By Eamonn Brady MPSI

Asthma

Asthma is a long-term condition that can cause a cough, wheezing and breathlessness. The severity of the symptoms varies from person to person.

In Ireland, respiratory diseases are the third commonest long-term illness group after cardiovascular and musculoskeletal diseases, with asthma being the second most common single condition reported.

Causes

With asthma, the airways become over-sensitive and react to things that would normally not cause a problem, such as cold air or dust. Muscles around the wall of the airway tighten up, making it narrow and difficult for the air to flow in and out. The lining of the airways swell and sticky mucus is produced. This makes it difficult for air to move in and out and why the chest has to work so much. Tightening of muscle around the airways can happen quickly and is the most common cause of mild asthma. The tightening of muscle can be relieved with a reliever inhaler (usually a blue inhaler like a Ventolin® inhaler). However, the swelling and build-up of mucus happen more slowly and need a different treatment. This takes longer to clear up and is a serious problem in moderate to severe asthma.

Facts about asthma

The exact cause of asthma is not known. According to the Asthma Insights and Realities in Ireland (AIRI) report in 2002, 470,000 people have asthma in Ireland meaning approximately one in 8 of the population suffer from it. Ireland has the fourth highest prevalence of asthma in the world after Australia, New Zealand and the UK. The Irish Pharmaceutical Health Care Association (IPHA) reported there were 600,000 GP consultations for asthma in 1997 and it is likely this figure has risen since.

There is a strong genetic link. If a parent has asthma, the risk of their child getting it doubles. If both parents have it, it doubles again. And, if one in a family has asthma, the risk of the other children getting it increases, but it is not known by how much. In adults, it is more common in women than men. Asthma can start at any age, but most commonly starts in childhood. Adult onset asthma may develop after a respiratory tract infection. In many cases, asthma disappears during teenage years. Many asthma sufferers also suffer from other allergic conditions such as hayfever, eczema and hives. Asthmatics who also have hayfever find that their symptoms get worse during hayfever symptoms. In fact, research by allergy UK found that 69% of asthmatics who also had hayfever found their symptoms worsened during hayfever season. Asthma has got more common in recent years. The incidence of asthma among 13 and 14 year olds has increased by 40% from 1995 to 2003. The exact reason for this is not known. Many aspects of modern living such as changes in housing, diet and a more sterile home environment may have contributed to the rise in asthma over recent decades. This theory is called the 'hygiene hypothesis'.

Facts about asthma in children

Asthma in children is more common in boys than girls. Children who develop asthma at a very young age are more likely to 'grow out' of the condition as they get older. If asthma is moderate to severe during childhood, it is more likely to continue into adulthood.

During the teenage years, the symptoms of asthma disappear in about three-quarters of all children with the condition.

Known risk factors for the development of asthma in children include:

- a family history of asthma, or other related allergic conditions (known as atopic conditions) such as eczema, hayfever or allergic conjunctivitis
- developing another atopic condition
- being exposed to tobacco smoke, particularly if the child's mother smoked during pregnancy
- being born prematurely
- being born with a low birth weight

A child with asthma should be taught to recognise the initial symptoms of an asthma attack, how they should respond, and when they should seek medical attention. Some children are less likely to develop asthma than others. Studies have found those children who are given fewer antibiotics and those who live on or near farms have less asthma than children with different backgrounds. Medical researchers explain this with the 'hygiene hypothesis'.

The 'hygiene hypothesis'

The 'hygiene hypothesis' is a theory that lack of exposure in early childhood to infectious agents means that the child's immune system has not been activated sufficiently during childhood. This lack of exposure is down to our super clean world of modern living including anti-bacterial washes, antibiotics and general sterility where children are not exposed to germs in a similar manner to previous generations of children. The theory is that because the immune system is "not activated" during childhood; this leads to the immune system becoming over sensitive to common substances such as pollen, dust-mite, animal fur; leading to the higher incidence of auto-immune conditions like asthma, hayfever and eczema in recent years. One of the first scientific explanations of this theory was by a lecturer in epidemiology from the London School of Hygiene and Tropical Medicine, David P Strachan, who published a paper on the theory in the *British Medical Journal* in 1989. He noticed that children from larger families were less likely to suffer from autoimmune conditions like asthma. Families have got smaller in the Western world over the last forty years meaning less exposure to germs and infections; it is over the same period that health authorities have seen an explosion in autoimmune conditions such as asthma. Further studies have been conducted since supporting the theory. For example, studies show that autoimmune diseases are less common in developing countries, however when immigrants from developing countries come to live in developed countries where living environments are more sterile, these immigrants suffer from increased levels of autoimmune conditions like asthma and the rate of autoimmune conditions like asthma increases the longer immigrants live in developed countries. It is a difficult to advise parents accurately on what is the best way to bring up their children in relation to this theory. All parents want the best for their children and common sense tells us all that cleanliness is important. No health care professional will be able to give you exact advice. In my opinion, a balanced view is to ensure children are administered important vaccines but "allow kids be kids", let children play outside with friends and try not to worry about them coming in contact with dirt and germs, but always be cautious with children with life threatening food allergies.

