High blood pressure and stroke

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Stroke Association

High blood pressure is the biggest single risk factor for stroke. This guide explains what high blood pressure is, the types of medication used to treat it and what you can do to lower your blood pressure.

What is high blood pressure?

Your heart pumps blood all around your body. Blood pressure is a measure of how strongly the blood presses against the walls of your arteries. If this pressure is too high it puts a strain on your arteries and your heart. If it's not controlled it can increase your risk of having a stroke or heart attack.

A diagnosis of high blood pressure means that your blood pressure stays high over a long period. The medical term for this is hypertension.

Your blood pressure can go up and down over the course of a day, such as during exercise or sleep. These short-term changes are not likely to cause stroke. But when your blood pressure stays high over a long period of time, this leads to damage to the blood vessels and can eventually cause a stroke.

High blood pressure is a common problem. There are 9.5 million people with a diagnosis in the UK. And for every 10 people diagnosed with high blood pressure, another seven don't know they have it. That is more than 5.5 million people living with untreated high blood pressure in England alone.

It usually has no symptoms so having it measured is the only way to tell if your blood pressure is high.

What is the link between high blood pressure and stroke?

Strokes due to a clot in the blood supply to the brain (ischaemic stroke)

High blood pressure puts a strain on all the blood vessels throughout your body, including the ones leading to the brain. This strain can damage your blood vessels, causing them to become harder and narrower, a condition called atherosclerosis. This makes a clot more likely to occur, which could cause a stroke or transient ischaemic attack (TIA or mini stroke).

Stroke due to bleeding in or around the brain (haemorrhagic stroke)

The extra strain that high blood pressure puts on your blood vessels may cause a weakened blood vessel to burst inside the brain, causing bleeding on and into surrounding tissues. This is called a haemorrhagic stroke.

Who is at risk of high blood pressure?

You are more likely to have high blood pressure if you have one or more of these risk factors:

- Age: the risk of having high blood pressure rises as you get older.
- Family history of high blood pressure.
- Ethnicity: people of African-Caribbean origin are more likely to develop high blood pressure.
- Eating too much salt.
- Being inactive.
- Being overweight.
- Drinking large amounts of alcohol.

High blood pressure can sometimes be caused by health conditions:

- Kidney disease.
- Diabetes.
- Obstructive sleep apnoea (interrupted breathing during sleep).
- Pregnant women can develop pre-eclampsia, which causes high blood pressure.
- Lupus (immune disorder).

Some medications can affect blood pressure including the combined oral contraceptive pill (combi pill) and steroids. Illegal drugs such as cocaine and amphetamines can also raise blood pressure.

Stress and high blood pressure
Feeling stressed can raise your blood pressure for a short time, but it isn't a direct cause of high blood pressure. However, if you're under stress you might eat unhealthy food, drink too much or lose out on sleep. All these things can eventually lead to high blood pressure. So it's a good idea to reduce your stress levels as part of a healthy lifestyle.

How is blood pressure measured?

Measuring your blood pressure is quick, simple and painless, and can be carried out at your doctor's surgery or at some pharmacies. A stethoscope, arm cuff, pump and dial was used until recently to measure blood pressure, but automatic devices with sensors and digital displays are now in common use.

Understanding your blood pressure reading

Your blood pressure reading is recorded as two numbers. The first number is the greatest pressure your arteries experience when your heart beats (this is called systolic pressure). The second number is the lower pressure when your heart relaxes between beats (diastolic pressure). Both pressures are measured in millimetres of mercury, written as 'mmHg'.

The ideal blood pressure is between 90/60 mmHg and 120/80 mmHg. Both numbers are equally important, and blood pressure is counted as being high if either number is high.

How is high blood pressure diagnosed?

You are usually diagnosed with high blood pressure if it is consistently higher than 140/90 mmHg.

If you have diabetes, you may be treated with medication if your blood pressure is consistently above 130/80 mmHg and you have any complications of diabetes such as eye or kidney problems.

