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Stroke: Preventive Strategies

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ABSTRACT

A stroke, also known as a cerebro vascular accident (CVA), is a sudden loss of brain function brought on by an issue with the brain's blood supply, commonly referred to as a brain assault. This may be the result of a haemorrhage or ischemia, which is a loss of blood flow brought on by a blockage (thrombosis, arterial embolism). A stroke is a medical emergency that can result in death or irreversible neurological damage. Stroke is a cerebrovascular disease. This indicates that it has an impact on the blood arteries that carry oxygen to the brain. Damage could begin if the brain does not get enough oxygen. A stroke happens when the blood supply to the brain is interrupted or reduced due to a blockage or leak in the blood arteries. When this occurs, the brain's cells begin to deteriorate because it is not getting enough nourishment or oxygen. 90% of all these strokes can be preventable through life style modification.

Keywords: Stroke, Cerebro Vascular Accident, FAST, DALY, TIA

INTRODUCTION

Stroke, sometimes referred to as paralysis, is a major non-communicable disease that is the leading cause of mortality and severe disability in the adult population. The illness stroke also adversely affects a person's quality of life, functional abilities, mood swings, and cognitive capacities. This illness also puts a strain on the caregiver and causes financial hardship for patients, families, and the country as a whole. Every year, October 29th is designated as World Stroke Day.

According to data currently available, around 1.5 out of every 1000 people in India are estimated to have a stroke each year, and of them, 41% may die from acute stroke-related illness. Thus, of the 1.2 billion individuals that currently make up India's population, roughly 1.8 million may have a stroke annually, and of them, about one-third pass away as a result of the illness.

Today's population is under a great deal of stress to meet their basic needs, and this, along with abrupt changes in daily routine, dietary habits, relocation, and other related factors, puts us at risk for developing a stroke, which is extremely deadly.

DEFINITION OF STROKE

A stroke is comparable to a heart attack, except that the brain's blood supply is cut off instead of the hearts. Cerebrovascular accidents (CVAs) are another name for strokes. The brain's arteries can become temporarily or permanently clogged. Permanent blockages that do not quickly and spontaneously clear themselves are sometimes referred to as strokes. These obstructions cause physical or mental disabilities as well as irreversible brain damage.

A stroke is a medical illness characterized by an abrupt or acute loss of brain function that arises from either intracranial hemorrhage or a significant decrease in blood supply to the brain. Stroke is a major health concern in the twenty-first century and one of the primary causes of mortality globally.

PREVALENCE

Age-adjusted cerebrovascular incidence rates in Western developed nations vary from 100 to 300 per 100,000 persons annually. Approximately 700.000 individuals of all ages in the US experience a new or recurrent stroke each year. Stroke is the third most common cause of mortality in the US, accounting for over 158.000 of these deaths. In 100.000 people, there are 270–290 stroke cases reported annually in Mongolia; this suggests that the country has a higher stroke incidence rate

than the global average. Cerebral ischemia made up 87% of all forms of stroke in wealthy nations. Epidemiological studies suggest that ischemic strokes account for 80-85%, hemorrhagic strokes for 15-20% and subarachnoid haemorrhages for 10%. Of ischemic strokes, cardio embolism account for 15-30%, atherosclerotic infarction accounts for 15-40%.

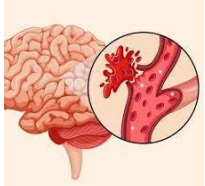
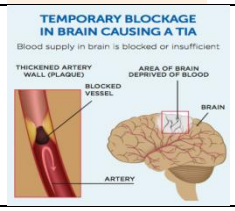
In India, stroke accounts for 3.5% of the disability-adjusted life years (DALY), making it a significant Non-Communicable Disease (NCD). Stroke is the third largest cause of mortality globally, accounting for 113 million disability-adjusted life years (DALYs) and a total of 6.5 million deaths in 2013. Over two thirds of these fatalities happened in underdeveloped nations.

