



STROKE - A REVIEW ON CURRENT TRENDING TOPIC.

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Abstract

Stroke is the world's second leading cause of death and a significant source of disability. Ischemic stroke is the most frequent type of stroke, and it is particularly widespread in developing nations. Stroke is the second most common cause of mortality and the third most common cause of disability. Ischemic strokes account for 68% of all strokes, while hemorrhagic strokes make for 32%. In the United States, ischemic stroke accounts for 87% of all strokes, hemorrhagic stroke accounts for 10%, and subarachnoid hemorrhage accounts for around 3%. Stroke is influenced by risk variables, both modified and unmodified. Doctors can employ a variety of diagnostic tests to detect the type of stroke. Medical and surgical treatment of stroke includes clot-busting and neuroprotective medications, as well as carotid endarterectomy, carotid stenting, surgery to repair aneurysms and AVMs and PFO closure.

Keywords: Stroke, Epidemiology, pathophysiology, Risk factors, Treatment.

INTRODUCTION

Stroke is a neurological condition in which blood arteries become blocked. Clots grow in the brain, interrupting blood flow and blocking arteries, causing blood vessels to burst, resulting in bleeding. When the arteries leading to the brain burst during a stroke, brain cells die suddenly due to a lack of oxygen. Dementia and despair are common side effects of stroke.

Stroke history

“The term stroke was most likely first used in medicine by William Colein in 1689 in a physico-medical study about late apoplexies frequencies.^[1] “Apoplexy was the most commonly used term before Cole to characterize acute non-traumatic brain injury. Hippocrates utilized it for about 2000 years, starting at 400 BC.^[2]

Definition

The world health organization defines stroke as a clinical illness characterized by quickly increasing clinical indications of focal (or global in the case of coma) disruption of brain function lasting more than 24 hours or leading to death, with no obvious explanation other than a vascular origin.^[3] Ischemic stroke, hemorrhagic

stroke, and subarachnoid hemorrhage are the three main types of stroke. Ischemic stroke occurs when a blood artery is blocked, limiting blood flow to the brain, whereas hemorrhagic stroke happens when a blood vessel ruptures, spilling blood into the cerebral cavity.^[4] Ischemic strokes account for 60–80 percent of all strokes.

EPIDEMIOLOGY:

Stroke is a life-threatening and disabling condition. It is the world's second leading cause of death. It affects 13.7 million people and kills 5.5 million people per year. Ischemic infarctions account for about 87 percent of strokes, a prevalence that grew significantly between 1990 and 2016, owing to lower mortality and better therapeutic management. The majority of strokes are caused by primary (first-time) haemorrhages, with secondary (second-time) hemorrhages accounting for 10–25 percent.^[5,6]

Each year, around 795,000 people in the United States have a new or recurrent stroke. In 2016, a person died of a stroke every 3 minutes 42 seconds on average, accounting for 1 in 19 deaths in the United States.

^[7] The global stroke prevalence was projected to be 2.7 percent between 2011 and 2014. ^[8]

Stroke is the second biggest cause of mortality in Europe, accounting for 405,000 men and 583,000 women fatalities per year. With around 1.6 million new stroke cases in Europe, stroke accounts for nearly 14% of all new CVD cases. Females had a somewhat greater incidence than males, with 880,000 new cases compared to 680,000 new cases. ^[9]

In China, the total number of strokes is 601.9 per 100,000. (age-adjusted). ^[10]

In rural areas, the prevalence is 1.6 percent, while in urban areas, it is 9.3 percent. ^[11]

In terms of mortality, stroke accounts for 28.8% (urban) to 29.1% (rural) of all deaths, making it one of the highest rates in the world. ^[12]

BURDEN OF STROKE

Stroke is a devastating and debilitating disease. It is the second leading cause of death worldwide, exceeded only by ischemic heart disease and a leading cause of adult disability. ^[12, 13]

STROKE PATHOPHYSIOLOGY

Stroke is described as a sudden neurological eruption caused by inadequate blood vessel perfusion to the brain. To research the clinical manifestation of a stroke, it is necessary to have a good understanding of neurovascular anatomy. Two internal carotid arteries in the front and two vertebral arteries in the back control blood flow to the brain (the circle of Willis). Hemorrhagic stroke is caused by bleeding or leaky blood vessels, while ischemic stroke is caused by a lack of blood and oxygen flow to the brain.