Before diagnosing high blood pressure, your doctor may take a few readings over a period of days or weeks to make sure that the high reading is consistent over time. Some people can have a higher reading if they are feeling anxious about seeing a medical professional. This is sometimes called 'white coat effect'.

You may be given a machine that records your blood pressure at home at regular intervals over a 24-hour period, known as 24-hour monitoring, or ambulatory monitoring. Your doctor will then use a number of the readings to work out your typical blood pressure.

How often should my blood pressure be checked?

All adults should have their blood pressure checked regularly. If you have normal blood pressure, try to be checked at least once every five years, preferably more often.

Your blood pressure should be checked more frequently if it is nearer 140/90 mmHg, as you have a higher risk of developing high blood pressure. If you've had a high or borderline reading in the past, your blood pressure should be measured at least once a year.

Women taking the contraceptive pill, who are pregnant or taking hormone replacement therapy (HRT), also need to have their blood pressure checked more often.

And if you are already taking medication to control your blood pressure, you will need to have it checked regularly. You might be offered ambulatory or home monitoring.

If you wish to buy a blood pressure monitor, you can find information and a list of validated monitors on the British Hypertension Society website (see 'Other sources of help and information' later in this guide). If you are using a machine at home, you will usually be advised to take your blood pressure twice a day, at the beginning and the end of the day to start with.

If you are thinking of buying a home monitor, discuss with your doctor how it can help you achieve your target blood pressure.

How is it treated?

Many people can lower their blood pressure by making changes to their lifestyle. If you are overweight, losing some weight can make a big difference. Doing some more exercise, eating healthier food, and reducing alcohol can also cause a big improvement in blood pressure levels.

You may be advised to take medication, especially if you have some additional risk factors. To help you make a decision about medication, your doctor will assess your personal risk of developing stroke or heart disease in future. They look at whether your high blood pressure has caused problems in the body already. You may have a blood test, a urine test, and an electrocardiogram (ECG) to check for heart problems.

If your blood pressure is consistently above 140/90 mmHg (or 135/85 mmHg at home) but your overall risk of a stroke is low you'll be advised to make some changes to your lifestyle such as losing weight or stopping smoking.

If your blood pressure is consistently above 140/90 mmHg (or 135/85 mmHg at home) and your risk of stroke is high, you'll be offered medication to lower your blood pressure and advice about making lifestyle changes.

If your blood pressure is consistently above 160/100 mmHg, you'll be offered medication to lower your blood pressure, even if your risk of a stroke is low, as well as advice on making lifestyle changes.

Medication for high blood pressure

This guide can only give general information. You should always get individual advice about your own health and any treatment you may need from a medical professional such as a GP or pharmacist.

Tailoring your treatment

The medication you take will be tailored to your individual needs. The medication recommended for you at first will depend on your age and ethnicity.

You might take one type of medication or a combination of two or more types. This is because the drugs work in different ways, and rather than take more of one type, it can be more effective to take two or more different types.

You may need to try different combinations to find out which works best for you. If you need to take four or more different types of medication to control your blood pressure, you should be referred to see a specialist.

How long will I be on medication?

The aim of the medication is to keep your blood pressure low and stable over many years. This helps to keep your blood vessels healthy and reduce the risk of a stroke.

Some people may be advised to continue taking medication for high blood pressure for the rest of their lives. Talk to your doctor, pharmacist or stroke nurse to find out more about what is causing your high blood pressure, and the best treatment options for you.

Making changes to your lifestyle such as stopping smoking or losing weight can help to lower blood pressure. With support from your doctor or pharmacist, some people may eventually be able to reduce or stop the medication.

If you stop taking your medication, your blood pressure will rise. This means your stroke risk will go up. So if you are thinking of stopping your medication for any reason, it's a good idea to get help and advice from a medical professional.

If you are worried about side effects, ask for a medication review from your doctor or pharmacist. You should have regular blood pressure checks, and a medication review every year.

High blood pressure in pregnancy

If you have high blood pressure during pregnancy, your blood pressure will be monitored during pregnancy, labour and after the birth. If it's very high you may need to stay in hospital until it improves.