Symptoms of asthma

- Difficulty in breathing/shortness of breath.
- A tight feeling in the chest.
- Wheezing (a whistling noise in the chest).
- Coughing, particularly at night.
- Hoarseness

These symptoms may occur in episodes, perhaps brought on by colds or chest infections, exercise, change of temperature, dust or other irritants in the air, or by an allergy e.g. pollen or animals. Episodes at night are common, often affecting sleep.

Common triggers

Any-thing that irritates the airways and brings on the symptoms of asthma is called a trigger. Common triggers include house dust mites, animal fur, pollen, tobacco smoke, exercise, cold air and chest infections. Other triggers which are less common include non-steroidal anti-inflammatory drugs such as ibuprofen (Nurofen®) and diclofenic (Defene®, Diclac®), emotional factors such as stress, sulphites in some foods and drinks (found in certain wines and used as a preservative in some foods such as fruit juices and jam), mould or damp in houses and food allergies (eg) nut allergy.

What happens during an asthma attack?

During an asthma attack, something triggers inflammation, a natural biological process. Inflammation is one of the ways that the body's immune system fights infection. If the body detects a lung infection, it starts the process of inflammation. White blood cells engulf infection area to kill the infection and prevent it spreading. The white blood cells cause the airways to swell and produce mucus. In an asthmatic, the airways are over sensitive to the effects of inflammation. As a result, too much mucus is produced and the airways swell more than usual. Also, as a response to the inflammation, the muscles surrounding the airways begin to contract, making the airways narrower and narrower. The combination of excess mucus, swelling and contraction of the airways, makes breathing difficult and produces the wheezing and coughing that is associated with asthma.

Diagnosis of Asthma

The following are examples of questions asked by doctors to see if asthma is the problem:

- Is there a family history of asthma?
- Are symptoms frequent and do they affect quality of life?
- Has there been an attack or recurrent attacks of wheezing?
- Is there a regular night time cough?
- Does exercise trigger wheezing or coughing?
- Is there wheezing, chest tightness, or cough after exposure to airborne allergens or pollutants?
- Does the patient suffer from constant chest infections?
- Do chest infections take a long time to clear up?
- Are symptoms improved by when using a reliever inhaler?

Answering yes to a number of these questions may indicate that a person is suffering from Asthma.

The following tests are often done to confirm the diagnosis of asthma:

1. Spirometry is a simple breathing test that gives measurements of lung function. A spirometer is the device that is used to make the measurements. It is common to measure lung function with a spirometer before and after a dose of reliever inhaler to see if lung function has improved
2. Peak Expiratory flow rate (PEFR) is a breathing test. It uses a simple hand held device called a peak flow meter which a person blows into to measure lung function. The PEFR test is only suitable for children over five years of age
3. An exercise test to check if exercise worsens asthma symptoms

When to get immediate help?

The following are signs of a severe asthma attack:

- The reliever inhaler does not help symptoms at all.
- The symptoms of wheezing, coughing, tight chest are severe and constant
- Too breathless to speak
- Pulse is racing
- Feeling agitated or restless
- Lips or finger nails look blue

It is important to immediate medical help when these symptoms occur.

Non-Pharmacological Management

Asthmatics should be advised strongly not to smoke and to lose weight. Allergen avoidance measures may be helpful but the benefit of avoiding allergens such as dust mite, animal fur has not been proven in studies. Currently there is insufficient or no evidence of the clinical benefit of complementary therapy for asthma such as Chinese medicine, acupuncture, breathing exercises and homeopathy.

In Whelehans, we have found that some asthmatics claim Lyprinol® relieves their asthma symptoms. Lyprinol® is a potent omega 3 supplement made from muscle lipid extract. It is available in Whelehans. Some studies have shown the benefit of Lyprinol® in relieving asthma symptoms. However, more studies are needed before it is conclusively proven to benefit asthma and it should never be used as an alternative to prescription medication prescribed by your doctor.

Treatment

There is no cure for asthma. Symptoms can come and go throughout the person's life. Treatment can help control the condition. Treatment is based on relief of symptoms and preventing future symptoms and attacks from developing. Successful prevention can be achieved through a combination of medicines, lifestyle changes and identification and avoiding asthma triggers. Chesty cough mixtures such as Whelehans Special Cough Mixture and Exputex® contain an expectorant which liquefy mucus so it can be coughed up easier.