Around 85 percent of stroke victims die from ischemic occlusions, with the remainder dying from intracerebral hemorrhage. In the brain, ischemic occlusion causes thrombotic and embolic situations. ^[14] The narrowing of veins due to atherosclerosis affects blood flow in thrombosis. Plaque buildup will eventually narrow the vascular chamber and cause clots, resulting in thrombotic stroke. Reduced blood supply to the

brain region creates an embolism in an embolic stroke; blood flow to the brain decreases, producing acute stress and premature cell death (necrosis). After necrosis, the plasma membrane is disrupted, organelles enlarge, and cellular contents seep into the extracellular environment. [15] As well as the loss of neural function Inflammation, energy failure, loss of homeostasis, acidosis, increased intracellular calcium levels, excite toxicity, free radical-mediated toxicity, cytokine-mediated cytotoxicity, complement activation, impairment of the blood–brain barrier, activation of glial cells, oxidative stress, and leukocyte infiltration are all factors that contribute to stroke pathology. [16-20]

Hemorrhagic stroke accounts for approximately 10–15% of all strokes and has a high mortality rate. In this condition, stress in the brain tissue and internal injury cause blood vessels to rupture. It produces toxic effects in the vascular system, resulting in infarction. [21] It is classified into intracerebral and subarachnoid hemorrhage. In ICH, blood vessels rupture and cause abnormal accumulation of blood within the brain. The main reasons for ICH are hypertension, disrupted vasculature, excessive use of anticoagulants and thrombolytic agents. In subarachnoid hemorrhage, blood accumulates in the subarachnoid space of the brain due to a head injury or cerebral aneurysm. [22-23]

RISK FACTORS FOR STROKE:-

As previously stated, the risk of stroke rises with age and doubles in men and women over the age of 55. When a person has a pre-existing medical condition like hypertension, coronary artery disease, or hyperlipidemia, the risk increases even more. Patients having a history of transient ischemic attack account for nearly 60% of all strokes (TIA). Some of the risk factors for stroke can be changed, while others cannot.

A. Non-modified risk factors.

1. Age- Stroke rates rise with age, more than tripling beyond the age of 55. Strokes in adults aged 20–54 years, on the other hand, climbed from 12.9 percent to 18.6 percent of all cases globally between 1990 and 2016. [24]

2. Gender: Men have a higher risk of ischemic stroke at a younger age than women, while women have a higher mortality and lifetime risk of ischemic stroke in general. [25]

3. Race/ethnicity-African Americans are at a considerably higher risk of dying or being disabled as a result of a stroke than white people. This is largely due to the fact that African-Americans have a higher rate of high blood pressure. [26]

4. TIA- TIAs are also known as mini-strokes. The symptoms are similar to those of a stroke, although they don't stay as long. You're almost ten times more likely to suffer a stroke if you've had one or more TIAs than someone your age and sex who hasn't. [27]