Over 80% of the estimated 15 million additional stroke cases worldwide by 2050 are expected to occur in low- and middle-income nations. According to research, there are between 116 and 163 stroke cases for every 100,000 people in India. In a recent study titled "India: Health of the Nation's States," published by the ICMR, stroke ranked fifth in terms of disability-adjusted life years (DALY) and fourth in terms of overall mortality in 2016.

A community-based approach known as the "take charge" strategy or protocol aids in the self-management of stroke & its aftereffects. This idea holds that when a stroke victim takes care of their regular needs on their own, they feel safer and more at ease. Participating in day-to-day tasks with little help or support fosters accountability and independence. **(International journal of stroke)**

SUBTYPES OF STROKE

Stroke's pathogenesis may be broadly classified into two categories:

Ischemic stroke: Representing 87% of all instances, this form of stroke is the most prevalent. A portion of the brain cannot receive blood or oxygen because of a blood clot.	
Hemorrhagic stroke: When a blood vessel bursts, this happens. These are typically brought on by arteriovenous malformations (AVMs) or aneurysms.	
Transient ischemic attack (TIA): This happens when there is a temporary interruption in the blood flow to a specific area of the brain. After a brief period of time, normal blood flow returns, and the symptoms go away on their own. Others refer to this as a ministroke.	

CAUSES AND RISK FACTORS OF STROKE:

Stroke can occur in anyone regardless of race, gender or age however the chances of having a stroke increase if an individual has certain risk factors that can cause a stroke.

People's lifestyles have been impacted by the industrialization and globalization that have occurred over the past 20 years, especially in emerging nations. The rising number of stroke cases is a result of both fast cultural adaption in the West and demographic shifts that have led to a rise in the older population, including:

1] Sedentary lifestyle
2] Adverse health behaviors, such as smoking, drinking alcohol, and eating a diet heavy in fat or cholesterol.

Key factors that increase the risk for coronary artery disease and stroke, including hypertension, diabetes, hypercholesterolemia, sedentary lifestyle, obesity, and heavy alcohol use, have increased as a result of these.

Stroke risk factors are divided into-

Modifiable risk factors	**Non-modifiable risk factors**
Life style risk factors, e.g. a. smoking b. alcohol use c. physical inactivity d. obesity **Medical risk factors, e.g.** a. high blood pressure b. atrial fibrillation c. diabetes mellitus d. high cholesterol	a. Age b. Gender c. Family history of stroke d. Race

Clinical Manifestations

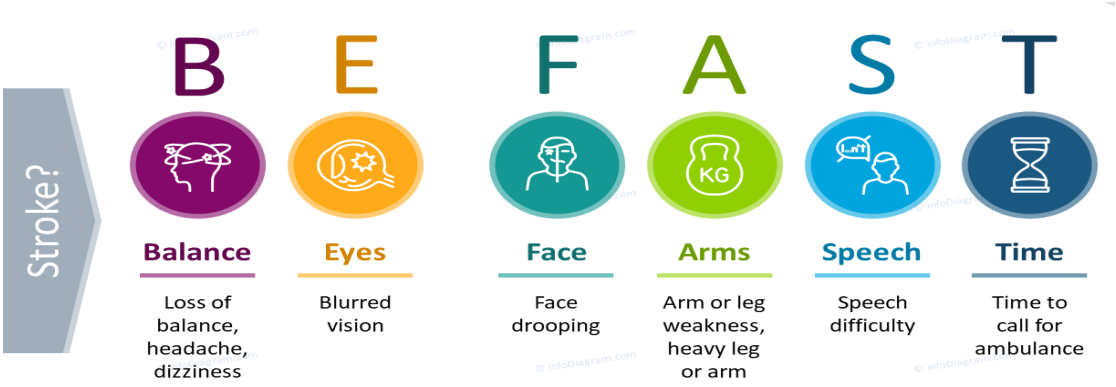
1] Morning signs in clients with stenosis of great blood vessels in the neck
2] Hemiplegia
3] Transient loss of speech
4] Paresthesia involving half of the body