Reliever inhalers

A short-acting beta 2-agonist open up the airways. These work quickly to relieve asthma. They work by relaxing the muscles surrounding the narrowed airways. They most commonly come in inhaler form, they are commonly called relievers and are generally blue in colour. Examples of beta 2-agonists include salbutamol (Ventolin®, Salamol®) and terbutaline (Bricanyl®). They are generally safe medicines with few side effects, unless they are over used. It is important for every asthmatic to have a reliever inhaler. If an asthmatic needs to use their beta agonist inhaler too regularly (three or more times per week) should have their therapy reviewed by their doctor. The main side effects include a mild shaking of the hands, headache and muscle cramps. These usually only occur with high doses of relievers and usually only last for a few minutes. Not getting checked by your doctor when you need to excessively use short acting relievers have been associated with asthma deaths. This is not the fault of the reliever medication, but down to the fact that the person failed to get treatment for their worsening asthma symptoms. In exercise induced asthma, suffers are advised to use a reliever inhaler 10-15 minutes before they exercise, and again after two hours of prolonged exercise, or when they finish.

Preventer inhalers

Preventer inhalers are slower acting inhalers that reduce inflammation in the airways and prevent asthma attacks occurring. The preventer inhaler must be used daily for some time before full benefit is achieved. The preventer inhaler usually contains an inhaled corticosteroid. Examples of preventer medicines include beclometasone (Becotide®, Beclazone®), budesonide (Pulmicort®), and fluticasone (Flixotide®). Preventer inhalers are often brown, red or orange. The dose of inhaler will be increased gradually until symptoms ease. For example, an ashmatic may start on a beclamethasone 100mcg inhaler and may be put on a beclamethasone 250mcg inhaler if there is not sufficient improvement in symptoms. Preventer treatment is normally recommended if the person:

- has asthma symptoms more than twice a week
- wakes up once a week due to asthma symptoms
- has to use a reliever inhaler more than twice a week

Regular inhaled corticosteroids have been shown to reduce symptoms, exacerbations, hospital readmissions and asthma deaths. The majority of ashmatics require a dose of less than 400mcg per day to achieve maximum or near maximum benefit. Side effects are minimal at this dose. Smoking can reduce the effects of preventer inhalers. Preventers are very safe at usual doses, although they can cause some side effects at high doses, especially over long-term use. The main side effect of preventer inhalers is a fungal infection (oral candidiasis) of the mouth or throat. This can be prevented by rinsing the mouth with water after inhaling a dose. They may also cause a hoarse voice. Using a spacer can help prevent these side effects (see later in this article)

Long-acting reliever inhaler

If short acting bets 2-agonist inhalers and preventer inhalers are not providing sufficient symptom relief, a long-acting reliever (long acting beta 2-agonist) may be tried. Inhalers combining an inhaled steroid and a long-acting bronchodilator (combination inhaler) are more commonly prescribed than long acting beta 2-agonists on their own. Long acting beta 2-agonists work in the same way as short-acting relievers, but they take longer to work and can last up to 12 hours. A salmeterol (Serevent®) inhaler is an example of a long acting reliever inhaler used in Ireland. Long-acting relievers may cause similar side effects to short-acting relievers, including a mild shaking of the hands, headache and muscle cramps.

Long-acting reliever inhalers should only be used in combination with a preventer inhaler. Studies have shown that using a long-acting reliever on its own (without a combination corticosteroid) can increase asthma attack and can even increase the risk of death from asthma, though increased risk of death is small. In November 2005, the Food and Drug Administration in the United States issued an alert indicating the potential increase risk of worsening symptoms and sometimes death associated with the use of long acting beta 2-agonists. This is why you will only be prescribed this type of inhaler in combination with a corticosteroid inhaler; these are called combination inhalers and are perhaps the most effective asthma treatment available.

Combination inhalers

Examples of combination inhalers containing long acting beta 2-agonist and steroids include Seretide® and Symbicort®. Combination inhalers containing beta 2-agonists and corticosteroids can be very effective in controlling asthm. They have been shown to have better outcomes compared to leukotriene receptor antagonists such as montelukast (see later in article). Both treatment options lead to improved asthma control; however compared to leukotriene receptor antagonists, the addition of long-acting beta 2-agonist to inhaled corticosteroids is associated with significantly improved lung function, more symptom-free days, less need for short term beta 2-agonists, less night awakenings, and better quality of life. Although the magnitude of some of these differences is small.

