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Research Article

Brian stroke memory impairment and treatment strategies

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ABSTRACT

A brain stroke occurs when one of the brain parts are deprived form oxygen-rich blood due to various mechanism. Usually a brain stroke occurs when one of the arteries is blocked either because of narrowing of small arteries with in the brain or the hardening of the arteries that lead to atherosclerosis strokes can be either ischemic (85%) or Hemorrhagic (15%). Forget fullness is a common complaint among older people. Age – related memory changes are not the same thing as dementia. Preventing memory loss is by exercise regularly staying social, manage stress, get plenty of sleep and don't smoke. Eat plenty of fruits and vegetable and take food contain antioxidant in abundance; will reduce your risk of stroke. Walking regularly is an easy to fight memory loss and also brain exercises to prevent loss and boost brainpower. Research is going no to enhance memory power in brain in patient with brain stroke.

Keywords: Brain stroke, Memory, Ischemic stroke, Hemorrhagic stroke.

INTRODUCTION

Brain stroke occurs when one of the arteries is blocked either because of the narrowing of the small arteries within the brain or the hardening of the arteries that lead to the brain stroke is called atherosclerosis. In some cases, a brain stroke may be a result of an embolism which traveled A brain stroke occurs when one of the brain parts are deprived from oxygen-rich blood. Usually from the heart to the brain. Strokes can be either ischemic 85%, when it is caused by a blood clot in blood vessels hemorrhagic when ruptured aneurysms bleed into to brain. This results in the death of the brain cells. Depending on the area of the brain involved and the extent of brain cell death, the specific body functions such as speech, movement or memory may be affected. According to the World Health Organization, 15 million people suffer stroke worldwide each year. Of these, 5 million die and another 5 million are permanently disabled. High blood pressure contributes to more than 12.7 million strokes worldwide. Europe averages approximately 650,000 stroke deaths each year. In developed countries, the incidence of

stroke is declining, largely due to efforts to lower blood pressure and reduce smoking. However, the overall rate of stroke remains high due to the aging of the population. The most important and difficult part of the treatment. As soon as the patient is no longer acutely ill he or she must follow rehabilitation therapy in order to regain his or her functional abilities. Therapy can be followed either at a rehabilitation specialized hospital or at a nursing facility. Rehabilitation process includes family education intended to orient the family considering the challenges they will face. However the tissue plasminogen activator (or TPA) is the most common treatment for brain stroke. It actually consists in injecting TPA into a vein of the arm as soon as possible since the earlier it is administrated, the better the results.

CLASSIFICATION OF BRAIN STROKE

Strokes can be classified into two major categories

Ischemic and hemorrhagic. [4] Ischemic strokes are those that are caused by interruption of the blood supply. Hemorrhagic strokes are the ones which result from rupture of a Blood vessels or an abnormal vascular structure.

Ischemic stroke

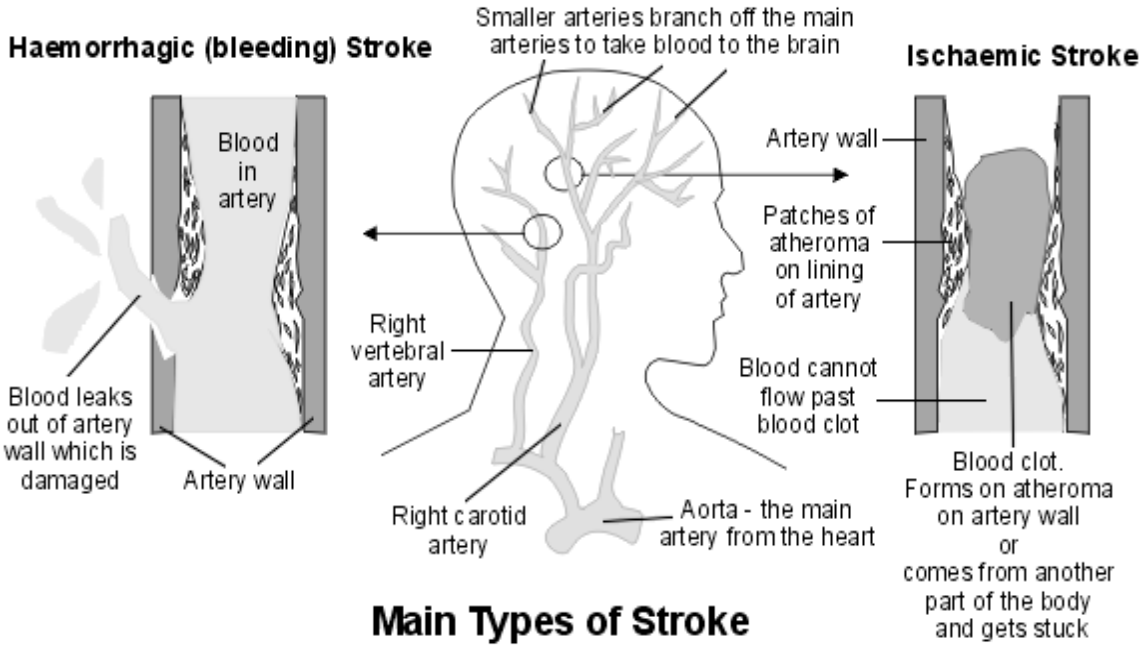
About 85% of strokes are ischemic strokes. Ischemic strokes occur when the arteries to your brain become narrowed or blocked, causing severely reduced blood flow (ischemia). The most common ischemic strokes include:

Thrombotic stroke

A thrombotic stroke occurs when a blood clot (thrombus) forms in one of the arteries that supply blood to your brain. A clot may be caused by fatty deposits (plaque) that build up in arteries and cause reduced blood flow (atherosclerosis) or other artery conditions.

Embolic stroke

An embolic stroke occurs when a blood clot or other debris forms away from your brain commonly in your heart and is swept through your bloodstream to lodge in narrower brain arteries. This type of blood clot is called an embolus.



Main Types of Stroke

Transient ischemic attack (TIA)

A transient ischemic attack (TIA) also known as a ministroke is a brief period of symptoms similar to those you'd have in a stroke. A temporary decrease in blood supply to part of your brain causes TIAs, which often last less than five minutes. Like an ischemic stroke, a TIA occurs

when a clot or debris blocks blood flow to part of your brain. A TIA doesn't leave lasting symptoms because the blockage is temporary. Seek emergency care even if your symptoms seem to clear up. Having a TIA puts you at greater risk of having a full-blown stroke, causing permanent damage later. If you've had a TIA, it means there's likely a partially blocked or narrowed artery leading to your brain or a clot source in the heart. It's not possible to tell if you're having a stroke or a TIA based only on your symptoms. Up to half of people whose symptoms appear to go away actually has had a stroke causing brain damage.

Hemorrhagic stroke

Hemorrhagic stroke occurs when a blood vessel in your brain leaks or ruptures. Brain hemorrhages can result from many conditions that affect your blood vessels, including uncontrolled high blood pressure (hypertension), overtreatment with anticoagulants and weak spots in your blood vessel walls (aneurysms).

A less common cause of hemorrhage is the rupture of an abnormal tangle of thin-walled blood vessels (arteriovenous malformation) present at birth. Types of hemorrhagic stroke include:

Intracerebral hemorrhage

In an intracerebral hemorrhage, a blood vessel in the brain bursts and spills into the surrounding brain tissue, damaging brain cells. Brain cells beyond the leak are deprived of blood and also damaged.

High blood pressure, trauma, vascular malformations, use of blood-thinning medications and other conditions may cause an intracerebral hemorrhage.

Subarachnoid hemorrhage

In a subarachnoid hemorrhage, an artery on or near the surface of your brain bursts and spills into the space between the surface of your brain and your skull. This bleeding is often signaled by a sudden, severe headache.

A subarachnoid hemorrhage is commonly caused by the bursting of a small sack-shaped or berry-shaped out pouching on an artery known as an aneurysm. After the hemorrhage, the blood vessels in your brain may widen and narrow erratically (vasospasm), causing brain cell damage by further limiting blood flow. 1,2,3,4, 5RF

Memory

Memory is the process by which information is encoded, stored, and retrieved. Encoding allows information that is from the outside world to reach our senses in the forms of chemical and physical stimuli. In this first stage we must change the information so that we may put the memory into the encoding process. Storage is the second memory stage or process. This entails that we maintain information over periods of time. Finally the third process is the retrieval of information that we have stored. [6, 7, 8]

Memory storage types:

- Sensory memory
- Short-term memory
- Long-term memory

Sensory memory: Sensory memory holds sensory information for a few seconds or less after an item is perceived. The ability to look at an item, and remember what it looked like with just a second of observation, or memorization.