The most commonly used drug for high blood pressure in pregnancy is labetalol. If you can't take labetalol, methyldopa and nifedipine are possible alternatives. These are not licensed for use in pregnancy, but they can be offered along with advice about the risks and the reasons for using it.

If you are on blood pressure medication before becoming pregnant, you might need to change to a different type as some types are not safe to use in pregnancy. You should speak to your doctor to discuss the best way to manage your blood pressure during pregnancy.

Types of medication

The main groups of blood pressure medication are:

1. ACE (angiotensin-converting enzyme) inhibitors.
2. Angiotensin-2 receptor blockers.
3. Calcium channel blockers.
4. Thiazide-like diuretics.

These are the most commonly used ones, but other types are also available, including beta-blockers.

1. ACE inhibitors

These drugs are usually the first choice of treatment for people aged under 55 who are not of African-Caribbean origin. Angiotensin-2 is a hormone which regulates blood pressure. ACE inhibitors stop the production of this hormone and relax your arteries, so your blood pressure falls.

ACE inhibitors seem to work better at lowering your blood pressure if you also reduce the amount of salt you eat.

Examples of ACE inhibitors include enalapril, lisinopril, perindopril and ramipril. Possible side effects include dizziness, tiredness, weakness, rash, headaches and changes to your sense of taste. The most common side effect is a persistent dry cough.

You will have blood tests after starting or increasing your dose of ACE inhibitor to check your kidney function and the level of potassium in your blood.

ACE inhibitors can cause unpredictable effects if they are taken with other types of medication including non-steroidal anti-inflammatory (NSAID) drugs like ibuprofen, as well as other drugs such as antacids and lithium. You should not take ACE inhibitors at the same time as Angiotensin-2 receptor blockers (ARBs).

Check with your GP or pharmacist before taking any other types of medication if you take an ACE inhibitor.

2. Angiotensin-2 receptor blockers (ARB)

Like ACE inhibitors, these work on the hormone angiotensin-2 by blocking its effects. They are usually used instead of an ACE inhibitor if you are not able to tolerate one. The two types of medication should not be used together.

These drugs are usually recommended for people aged under 55 who are not of African-Caribbean origin. They can be useful if you have diabetes or kidney disease as well as high blood pressure. This is because these types of drug can protect your kidneys. Examples include candesartan, irbesartan, losartan, valsartan and olmesartan. Possible side effects are usually mild and include dizziness, headache or cold or flu-like symptoms.

3. Calcium channel blockers

These drugs are particularly effective in controlling high blood pressure in people aged over 55 and in African-Caribbean people of any age. They stop calcium from entering the muscle cells in your heart and blood vessels. This widens your arteries and lowers your blood pressure.

Examples of calcium channel blockers include amlodipine, felodipine and nifedipine. Diltiazem and verapamil may also be prescribed. Possible side effects include swollen ankles, ankle or foot pain, constipation, skin rashes, a flushed face, headaches, dizziness and tiredness.

You should avoid drinking grapefruit juice while taking some types of calcium channel blockers as it can increase the amount of medication in your bloodstream. This can make your blood pressure drop suddenly and increase your risk of side effects. Ask your doctor or pharmacist for advice.

4. Thiazide-like diuretics

Thiazide-like diuretics are the diuretics most commonly used to treat high blood pressure. Diuretics are also known as water pills because they work by flushing out excess water and salt from the body through urine. This class of drug is often very successful in lowering blood pressure, especially in people over 55 and those of African-Caribbean origin.

You may need to have regular blood tests after you start treatment to check that the potassium levels in your blood have not dropped, and that your blood sugar level is maintained.

Examples of thiazide-like diuretics include indapamide and chlortalidone. Possible side effects include an increased need to go to the toilet, feeling thirsty, dizziness, weakness, feeling lethargic or sick, muscle cramps, skin rash, an increase in uric acid (a chemical in the body that can cause kidney problems and gout), raised blood sugar levels and for men, problems with getting an erection.

Taking diuretics with beta-blockers can increase your long-term risk of diabetes. Check with your doctor whether this medicine combination is right for you.

