Ischaemic stroke

Most strokes happen because of a blockage in an artery leading to the brain. This is called an ischaemic stroke. If you, or someone you know, has had an ischaemic stroke this factsheet explains some of the causes, as well as how it is diagnosed and treated. It also considers some of the questions you may have if you have had a stroke.

What is an ischaemic stroke?

A stroke is a brain attack. It happens when the blood supply to part of your brain is cut off. Blood carries essential nutrients and oxygen to your brain. Without blood your brain cells can be damaged or die.

Around 85% of strokes are caused by a blockage cutting off the blood supply to the brain. This is called an ischaemic stroke.

The blockage can be caused by a blood clot forming in an artery leading to the brain or within one of the small vessels deep inside the brain. This is known as cerebral thrombosis. Blockages in the brain can also be caused by a blood clot or other matter, (such as an air bubble or piece of fatty debris) moving through the blood stream from another part of the body. This is called a cerebral embolism.

What are the symptoms of a stroke?

The FAST test (right) can help you to recognise the symptoms of a stroke. These symptoms usually come on suddenly.

**A stroke is a medical emergency.** If you see any one of these signs, seek immediate medical attention.

Facial weakness
- Can the person smile?
- Has their mouth or eye drooped?

Arm weakness
- Can the person raise both of their arms?

Speech problems
- Can the person speak clearly and understand what you say?

Time to call 999

Other symptoms include sudden weakness or numbness on one side of the body, sudden confusion, dizziness or unsteadiness.

A TIA or transient ischaemic attack (also known as a mini-stroke) is the same as a stroke, except that the symptoms last for a short amount of time and no longer than 24 hours. **A TIA is serious and should not be ignored.** If you experience any of the symptoms described above you must call 999.
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What causes an ischaemic stroke?

There are a number of reasons why blockages can form and cause an ischaemic stroke.

Atherosclerosis
Our arteries naturally become thicker and less flexible as we get older, but the condition atherosclerosis can speed this process up.

Atherosclerosis occurs when fatty deposits build up on the inside walls of your arteries. These patches of deposits are called plaques or atheromas. They cause your arteries to become harder and narrower, making them more likely to become blocked. The narrowing of your arteries is called stenosis. Lifestyle factors, like smoking and your diet, as well as certain medical conditions, such as high blood pressure, high cholesterol or diabetes, can lead to atherosclerosis.

Atheromas can build up in any artery, including the ones in your brain. As well as making them narrower, atheromas can make the inner surface of your artery walls more fragile and likely to break up. When this happens the lining of your artery becomes exposed and blood clots over it. If the blood clot grows it can cause the artery to become blocked, or it can break off and move through the bloodstream causing a blockage somewhere else.

Small vessel disease
Small vessel disease is when the tiny blood vessels within your brain become blocked. Deposits collect in the blood vessels, causing them to thicken and become less flexible. If they become completely blocked, this can lead to a stroke. It’s thought that around 20-25% of ischaemic strokes are caused by small vessel disease.

Strokes caused by small vessel disease tend to affect a small part of your brain. This means that the symptoms are often less severe compared with other strokes, and they can go unnoticed. This type of stroke is known as a lacunar stroke. Over time, the damage caused by small vessel disease can cause a type of dementia called sub-cortical vascular dementia.

Heart conditions
Some conditions can cause blood clots to form in your heart, which can then move through your blood stream up into your brain. This is called an embolism. The most common condition to cause this is atrial fibrillation or AF (a type of irregular heartbeat) but other heart problems, such as a recent heart attack or a mechanical heart valve, can cause embolisms too.

Patent foramen ovale (or PFO) is a condition that also affects the heart. Foramen ovale is the name of the hole between the right and left side of your heart. This hole normally closes after birth, but in as many as one in four people it remains open or ‘patent’. Whilst it doesn’t make your blood more likely to clot, a PFO makes it possible for a blood clot to pass from one side of your heart to the other and up to your brain. A PFO is sometimes referred to as ‘a hole in the heart’.

Arterial dissection
Sometimes tears in the lining of an artery can develop and allow blood to get between the layers in your artery walls. This is called arterial dissection. It can happen for no clear reason or it can be the result of a ‘trauma’, such as an injury like whiplash.
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As blood builds up a clot can form. If this clot restricts the flow of blood to your brain, or moves up into your brain, it can cause a stroke. It’s thought that arterial dissection causes around 2% of all strokes but up to 25% of strokes in people aged 45 or younger.