Short – term memory: Short-term memory (or "primary" or "active memory") is the capacity for holding, but not manipulating, a small amount of information in mind in an active, readily available state for a short period of time. The duration of short-term memory (when rehearsal or active maintenance is prevented) is believed to be in the order of seconds. A commonly cited capacity is *The Magical Number Seven, Plus or Minus Two* (which is frequently referred to as *Miller's Law*.) In contrast, long-term memory can hold an indefinite amount of information. [9].

Three key aspects in short term memory:

1. **Limited capacity** (only about 7 items can be stored at a time)
2. **Limited duration** (storage is very fragile and information can be lost with distraction or passage of time)
3. **Encoding** (primarily acoustic, even translating visual information into sounds). [10,11]

Long – term memory: The storage in sensory memory and short-term memory generally have a strictly limited capacity and duration, which means that information is not retained indefinitely. By contrast, long-term memory can store much larger quantities of information for potentially unlimited

duration (sometimes a whole life span). Its capacity is immeasurably large. For example, given a random seven-digit number we may remember it for only a few seconds before forgetting, suggesting it was stored in our short-term memory. On the other hand, we can remember telephone numbers for many years through repetition; this information is said to be stored in long-term memory. [12, 13]

Memory loss

Memory loss is something that everyone experiences at times, often increasing with age, or following a stroke. It is estimated that approximately one third of stroke patient will develop memory problems. There are several different types of memory loss after stroke. The most common is vascular dementia. [14]

- Verbal: memory of names, stories and information having to do with language
- Visual: memory of shapes, faces, routes and things seen
- Informational: memory of information and skills or trouble learning new things
- Vascular dementia: A common post-stroke condition involving loss of thinking abilities. [15]

A short-term memory problem in people with left-brain stroke, Long-term memory is usually preserved, but they may also have difficulty learning new information. They will likely need to have things repeated and be reminded over and over. [16]

People with right-brain strokes have memory problems of another kind they tend to get things out of sequence or misinterpret or confuse information. These survivors may mix up the details surrounding an event. Usually, they can recall events but get confused about when they happened or who was involved. [16]

SING & SYMPTOMS

The symptoms of a stroke usually appear suddenly. Initially the person may feel sick and look pale and unwell. They may complain of a sudden headache or dizziness.

They may also

- have
  sudden numbness, weakness or paralysis in their face or limbs, particularly down one side of their body
- appear confused, having problems with concentration or memory
- have trouble talking or understanding what is being said to them
- have difficulty swallowing
- have vision problems
- have trouble walking
- unsteadiness or a sudden fall
- Difficulty with co-ordinating their movements and keeping their balance. [17]

Risk factors for stroke

The older you get, the greater the risk of having a stroke, however, a significant number of young and middle-aged people also have strokes.

Men are also more likely to have a stroke than women. People who have had a previous stroke or TIA are also more likely to have another one, as are people with a family history of stroke or other types of cardiovascular disease (such as angina or heart attack).

Risk factors for ischaemic stroke

- High blood pressure;
- A type of irregular heartbeat known as atrial fibrillation (AF);
- Cigarette smoking;
- Excessive alcohol intake;
- Being overweight or obese;
- Diabetes;
- High cholesterol; and
- Poor diet and inadequate physical activity.

Stroke is a disease of blood vessels (vascular disease), and so shares many risk factors with coronary vascular disease (also known as coronary artery disease – disease affecting the heart's blood vessels). [18]

Risk factors for haemorrhagic stroke

- high blood pressure;
- smoking;
- taking anticoagulant medicines;
- having a bleeding disorder (such as thrombocytopenia or haemophilia); and
- a previous brain/head injury [19]

Diagnosis

To allow rapid identification of these stroke patterns and to assist in the exclusion possible diagnoses, the following screening tools have been developed.

F.A.S.T.

This stands for **F**ace, **A**rm, **S**peech, **T**ime and has been the subject of a national television awareness campaign. It is used by paramedics and emergency department triage staff to screen for stroke symptoms and can be up to 81% sensitive. It prompts assessment for facial asymmetry, arm weakness, slurred or disordered speech and then rapid transfer to the appropriate acute care setting for further assessment. FAST is not infallible and is particularly prone to missing posterior circulation events.[20]

R.O.S.I.E.R8.

