

**Conclusion**

With the increase in the prevalence of asthma it is likely that the dental nurse may come into contact with patients who are asthmatic. Patients with asthma may have acute attacks that are triggered by internal or external factors. It is important that the dental team are aware of any potential triggers for patients and that they know how to manage an asthma attack should it occur in the dental surgery.

- More information on asthma can be found in the non-verifiable CPD section of the website.
- Please remember to regularly check the Resuscitation Council Guidelines for Medical Emergencies in Dental Practice. It is recommended that the dental team should practise together at least once a year in simulated medical emergencies so that everyone knows their role should a medical emergency arise.

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References
7. Inhaler image