How is an ischaemic stroke diagnosed and treated?

Diagnosis

A stroke is a medical emergency and if you have one you need to call 999 immediately. You may be taken to accident and emergency or another assessment ward to begin with, but it is likely you will be quickly admitted to an acute (or hyper-acute) stroke unit. An acute stroke unit has a range of trained professionals who are experienced in stroke care.

The quicker your stroke is diagnosed and treated, the better your recovery will be. Once you’re admitted to the stroke unit you’ll be sent for a brain scan as soon as possible. If it’s thought that you may need a special kind of treatment to break down clots, you are taking blood-thinning medication, or that there may be bleeding in your brain, you should have a brain scan straight away.

You will either have a computed tomography (CT) scan or a magnetic resonance imaging (MRI) scan. Both of these produce pictures of your brain and will help doctors to rule out other causes of your symptoms and see how much of your brain has been affected. It will also help them decide how best to treat you, as treatments are different depending on the cause of your stroke.

The doctors will also measure your blood pressure and carry out blood tests to check whether your blood is clotting too much, as well as your blood sugar and cholesterol levels.

You may undergo other tests to check for conditions that could have contributed to your stroke. These include an electrocardiogram (ECG), which checks for an irregular heartbeat, or a blood vessel scan to check for blockages in the arteries in your neck.

Treatment

If your ischaemic stroke is caused by a blood clot, you may be treated with a clot-busting medicine. The medicine itself is called alteplase, or recombinant tissue plasminogen activator (rt-PA). The process of giving this medicine is known as thrombolysis.

Thrombolysis can break down and disperse a clot that is preventing blood from reaching your brain. Currently, for most people it needs to be given within four and a half hours of your stroke symptoms starting. In some circumstances your doctor may decide that it could still be of benefit within six hours. However the more time that passes, the less effective thrombolysis will be. This is why it’s important to get to hospital as quickly as possible when your symptoms start.

Unfortunately not everyone who has an ischaemic stroke is suitable for thrombolysis. At present only 15% of people who are admitted to hospital with a stroke are eligible to receive it.
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If you are not suitable, it may be because:
• you have a bleed in the brain
• you do not know or cannot tell doctors when your symptoms began
• you do not reach hospital in time
• you have a bleeding disorder
• you have recently had major surgery
• you have had another stroke or head injury within the past three months
• your current medication is not compatible with alteplase.

If you are suitable for thrombolysis, your medical team will explain the treatment to you and ask if you agree to have it. You do not have to sign any paperwork – a verbal agreement is enough. If you are unable to give your consent, either because of the effects of your stroke or another reason, the medical team will seek permission from your next of kin or another family member. Time is critical so if this isn’t immediately possible the medical staff will make the decision for you based on what they feel is in your best interests.

You will receive the medicine through a tube into one of the veins in your arm. During this procedure, which takes around one hour, the medical team will closely monitor your blood pressure, body temperature, breathing and blood sugar levels to ensure that they remain stable.

Thrombolysis doesn’t work every time – one in seven people who receive it benefit from the treatment. There is also a risk that thrombolysis can cause harmful bleeding in your brain. This happens in approximately 7% of cases.

If you’re not able to receive thrombolysis, or it doesn’t work, the blood clot will break up naturally within a few days or weeks. Sadly, this natural process will probably take too long to prevent much of the damage that has been caused to your brain. In spite of this, research does show that being looked after on a stroke unit can have a big effect on your recovery.

It is possible to try to physically remove a blood clot using something called a clot retrieval device. This usually involves inserting a corkscrew-like device into an artery in your groin, moving it up to your brain, and pulling the blood clot out. There are significant risks with this treatment and it is not always successful. Current guidelines in the UK say that there isn’t enough evidence about its safety and effectiveness to widely recommend its use, however there is research taking place to look into this. At present, clot retrieval devices are only used in very rare circumstances or as part of a research trial.

Most people who have an ischaemic stroke will be given anti-platelet medication, which helps to prevent your blood from further clotting. For most people this will be aspirin, which you’ll be given to take at a high dose (300mg) for up to two weeks. If you receive thrombolysis, you will need to wait at least 24 hours before you can begin taking aspirin. If aspirin is not suitable for you, you may be given an alternative drug, such as clopidogrel, instead.