The above features are called as Transient Ischemic Attacks (TIAS)

Five events that may leads cerebral haemorrhage in hypertensive patients

a. Acute occipital headache or at nape of the neck [nuchal]. b. Dizziness(vertigo) or fainting(syncope) c. Motor or sensory disturbances-e.g.parasthesia and tingling d. Epistaxis-bleeding from nose e. Retinal hemorrhage	Other findings like- a. Headache b. Fever c. Confusion d. Vomiting e. Seizures f. Nuchal rigidity g. Hypertension h. Disorientation i. Impairment of memory

Warning Signs of Stroke:



Learning the acronym "FAST" is a good way to remember the symptoms of stroke. This can help a person seek prompt treatment. **FAST** stands for:

- **Face drooping**: If the person tries to smile, does one side of their face droop?
- **Arm weakness**: If the person tries to raise both their arms, does one arm drift downward?

- **Speech difficulty:** If the person tries to repeat a simple phrase, is their speech slurred or unusual?
- **Time to act**: If any of these symptoms are occurring, contact the emergency services immediately.
- The outcome depends on how quickly someone receives treatment. Prompt care also means that they would be less likely to experience permanent brain damage or death.
- Beyond **F.A.S.T.,** a stroke may also cause the following symptoms to develop suddenly:
- difficulty walking
- dizziness
- falling without an identifiable cause
- a sudden inability to understand speech
- confusion
- rapidly developing vision problems
- a severe headache without an apparent cause

Diagnostic Evaluation

1. Gathering the client's medical history; this includes any head trauma, mishaps, diseases of the brain such as meningitis or encephalitis, and co-morbid conditions such as diabetes, hypertension, etc.
2. Fundoscopy and neurological testing are included in the physical evaluation.
3. Coagulation studies include PT, APTT, INR, heart-related enzymes like troponin, CKMB, and CPKMB, lipid profiles, diabetic work up cholesterol level, an erythrocyte sedimentation rate (ESR) for heart disease, electrolytes in the serum, renal function tests, and blood studies include full blood counts to detect polycytheamia.
4. CSF sensitivity and culture to identify any encephalitis and meningitis
5. Examination of the CSF (cerebrospinal fluid)
6. Skull X-ray study
7. ECG to rule out myocardial infarction (MI) and arrhythmias.All stroke patients require it (AHA/ASA procedures and recommendations).
8. Echocardiography to detect intracardiac clots and valvular disease
9. Angiography of the brain
10. CT scans can be used to identify hemorrhagic strokes.
11. Brain MRI: This scan offers a three-dimensional picture of the brain on a range of radio imaging slides, making it easier to find and classify lesions in the dorsal fossa, especially in cases of posterior circulation stroke when the cerebellum and pons are involved. Additionally, it is advised that clients experiencing temporary neurologic symptoms have neuroimaging as soon as feasible, ideally within 24 hours.
12. The Glasgo Coma Scale draws conclusions about the state of consciousness and determines the initiation of therapies.

Common failures/misjudgments in prompt management of stroke

1] Striking patients with elevated blood pressure as soon as possible and aggressively
2] Hemorrhagic stroke may be mistakenly diagnosed as hypertensive encephalopathy.
3] Inadequate or incorrect identification and management of hyper- and hypoglycemia.
4] Inadequate treatment and inadequate diagnosis of stroke consequences.

THERAPEUTIC RECOMMENDATIONS

Table 1: Phases of contemporary management of stroke

Phases	Period From Onset	Activities	Preferred Location
1.Acute(emergency) care: hyper acute or acute	First to seventh day	1.Assessment 2.prompt and early supportive care	Institutional or hospital
2.Early sub acute (supportive) care	Second to fourth week	1.prevention and treatment of complications	Hospital
3.Late sub acute (maintenance) care	Second to sixth month	1.Intiation of rehabilitation 2.Providing supportive psychological support 3.preventtion of onset recurrence	Institutional or Community
4.Long term (chronic) care	Seventh month onwards	1.continuation of rehabilitation 2.sustained psychological support 3.prolonged social support 4.prevention of further recurrence	Community