5. Genetics - People with a family history of stroke have a higher risk of having a stroke. [28]

B.Modified risk factors

1. Hypertension - Blood pressure of 140/90 or greater might cause damage to the brain's blood vessels (arteries). ^[29]
2. Smoking- Tobacco use has been associated to an increased risk of stroke. A smoker has twice the risk of having a stroke as someone who does not smoke. Smoking is responsible for 15% of stroke-related deaths. According to research, quitting smoking lowers the relative risk of stroke, however chronic second-hand smoking raises the risk of stroke by 30%.^[30-32]
3. Abuse of alcohol and other drugs- Having more than two drinks each day elevates blood pressure. Binge drinking can cause a stroke. Drug usage increases the chance of blood clots causing a stroke (cerebral embolisms). Cocaine and other narcotics have been linked to heart attacks, strokes, and a variety of other cardiovascular issues. ^[33, 34]
4. Physical inactivity—Physical inactivity has been linked to a variety of negative health outcomes, including stroke. Physically active people have a lower risk of stroke and stroke mortality than those who do not exercise. ^[35, 36]
5. Hyperlipidemia- This condition is a key contributor to coronary heart disease, although its link to stroke is murky. Total cholesterol is linked to a higher risk of stroke, but high-density lipoprotein (HDL) is linked to a lower risk of stroke. ^[37-39]
6. Diet- Diet has an impact on stroke risk as well as other stroke risk factors such diabetes, hypertension, and dyslipidemia. ^[40]
7. Diabetes mellitus- Diabetes mellitus doubles the risk of ischemic stroke and has a 20% higher death rate. Furthermore, diabetes people have a worse prognosis after a stroke than non-diabetic patients, with higher incidence of severe impairment and delayed recovery. ^[41, 42]
8. Atrial fibrillation- (AF) has long been recognized as a major risk factor for stroke, and this risk has only increased as the US population has aged. In the last three decades, the number of strokes caused by AF has virtually tripled. ^[43]
9. Genetics: No modifiable risk factors for stroke include parental and family history, with parental and family history increasing the risk of stroke. ^[44]

SYMPTOMS OF STROKE

A stroke is a medical emergency. It's critical to recognize the symptoms of a stroke and seek care as soon as possible. Immediately dial 911 or your local emergency number. When treatment is started as soon as possible, it is most effective.

Symptoms of a stroke might appear unexpectedly. Symptoms differ from individual to person. Among the signs and symptoms are:

- Weakness or numbness in one side of the body, generally the face, arm, or leg
- Having difficulty communicating or comprehending
- Vision issues, such as dimmer eyesight or loss of vision in one or both eyes
- Dizziness or balance or coordination issues
- Movement or walking difficulties
- Passing out (losing consciousness) or having a seizure
- Severe headaches that appear out of nowhere
- Other stroke symptoms that are less common include:
 - Nausea or vomiting that isn't caused by a virus
 - Short-term loss of consciousness, such as fainting, disorientation, seizures, or coma^[45]

STROKE DIAGNOSIS

A comprehensive health history and physical examination will be taken by your healthcare professional. For a stroke, you'll need testing like brain imaging and blood flow measurements in the brain. The following tests may be performed:

- A computed tomography (CT) scan of the brain. An X-ray imaging procedure that produces clear, detailed images of the brain. A CT scan of the brain can reveal bleeding or damage to brain cells caused by a stroke. It is used to detect anomalies and to assist in determining the site and kind of stroke.
- Magnetic resonance imaging (MRI). This test creates comprehensive images of organs and structures in the body using a combination of massive magnets, radiofrequencies, and a computer. Magnetic fields are used in an MRI to detect minute changes in brain tissue that aid in the detection and diagnosis of stroke.
- CTA (call to action) (computed tomographic angiography). The blood vessels as seen on an X-ray picture. A CT angiography is a procedure that employs CT technology to produce images of blood arteries.
- MRA (Multiple Resource Agreement) (magnetic resonance angiography). The blood flow via the arteries is checked using MRI technology.
- Doppler sonography- is a type of sonography that uses sound waves to determine (carotid ultrasound). A test that creates images of the inside of your carotid arteries using sound waves. This examination might reveal whether your carotid arteries have constricted or become obstructed due to plaque.