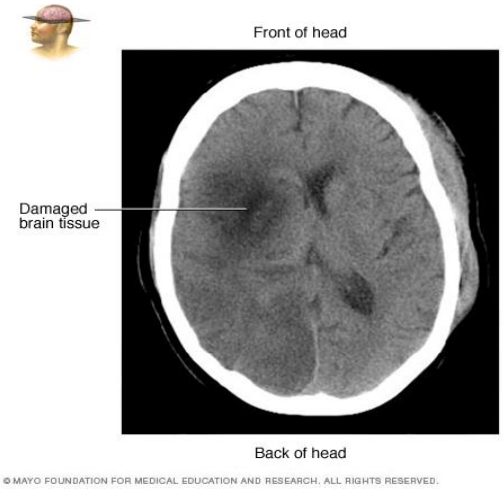
This tool is for **R**ecognition **o**f **S**troke **i**n the **E**mergency **R**oom. It was developed to help emergency department staff assess possible stroke patients and provides some tools for screening out mimics such as hypoglycaemia, seizures and syncope. It has a sensitivity of 93% and specificity of 83%. [21,]

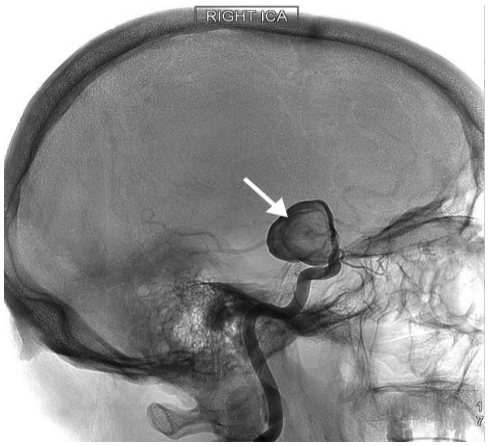
Laboratory tests.

A blood glucose level is necessary to exclude hypoglycaemia as a stroke mimic and this can usual be done as a bedside finger prick test. Blood tests should be sent for full blood count and biochemistry. A coagulation screen should be sent particularly if a bleed is suspected, if the patient is anti-coagulated or if thrombolysis is being considered. In the days after a stroke, thyroid function tests, lipid profile and ESR. [22]

Computerized tomography (CT) scan

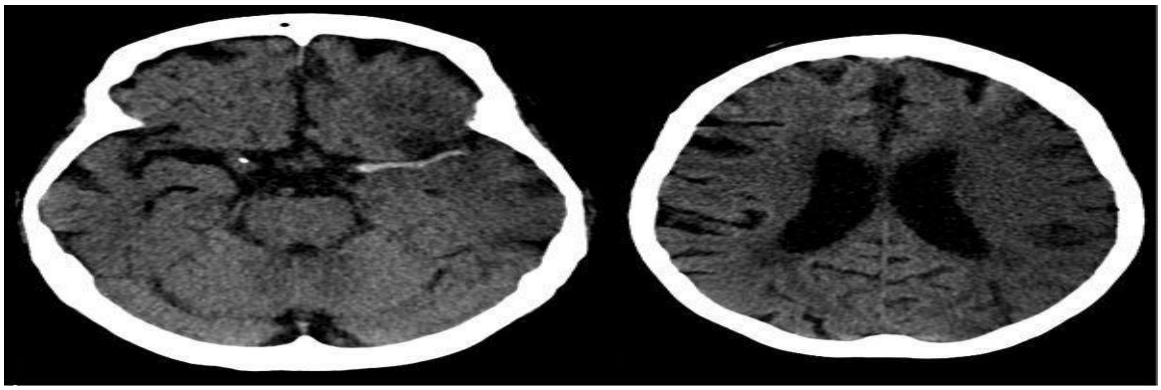
A CT scan uses a series of X-rays to create a detailed image of your brain. A CT scan can show a hemorrhage, tumor, stroke and other conditions. Doctors may inject a dye into your bloodstream to view your blood vessels in your neck and brain in greater detail (computerized tomography angiography).





Magnetic resonance imaging (MRI)

An MRI uses powerful radio waves and magnets to create a detailed view of your brain. An MRI can detect brain tissue damaged by an ischemic stroke and brain hemorrhages. Your doctor may inject a dye into a blood vessel to view the arteries and veins and highlight blood flow (magnetic resonance angiography, or magnetic resonance venography).