Other Preventer medication

If treatment of asthma is still not successful, additional preventer medicines can be tried. Two possible alternatives include:

- leukotriene receptor antagonists (montelukast- brand name Singulair®): act by blocking part of the chemical reaction involved in inflammation of the airways
- theophyllines: helps widen the airways by relaxing the muscles around them

If asthma is still not under control, regular oral corticosteroids may be prescribed. This treatment is usually monitored by a respiratory specialist. Long-term use of oral corticosteroids has possible serious side effects, so they are only used once other treatment options have been tried. Theophylline is known to cause potential side effects, including headaches, nausea, insomnia, vomiting, irritability and stomach upsets. These can usually be avoided by adjusting the dose. Leukotriene receptor agonists do not usually cause side effects, although there have been reports of stomach upsets, feeling thirsty and headache.

Occasional use of oral corticosteroids

Most people only need to take a course of oral corticosteroids for one or two weeks. Once the asthma symptoms are under control, the dose can be reduced down slowly over a few days. Oral corticosteroids can cause side effects if they are taken for more than three months or if they are taken frequently (three or four courses of corticosteroids a year). Side effects can include:

- weight gain
- thinning of the skin
- osteoporosis
- hypertension
- diabetes
- cataracts and glaucoma
- easy bruising
- muscle weakness

To minimise the risk of taking oral corticosteroids:

- Eat a healthy, balanced diet with plenty of calcium.
- Maintain a healthy body weight.
- Stop smoking
- Only drink alcohol in moderation
- Do regular exercise

When can therapy be reduced?
Once control is achieved and sustained, gradual stepping down of therapy is recommended. Good control is reflected by the absence of night time symptoms, no symptoms on exercise and the use of relievers less than three times a week. Asthmatics should be maintained on the lowest effective dose of inhaled steroids, with reductions of 25-50% being considered every three months.

Spacer devices
Spacers are large plastic or metal containers with a mouthpiece at one end and a hole for the inhaler at the other. The medicine is puffed into the spacer by the inhaler and it is then breathed in through the spacer mouthpiece. Spacer devices in combination with metered dose inhalers (MDI) have a number of advantages: a) no need to co-ordinate inhaler activation with inspiration, b) more drug reaches the lungs and c) less drug in deposited in mouth so less possibility of side effects like oral thrush with corticosteroid inhalers . Some inhalers emit an aerosol jet when pressed. These work better if given through a spacer, which increases the amount of medication that reaches the lungs and reduce side effects. Some patients, especially children and elderly patients, find using inhalers difficult, and spacers can help. However, spacers are often advised even for patients who use inhalers well as they improve the distribution of medication in the lungs. Spacers are also good for reducing the risk of thrush in the mouth or throat with corticosteroid inhalers. When a spacer device is being used, only one puff of the inhaler must occur at a time. An example of a spacer device is a Volumatic® or an Aerochamber®.

Asthma deaths

Underestimating the severity of the fatal attack by the doctor, patient or relatives is considered to be the biggest cause of death in asthmatics. There were 92 asthma-related deaths in Ireland in 1999. The risk of dying from asthma increases with age and asthma-related deaths is extremely rare in children. Those at most risk of death are those who have severe asthma, obese patients, and those who have a history of not taking their asthma medication as advised by their doctor

Asthma and pregnancy

Medication used for asthma will not cause any problems for the developing baby in the womb. Due to the changes that take place in the body during pregnancy, asthma symptoms may change during pregnancy. For some women asthma improves, for others asthma worsens and for others asthma stays the same. The most severe asthma symptoms experienced by pregnant women tend to occur between the 24th and 36th week of pregnancy. Symptoms then decrease significantly during the last month of pregnancy.

Only 10% of women experience asthma symptoms during labour and delivery, and these symptoms can normally be controlled through the use of reliever medicine.

Asthmatics who are pregnant should manage their asthma in the same way as before pregnancy. The medicines used for asthma have been proven to be safe to take during pregnancy and when breastfeeding.

The one exception is leukotriene receptor antagonists (Singulair®). There is no evidence that it can harm babies during pregnancy and breastfeeding. However there is not enough evidence about its safety compared with other asthma medications.

However, if leukotriene receptor antagonists are needed to control asthma during pregnancy, the GP or asthma clinic may recommend that they are continued. This is because the risks to the patient and child from uncontrolled asthma are far higher than any potential risk from this medicine. Theophyline is often avoided during pregnancy and breastfeeding because of reports of irritability and apnoea (may cause a child to skip breathes) in the unborn child or the breast fed infant.

Disclaimer: Please ensure you consult with your healthcare professional before making any changes recommended

References available in Whelehans Pharmacy upon request

For comprehensive and free health advice and information call in to Whelehans, log on to **www.whelehans.ie** or dial 04493 34591. You can also e-mail queries to **info@whelehans.ie**.