In a very small number of cases (approximately 1%) an operation may be needed to relieve pressure on your brain. When the brain is injured the tissues can swell, just like a bruise. If there is a lot of swelling, there is a danger that it will put increased pressure onto other areas of your brain, causing further damage. If this is the case you will need a procedure called a
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decompressive hemicraniectomy. This involves opening up a section of your skull to allow the brain to swell outwards and relieve some of the pressure.

After your stroke is treated
The team on the stroke unit will continue to monitor you closely for at least 24 hours to ensure you remain stable. It’s likely you’ll have another brain scan to see if the treatment you’ve received has taken affect.

Once your stroke has been diagnosed, you should have a swallowing test. It can be dangerous to give you fluids, food or oral medication to take if you’re experiencing swallowing problems, so you won’t be allowed anything to eat or drink until your ability to swallow has been checked. This should be done within four hours of you being admitted to hospital. Your ability to move, control your bladder, understand, communicate, see and hear should also be assessed by someone in your stroke team within the first four hours.

You may see some signs of recovery as the blood supply to your brain is restored, but if you’re still showing lasting effects after 24 hours, you will need to have a full assessment with all the professionals on the stroke team. This means that within the first five days you should be seen by a physiotherapist, speech and language therapist, occupational therapist, dietitian and perhaps a psychologist, if your stroke unit has one.

Evidence shows that sitting up and moving about as early as possible can help you make a better recovery, so it’s likely that the professionals on your stroke team will encourage you to do this as soon as they think you are able.

If you’re not able to move about very much straight away, the way you are positioned is very important if you are to avoid problems with breathing, shoulder pain or pressure sores later on. The members of your stroke team should show you the best way to sit or lie down and help you to reposition yourself at regular intervals.

As soon as you are well enough, your doctor should talk to you about what he or she thinks caused your stroke and what action needs to be taken to reduce your risk of it happening again. This could mean taking medication or making changes to your lifestyle, or both. Make sure you understand what you need to do and why.

What effects can a stroke have?

Although all strokes are different, some common effects include:
- weakness and paralysis: this usually happens on one side of your body and can often be made worse by stiffness (spasticity) in your arm or leg muscles. This may cause you pain or discomfort, or you may lose feeling in your affected limbs altogether
- speech and language problems: many people have difficulty with language after their stroke. This is known as aphasia. It can include difficulties with forming words and understanding what people are saying to you, as well as reading and writing
- difficulties with your memory, concentration and learning
- problems with your vision
- problems with balance
- problems with swallowing
- difficulties controlling your bladder and bowels
- fatigue (severe tiredness).
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A stroke can also have an emotional impact and can cause problems such as anxiety, depression or changes to your personality.

All strokes are different so for some people the effects may be relatively minor and may not last long, while others may be left with more serious long-term effects. The quicker you receive treatment, the better your chances for a good recovery are, so it’s important to call 999 and get to hospital straight away.

Coping with the effects of stroke

Stroke brings a lot of questions and uncertainty with it. Coping with this can be overwhelming for both you and the people around you. Fear of another stroke, anger and grief about the things you’ve lost, shock and helplessness are all natural emotions to have after a stroke.

Dealing with both the emotional and physical effects of stroke is difficult, but there are things you can do to help you cope.

Talking to the right people and finding answers to some of your questions will help you feel more in control of your situation and help you plan for the future.

In England, Northern Ireland and Wales stroke survivors should have a review with someone at six weeks, six months and 12 months after their stroke to make sure they are receiving the care and support they need. In Scotland each health authority has its own guidelines about the follow up you should expect to receive after your stroke. If you’ve not had one of these reviews speak to your GP or another health professional.

But you don’t have to wait until your next review if you have concerns or need some help. There are lots of ways to find information and support. Don’t be afraid to ask anyone in your stroke team questions, they are all there to help you. You can find details of other sources of help and support in the How can I find out more? section of this factsheet.

Will I be able to make a full recovery?

Because every stroke is different, there is no set pattern for recovering from one. Your ability to recover and how quickly it happens will depend on the part of your brain that has been affected, the amount of damage that was done, as well as your own motivation to do everything you can to make the best recovery.