Medical management
It consists of the following treatment modalities-

1] Supportive management like

a. Maintenance of patent airway
b. Regulation of normal body temperature
c. Monitoring and recording of blood pressure
d. Cardiac assessment
e. Periodical assessment of blood glucose level

2] Thrombolysis-intravenous or intra arterial

3] Antiplatelet drugs

4] Anticoagulant drugs

5] Hemodilution, vasodilators and induced hypertension

6] Neuroprotective agents
a) Resting in bed In addition to improving venous drainage, giving patients a full 30 degree head elevation while they are in bed will assist lower intracranial pressure.
b) Regularly checking blood pressure c) Glasgow coma scale: used to gauge consciousness
d) Carefully provide intravenous fluids to prevent fluid overload e) The patient could need mechanical ventilation

Complications of stroke:
Stroke complications can include, but are not limited to, cerebral edema, herniation, using, aspiration, pneumonia caused by aspiration, urinary tract infection, cardiovascular dysrhythmia, deep vein thrombosis, fever, the infarct extension or recurrence, and pulmonary embolism. Transtentorial herniation and bleeding are the most common causes of mortality within the first week following the commencement of a stroke; bleeding deaths often occur during the first three days, whereas cerebral infarction deaths typically occur between the third and sixth day. A week following the beginning of the stroke, pneumonia, sepsis, and pulmonary embolism—complications arising from relative immobility—usually cause mortality. Within 24 hours after the stroke start, a fever or high body temperature is linked to a poor prognosis and extensive brain infarcts.

Blood pressure: In the early 24 hours following a stroke, both hypertension and hypotension are linked to unfavorable outcomes. Hypertension can be a sign of first-degree ICH or hypertensive encephalopathy, as well as oedema and hemorrhage.

Dysphagia affects 27–55% of stroke patients who have had a recent onset.By six months, only around half of individuals impacted are able to swallow normally again. It is linked to a higher risk of side effects such malnourishment, dehydration, and aspiration pneumonia.

Poor prognostic factors in stroke

1] Frequent fever 2] Severe hypertension and decreased blood pressure 3] Reduced oxygen saturation 4] Uncontrolled diabetes 5] Extremely low GCS score
5] Hemiplegia/hemiparesis severity

Early prevention and adequate management of complications –

1] Immediate treatment of problems aids in improving prognosis over the short and long terms.
2] Stroke aftereffects might be classified as neurological or medical.
3] Depending on when they start, complications can also be classified as acute or subacute.

MANAGEMENT OF STROKE BY SURGICAL METHOD

Ischemic stroke
1] Endovascular procedures or interventions-it includes the following

a. Angioplasty-
b. Extraction of clot
c. Disruption of clot
d. Angioplasty and Stenting

2] Parathyroidectomy
3] Surgical bypass
3] In the case of cerebral bleeding, surgical excision of the hemotome or blood clot is included.
4] For subarachnoid hemorrhage (SAH), coiling or cutting aneuristic or dialated blood vessels.
5] Surgery might be used to decompress a brain hemoatoma.
6] A craniotomy can decompress a cerebral enema.
7] Ventricular shunting or drainage in patients with intraventricular hemorrhage and severe hydrocephalus.

Nursing Management/ Supportive Management/Care At Earliest Stage

1. The majority of patients, or around 25%, will experience a deterioration of their neurological condition in the first 24 to 48 hours.
2. The effective usage of stroke units might aid in improving the general management of clients.
3. In order to encourage venous outflow from the upper body, we must nurse the patient with their head tilted up and supported up.
4. A continuous evaluation of neurological changes for degradation, including consciousness level, pupillary response, and sensitivity to sensory stimuli, which helps to avoid brain tissue herniation.
5. Constant cardiac work-ups or monitoring is crucial when there are risk factors for coronary heart disease (CHD).
6. When a client is comatose or unable to swallow, Ryles feeding tube is employed. For aware customers, we must first conduct a swallowing test before initiating the oral feeding procedure. Remember to position the client semi-upright and maintain appropriate food consistency and hygiene for both the client and the meal.
7. Early ambulation and mobility should be promoted for persons with mild severity.
8. It is crucial to begin physical therapy as soon as possible in order to enhance range of motion and encourage a speedy and healthy recovery.