Other types of medication

Beta-blockers

Beta-blockers work by making your heart beat more slowly and with less force, which reduces your blood pressure. They are usually only recommended if other treatments haven't worked, because they are less effective than other treatments.

It is important that you do not suddenly stop taking this type of medication without seeking medical advice first. These drugs would need to be tailed off gradually. Stopping suddenly can lead to serious side effects such as a rise in blood pressure or an angina attack.

Examples of beta blockers include labetalol, atenolol, and bisoprolol. Possible side effects include slowing of the heart rate, cold fingers and toes, nausea, diarrhoea, tiredness and disturbed sleep. If you are taking beta-blockers and experience difficulty breathing, or develop asthma, you should contact your doctor immediately.

Other drug groups

Other drugs that may be used to control blood pressure include doxazosin and terazosin (which belong to a group called alpha-blockers), and clonidine and methyldopa (which belong to a group called centrally acting drugs). Another type of diurectic called spironolactone can also be used at low doses. These drugs are only usually recommended if other treatments haven't worked.

Interactions and side effects

In a small number of cases, medicines to lower blood pressure can react negatively with other health conditions or types of medication you may be taking, including some over-the-counter ones. Always ensure your GP knows your full medical history, and check with your GP or pharmacist before taking any other types of medication.
Many people experience no side effects when taking their medication. However, if you are reacting badly to your blood pressure medication or start to feel unwell, make an appointment with your doctor or nurse as soon as you can.

What can I do to help myself?

To give yourself the best possible chance of lowering your blood pressure, take your medication according to the packet's instructions and as advised by your doctor.

You should have your blood pressure checked and your medication reviewed at least once a year. Your doctor may want to check this more regularly soon after initiating or changing any treatments.

If you have trouble remembering to take it, ask your GP or pharmacist for your medication to be given to you in pre-filled boxes with times clearly marked on them.

These tips for healthy lifestyle choices can also help to lower your blood pressure:

- Reduce your salt intake. Don't add salt to your food, and avoid processed foods that contain a lot of salt.
- Eat at least five portions of fruit and vegetables each day.
- Lose weight if you need to.
- Reduce your caffeine intake.
- Give up smoking.
- Reduce your alcohol intake and avoid binge drinking.
- Be more active.
- Reduce your stress levels and take time to relax.
- Try to get at least six hours sleep a night.

Where to get help and information

From the Stroke Association

Helpline

Our Helpline offers information and support for anyone affected by stroke, including family, friends and carers.

Call us on **0303 3033 100**, from a textphone **18001 0303 3033 100**
Email **helpline@stroke.org.uk**.

Read our information

Get more information about stroke online at **stroke.org.uk**, or call the Helpline to ask for printed copies of our guides.

My Stroke Guide

The Stroke Association's online tool My Stroke Guide gives you free access to trusted advice, information and support 24/7. My Stroke Guide connects you to our online community, to find out how others manage their recovery.

Log on to **mystrokeguide.com** today.

Other sources of help and information

Blood Pressure UK
Helpline: **020 7882 6218**
Website: **bloodpressureuk.org.uk**
Provides a wide range of information on high blood pressure.

British Heart Foundation (BHF)
Website: **bhf.org.uk**
Heart Helpline: **0300 330 3311**
The helpline is staffed by cardiac nurses.

British Hypertension Society
Website: **bhsoc.org/bp-monitors**
Publishes a list of blood pressure monitors.

About our information

We want to provide the best information for people affected by stroke. That's why we ask stroke survivors and their families, as well as medical experts, to help us put our publications together.

How did we do?
To tell us what you think of this guide, or to request a list of the sources we used to create it, email us at **feedback@stroke.org.uk**.

Accessible formats
Visit our website if you need this information in audio, large print or braille.

Always get individual advice
This guide contains general information about stroke. But if you have a problem, you should get individual advice from a professional such as a GP or pharmacist. Our Helpline can also help you find support. We work very hard to give you the latest facts, but some things change. We don't control the information provided by other organisations or websites.

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Every five minutes, stroke destroys lives. We need your support to help rebuild them. Donate or find out more at **stroke.org.uk**.

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