In the first few days and weeks after your stroke you’re likely to see some immediate recovery. After this early burst, progress tends to slow down. This is normal and doesn’t mean that you won’t recover any further. Although the brain cells that have been severely damaged or have died can’t grow back, other parts of the brain can learn to take over the jobs that they did. This is called neuroplasticity. This means that you can continue to make improvements many months or even years after a stroke.

Rehabilitation should begin as soon as possible after your stroke. While recovery means getting better, rehabilitation is about overcoming and adapting to the effects of your stroke. Your therapists will give you exercises and advice to help you relearn abilities you have lost and show you new ways of doing things, such as dressing with one arm.
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Starting your rehabilitation immediately will help to avoid further problems from developing and give you the best chances for recovery.

**Am I likely to have another stroke and can I stop it happening again?**

For many stroke survivors, their greatest fear is having another stroke. Once you’ve had a stroke your risk of having another one is increased. In the UK about 27% of people who have a stroke, have had a stroke or TIA before.

Even though your risk of having another stroke is increased, **understanding what factors caused your stroke will help you know how you can reduce your risk of it happening again.**

Certain medical conditions like diabetes and high blood pressure can lead to stroke. If you have a medical condition that is increasing your risk of stroke, make sure you take the medication you’re prescribed.

**If you have any questions about your medication, go back to your doctor or pharmacist and ask.** Tell them if you are worried about side effects, as there will usually be an alternative that you can take. Never stop taking your medication without talking to your doctor first.

Lifestyle factors such as smoking, diet, drinking too much alcohol, being overweight and not doing enough exercise can increase your risk as well. We have lots of information that can help you make positive changes to your lifestyle and reduce your risk of stroke.

**How can I find out more?**

**Talk to us**

At the Stroke Association, our Stroke Helpline can give you information about stroke and tell you about services and support available in your local area.

Call us on **0303 3033 100** (Monday to Friday, 9am-5pm) or email **info@stroke.org.uk**

**Get online**

We have lots of information about stroke and how to prevent it on our website. Go to **stroke.org.uk**

**Read our publications**

We also produce a range of other leaflets and factsheets about stroke and related issues. You can download these for free or order a printed copy to be posted to you via our website **stroke.org.uk** or by calling the helpline on **0303 3033 100**.

Some of our other factsheets include:

- Blood-thinning medication (F11)
- High blood pressure and stroke (F06)
- Atrial fibrillation (AF) and stroke (F26)
- Smoking and the risk of stroke (F19)
- Healthy eating and stroke (F08)

Go to **stroke.org.uk** for a full list.

**Other useful contacts**

If you’re looking for more information the following organisations may also be able to help. All are UK wide unless otherwise stated. Please note that details of these organisations are for information only. We are not recommending or endorsing anyone by including them in this factsheet.
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Atrial Fibrillation Association (AFA)
Website: www.atrialfibrillation.org.uk
Tel: 01789 451 837
Email: info@afa.org.uk
Provides information and support for people with atrial fibrillation.

Brain and Spine Foundation
Website: www.brainandspine.org.uk
Tel: 0808 808 1000
Provides information and support to people affected by neurological conditions including stroke. The helpline is manned by neuroscience nurses.

Chest, Heart and Stroke Scotland
Website: www.chss.org.uk
Helpline: 0808 801 0899
Email: advice-line@chss.org.uk
Provides information on local stroke groups in Scotland. It also runs an advice line staffed by nurses.

Different Strokes
Website: www.differentstrokes.co.uk
StrokeLine: 0845 130 7172
Provides information and support for younger stroke survivors, including guides for survivors, their family and employers.

Headway
Website: www.headway.org.uk
Tel: 0808 800 2244
Email: helpline@headway.org.uk
A national charity supporting people with a brain injury. They have local groups and branches, which include rehabilitation programmes, carer support, social activities, community outreach and respite care.

NHS Choices
Website: www.nhs.uk/livewell

NHS Inform (Scotland)
Website: www.nhsinform.co.uk
NHS websites providing information about living a healthier lifestyle. The NHS Live Well website offers programmes to help you lose weight, eat better and do more exercise.

About our information
We are committed to producing clear, accurate and unbiased information for stroke survivors, their families and friends. To produce our publications we use information from professional bodies and other reliable sources including NICE, SIGN, Royal College of Physicians, medical journals and textbooks. For a list of all the sources used in this factsheet go to stroke.org.uk

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