CARE OF A PATIENT WITH STROKE INCLUDES

Maintenance of patent airway and good ventilation

1. Regular oral secretions suctioning
2. It is best to remove loose teeth or dentures from the mouth.
3. Clients who exhibit symptoms of neurological dysfunction or who have changed or declining levels of awareness should have elective intubation.
4. Early signs of endotracheal intubation include customers who are at risk of aspiration and persistently having a low partial pressure of oxygen (under 60 mm Hg) or high partial strength of carbon dioxide (greater than 50 mm Hg).
5. When there are pulmonary difficulties and a lengthy coma lasting more than two weeks, tracheostomy must be performed.
6. It is vitally important to provide sufficient and additional tissue oxygenation in order to stop the progression of brain damage.
7. In accordance with the American Stroke Association's criteria or standards, we must keep the total pressure of oxygen or the saturation level of oxygen at or above 95%.

Fluid management or hydration therapy-

1. In cases of acute ischemic stroke, hypovolemia is invariably linked to a deadly consequence and a higher fatality rate.
2. For volume control, normal saline solution, or 0.9 percent, should be encouraged; three litters should be provided daily on average.
3. We must avoid using hypotonic solutions, such as 5 percent dextrose in water, in order to avoid cerebral oedema.

Management of temperature-

1. Frequent high fever spikes are usually linked to worse outcomes for stroke patients, and they may be caused by the following factors: a. high metabolic rate; b. affects neurotransmitter surge or flow; c. generates more free radicals.
2. Regular use of cold packs or sponges aids in reducing body temperature and promotes good recovery in stroke victims.
3. Convectional cooling is facilitated by adequate ventilation in the space.
4. Regular dental treatment or cleanliness makes the customer feel more energised and upbeat.
5. Keep chilly breezes and draughts out of the customer area.
6. Common antipyretic medications, such as an infusion of acetaminophen or paracetamol prescribed by a doctor.
7. If a fever is caused by an underlying illness, associated drugs are also administered.
8. Reith and Lancet claim that for every degree Celsius that a person's body temperature rises, their chance of a bad consequence doubles.
9. Since fever usually begins to rise over the first 24 hours, it's critical to often check the temperature.
10. It's important to keep in mind that the body's core temperature is often lower in the brain than it is elsewhere.
11. Treatment must be administered effectively, utilizing antipyretics such as acetaminophen.

Usage of Anticoagulants-

1. Thrombolysis can be performed in the first four t five hours of treatment with the use of alteplase, streptokinase, and other medications.
2. A typical dosage is one milligram for every kilogram of the client's body weight.
3. The risk of cerebral hemorrhage may be present in around 6% of individuals.
4. Using thrombolytics appropriately can cut incidence by thirty percent.

Management of blood pressure-

In the acute stage of a stroke, lowering blood pressure is highly challenging and contentious.

Because low blood pressure might result in tissue perfusion failure, blood pressures should be maintained within upper normal ranges.

With extreme caution, arterial pressure should be dropped when a treatment modality is started; within the first 24 hours, this should be reduced by around 15%.

Proper blood pressure control lowers the risk of: a. cerebral edema production; b. hemorrhagic transformation; and c. stroke recurrence.

It is important to realize that a sharp drop in blood pressure causes a drop in perfusion pressure in the ischemic areas of the brain.

Clinical research data indicate that it is best to start antihypertensive therapies within a period of 24 hours following a stroke.

When managing an acute ischemic stroke, the right antihypertensive drug selection is not supported by enough evidence or statistics.