Dens media sign in a patient with middle cerebral artery infarction shown on the left. Right image after 7 hours. [23,24.25]

Treatment

Ideally, you will be assessed quickly by a doctor. Commonly, a scan of the brain is organised as soon as possible. The aim of the scan is to confirm the diagnosis and to tell whether the stroke is an ischaemic or haemorrhagic stroke. This is very important to know, as the initial treatment of the two is very different. [26] The treatment plan can depend on factors such as the severity of the stroke, the effects it has, the cause of the stroke, and other diseases that may be present. Treatments that may be considered include the following:

Ischemic stroke

To treat an ischemic stroke, doctors must quickly restore blood flow to your brain.

Emergency treatment with medications

Therapy with clot-busting drugs must start within 3 hours if they are given into the vein and the sooner, the better. Quick treatment not only improves your chances of survival but also may reduce complications. You may be given:

Aspirin

Aspirin is an immediate treatment given in the emergency room to reduce the likelihood of having another stroke. Aspirin prevents blood clots from forming.

Intravenous injection of tissue plasminogen activator (TPA)

Some people can benefit from an injection of a recombinant tissue plasminogen activator (TPA), also called alteplase. An injection of TPA is usually given through a vein in the arm. This potent clot-busting drug needs to be given within 4.5 hours after stroke symptoms begin if it's given in the vein.

TPA restores blood flow by dissolving the blood clot causing your stroke, and it may help people who have had strokes recover more fully. Your doctor will consider certain risks, such as potential bleeding in the brain, to determine if TPA is appropriate for you. [27]

Emergency procedures

Doctors sometimes treat ischemic strokes with procedures that must be performed as soon as possible, depending on features of the blood clot:

Medications delivered directly to the brain: Doctors may insert a long, thin tube (catheter) through an artery in your groin and thread it to your brain to deliver TPA directly into the area where the stroke is occurring. [28] The time window for this treatment is somewhat longer than for intravenous TPA but is still limited.

Mechanical clot removal

Doctors may use a catheter to maneuver a tiny device into your brain to physically break up or grab and remove the clot.

However, recent studies suggest that for most people, delivering medication directly to the brain (intra-arterial thrombolysis) or using a device to break up or remove clots (mechanical thrombectomy) may not be beneficial. Researchers are working to determine who might benefit from this procedure. [29]

Hemorrhagic stroke

Emergency treatment of hemorrhagic stroke focuses on control bleeding and reducing pressure

in brain. Surgery also may be performed to help reduce future risk.

Emergency measures

If you take warfarin (Coumadin) or anti-platelet drugs such as clopidogrel (Plavix) to prevent blood clots, you may be given drugs or transfusions of blood products to counteract the blood thinners' effects. You may also be given drugs (intracranial pressure), lower blood pressure, prevent vasospasm or prevent seizures.

Surgical blood vessel repair: Surgery may be used to repair blood vessel abnormalities associated with hemorrhagic strokes. Doctor may recommend one of these procedures after a stroke or if an aneurysm or arteriovenous malformation (AVM) or other type of vascular malformation caused your hemorrhagic stroke:

- Surgical clipping: A surgeon places a tiny clamp at the base of the aneurysm, to stop blood flow to it. This clamp can keep the aneurysm from bursting, or it can prevent re-bleeding of an aneurysm that has recently hemorrhaged.
- Coiling (endovascular embolization): In this procedure, a surgeon inserts a catheter into an artery in your groin and guides it to your brain using X-ray imaging. Your surgeon then guides tiny detachable coils into the aneurysm (aneurysm coiling). The coils fill the aneurysm, which blocks blood flow into the aneurysm and causes the blood to clot.
- Surgical AVM removal**:** Surgeons may remove a smaller AVM if it's located in an accessible area of your brain, to eliminate the risk of rupture and lower the risk of hemorrhagic stroke. However, it's not always possible to remove an AVM if its removal would cause too large a reduction in brain function, or if it's large or located deep within your brain.
- Intracranial bypass: In some unique circumstances, surgical bypass of intracranial blood vessels may be an option to treat poor blood flow to a region of the brain or complex vascular lesions, such as aneurysm repair.
- Stereotactic radiosurgery: Using multiple beams of highly focused radiation, stereotactic radiosurgery is an advanced minimally invasive treatment used to repair vascular malformations. [30,31,32]

CONCLUSION

The brain controls most functions of the body. It allows us to think, understand, speak, move and feel. To work correctly, the brain constantly needs oxygen and glucose. Oxygen and glucose are carried to the brain in the blood. A stroke happens when blood is not able to reach the brain. When the brain does not receive its needed blood supply, brain cells begin to die and the brain can't function correctly. Since the brain controls most functions of the body, a stroke can affect the entire body

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