The following heart tests may also be done to aid in the diagnosis of heart abnormalities that have resulted in a stroke:

- An electrocardiogram (ECG)- This test measures the electrical activity of your heart. It reveals any abnormal cardiac rhythms that could have resulted in a stroke.
- Echocardiography. This test creates a picture of your heart using sound waves. This test will reveal your heart's size and shape. It can determine whether or not the heart valves are functioning appropriately. It can also check for blood clots within your heart. [46, 47]

EMERGENCY TREATMENT ON STROKE

On stroke medical and surgical treatments used in that medical treatments use for clot busting medicines, neuroprotective medicines and in surgery Carotid endarterectomy, Carotid Stenting, Surgery to repair aneurysms and AVMs and PFO closure used.

Clot-busting medicines (thrombolytic or fibrinolytic). These medicines dissolve the blood clots that cause an ischemic stroke. They can help reduce the damage to brain cells caused by the stroke. To be most effective, they must be given within 3 hours of a stroke occurring.

Medicines and therapy to reduce or control brain swelling. Special types of IV (intravenous) fluids are often used to help reduce or control brain swelling. They are used especially after a hemorrhagic stroke.

Neuroprotective medicines. These medicines help protect the brain from damage and lack of oxygen (ischemia).

Life support measures. These treatments include using a machine to help you breathe (a ventilator), having IV fluids, getting proper nutrition, and controlling your blood pressure.

Craniotomy. This is a type of brain surgery that is done to remove blood clots, relieve pressure, or repair bleeding in the brain. [48]

MEDICINES

Take your medicines as instructed by your healthcare provider. The following medicines can help prevent stroke:

- Blood-thinning medicines (anticoagulants) help prevent blood clots from forming. If you take a blood thinner, you may need regular blood tests.
- Antiplatelet, such as aspirin, are prescribed for many stroke patients. They make blood clots less likely to form. Aspirin is available over the counter
- Blood-pressure medicines help lower high blood pressure. You may need to take more than one blood-pressure medicine.
- Cholesterol-lowering drugs make plaque less likely to build up in your artery walls, which can reduce the risk for stroke.

- Heart medicines can treat certain heart problems that increase your risk of stroke.
- Diabetes medicines adjust blood sugar levels. This can prevent problems that lead to stroke.^[49-51]

SURGERY

Several types of surgery may be done to help treat a stroke, or help to prevent one. These include:

- **Carotid endarterectomy.** Carotid endarterectomy is surgery to remove plaque and clots from the carotid arteries, located in the neck. These arteries supply the brain with blood from the heart. Endarterectomy may help stop a stroke from occurring
- **Carotid stenting.** A large metal coil (stent) is placed in the carotid artery much like a stent is placed in a coronary artery.
- **Surgery to repair aneurysms and AVMs (arteriovenous malformations).** An aneurysm is a weakened, ballooned area on an artery wall. It is at risk for bursting (rupturing) and bleeding into the brain. An AVM is a tangle of arteries and veins. It interferes with blood circulation and puts you at risk for bleeding.
- **PFO (patent foramen ovale) closure.** The foramen ovale is an opening that occurs in the wall between the 2 upper chambers of the heart. This opening usually closes right after birth. If the flap does not close, any clots or air bubbles can pass into the brain circulation. This can cause a stroke or TIA (transient ischemic attack). However, experts are still debating whether the PFO should be closed.^[52]

KEY POINTS IN A STROKE

- A stroke occurs when the blood supply to the brain is cut off.
- It is a life-threatening circumstance caused by a constricted blood vessel, hemorrhage, or a blood clot that prevents blood flow. Symptoms can appear out of nowhere.
- If someone appears to be having a stroke, dial 911 right away.
- If emergency care is started straight away, you have a better chance of recovering from a stroke.
- How a stroke affects you is determined by the location of the stroke in your brain and the extent of the damage to your brain.

CONCLUSION

Stroke is a second leading cause of death and contributor to the disability worldwide. The recently trends of increasing stroke. In many countries in especially adult populations: Different factors effects on stroke to leading different sign and symptoms. In emergency treatments on stroke use medical and surgical treatment.CTA, CT SCAN, MRI, MRA as Different tests are used to diagnosis of the stroke.

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