Nicardipine 5 mg intravenously each hour, up to a maximum of 15–18 mg/hour, or labetalol 10 mg intravenously, followed by a continuation of the IV infusion of 2–8 mg per minute, can be used when the systolic blood pressure is greater than 170–220 mm Hg or the diastolic blood pressure is greater than 110–125 mm Hg.

If your blood pressure is uncontrolled or higher than 135 to 140 mm Hg, you should think about getting sodium nitroprusside intravenously and using oral antihypertensive medications like captopril and atenolol.

Protocols for blood pressure management in haemorrhagic stroke-

- Management of blood glucose level
- Use of Anticoagulants for stroke
- Use of Antiplatelets for stroke

Rehabilitation for stroke

Less than one-third of patients recover completely after stroke, even with the best possible care in a stroke center, including thrombolysis. The goal of rehabilitation is to help individuals with impairments operate as best they can on the physical, intellectual, psychological, and/or social levels. Rehabilitation objectives might change from the basic input of minimizing disability to more intricate treatments intended to promote active engagement.

Arrangement for healing

1. For acute stroke patients to get coordinated multidisciplinary rehabilitation, it is advised that they be admitted to a stroke unit with a rehabilitation facility;
2. Early rehabilitation commencement is advised;
3. If rehabilitation is given in community settings by an array of professionals with stroke competence, it is advised that physically sound individuals with mild to moderate disability may be discharged from the stroke unit early;
4. For certain individuals, tricyclic or anticonvulsant treatment is advised to manage post-stroke neuropathic pain;
5. It is advised that pharmacological therapy and non-drug therapies be used to help depressed individuals' mood and cognitive performance;
6. It is advised to continue therapy upon discharge for the first year following a stroke;
7. It is advised to lengthen and intensify rehabilitation;

Stroke unit study results indicate that well-coordinated multidisciplinary teams of personnel with stroke treatment competence are preferable. These teams can consist of stroke doctors, brain surgeons, physiatrists, neuroradiologists (including those conducting interventions), transpiring surgeons, dietitians, cardiac surgeons, nursing staff, physiotherapists, occupational therapists, and speech and language therapists. The exact makeup of these teams is not set in stone.

Preventive measures of Stroke

Up to 90% of all strokes are preventable, and attributable to 10 modifiable risk factors.

The primary goal of stroke prevention is to lower the risk of stroke by either lowering the possibility of acquiring risk factors or managing different risk factors that raise the risk of stroke.

- DASH diet. The DASH eating plan is based on2000caloriesaday. This diet is rich in proteins, nutrients and fiber. Diet rich in proteins are cereals, groundnuts, almonds, Skinless chicken, fish, leafy vegetables like Spinach, Palak, cauliflower, fenugreek leaves, radish leaves.
- Drink plenty of water at least 10 glasses.
- Reduce intake of salt, fat, coffee, Use lean meat.
- Avoid junk foods
- Regular blood cholesterol testing is necessary. High blood cholesterol (e.g., LDL > 150 mg/dl [3.9 mmol/l]) is best controlled with statins and a change in lifestyle;
- It is advised to give up smoking cigarettes.
- It's advised to exercise frequently;
- Heavy alcohol use and the use of sympathomimetic medications should be avoided.
- It is advised that those with an increased body mass index follow a diet that lowers their weight;
- It is not advised to use antioxidant vitamin supplements;
- Reduce stress and take adequate rest.
- The main prevention of stroke is not advised with hormone replacement treatment; Strokes are known to be less common in people who lead healthy lifestyles that include quitting smoking, maintaining a low body mass index, getting regular exercise, and eating a balanced diet.
- It is recommended that low-dose aspirin may be considered in men for the primary prevention of myocardial infarction; however, it does not reduce the risk of ischemic stroke;
- Antiplatelet agents other than aspirin are not recommended for primary stroke prevention;

Summary

90% of all strokes are preventable. Stroke can be controlled by the life style modifications. Health should be maintained by the person to avoid ill effects, because prevention is better than cure.

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