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Case Report

A case study on cerebrovascular accident

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ABSTRACT

CVA is a significant global health problem and a major cause of mortality and morbidity in developed countries. Cerebral stroke (CVA) is a medical emergency that can cause permanent neurological damage or even death. According to the WHO statistics, stroke was the second most frequent cause of death worldwide in 2012 and the main cause of disability.

The present study reported 59 years male ,married, hailing from Kokrajhar came to BH admitted in Intensive Care Unit on 13/08/2023 with the complain of Syncope, Not able to move right side of the body since 4 days,Face drooping at right side since 4 days,Loss of sensation in right side of the body since 4 days,Not able to eat food properly since 4 days,Difficulty speech since 4 days ,Patient was unconscious and was transferred to the ICU in stretcher and after various lab investigation, diagnostic procedures, patient was diagnosed as CVA and was treated with Tissue Plasminogen Activator and is under observation

1. Introduction

1.1. Cerebrovascular accident

CVA occurs when there is ischemia to a part of the brain or hemorrhage into the brain that results in death of brain cells. Functions such as movement, sensation or emotions that were controlled by the affected area of the brain are lost or impaired.[1]

70% of CVA occur in low-middle income countries and the subsequent disease burden is greater than that of high income countries. According to the Indian Stroke Association (ISA) There has been more than 100 per cent increase in incidence of stroke in low- and middle-income countries including India from 1970-1979 to 2000-2008.[2]

2. Etiology

1. Ischemia[3]
   (a) Most common type of stroke (87%)
   (b) It happens when the brain's blood vessels become narrowed or blocked, causing severely reduced blood flow.
   (c) It is caused by atherosclerosis.
2. Haemorrhage[3]
   (a) Haemorrhage occurs when the blood vessels leaks or ruptures.
   (b) Uncontrolled high BP
   (c) Overtreatment with blood thinness
   (d) Aneurysm
   (e) Cerebral amyloid angiopathy

3. Risk Factors[3]

1. Diet
2. Inactivity
3. Heavy alcohol and tobacco use
4. Family history
5. Sex

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6. Age
7. Race and ethnicity
8. Hormones
9. Health history

4. Types of Stroke

4.1. Ischemic stroke

4.1.1. Thrombotic stroke

It occurs from injury to a blood vessel wall and formation of a blood clot.

The lumen of the blood vessel narrowed and if it becomes occluded, infarction occurs.[4]

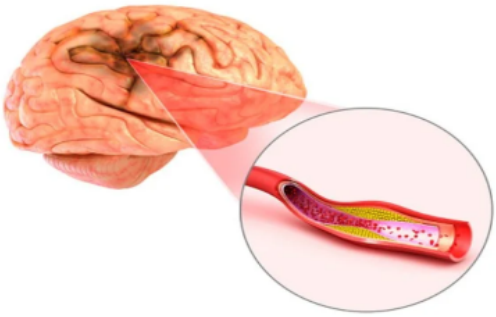

Figure 1: Showing ischemic stroke

4.1.2. Lacunar stroke

Refers to a stroke from occlusion of a small penetrating artery with development of a cavity in the place of the infarcted brain tissue.This most commonly occurs in the basal ganglia, thalamus, internal capsule and pons.[4,5]

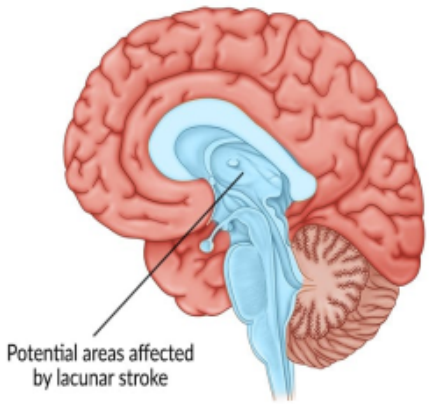

Figure 2: Showing Lacunar stroke

4.1.3. Embolic stroke

It occurs when an embolus lodges in and occludes a cerebral artery, resulting in infarction and edema of the area supplied by the involved blood vessels (24%)[4]

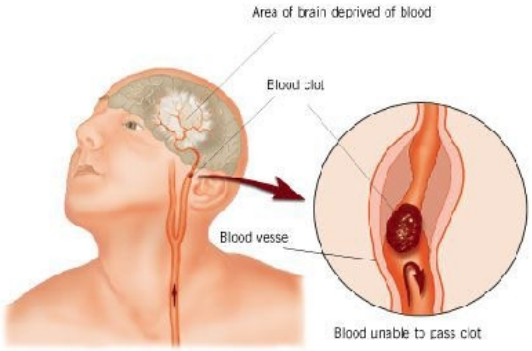

Figure 3: Showing Embolic stroke

1. Haemorrhagic stroke

   (a) Intracranial haemorrhage[4]

   i. ICH is bleeding within the brain caused by a rupture of a vessel and accounts for about 10% of all stroke. HTN is the common cause.

   ii. Occurs in the putamen and internal capsule, central white matter, thalamus, cerebellar hemispheres and pons.

   iii. Putaminal and internal capsule bleeding include weakness of one side, slurred speech and deviation of the eyes.

   iv. Thalamic haemorrhage results in hemiplegia with more sensory motor loss.

   v. Cerebellar haemorrhage are characterized by severe headache, vomiting, dysphagia, difficulty walking.

   vi. Haemorrhage in pons is the most serious because basic life function are rapidly affected. It can be characterized by hemiplegia leading to complete paralysis, coma, abnormal body posture, fixed pupils, hyperthermia and death.

   (b) Subarachnoid haemorrhage

   i. SAH occurs when there is intracranial bleeding into the CSF filled space between the arachnoid and pia meter membranes on the surface of the brain.

   ii. It is commonly caused by rupture of a cerebral aneurysm. The majority of aneurysms are in the circle of willis.

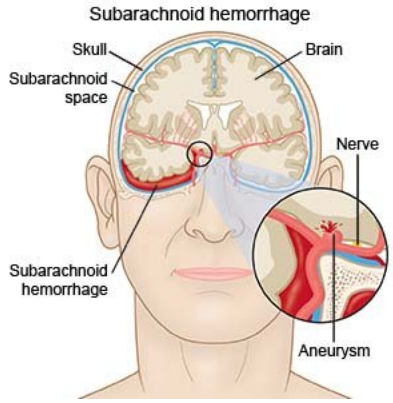

Figure 4: Showing subarachnoid haemorrhage

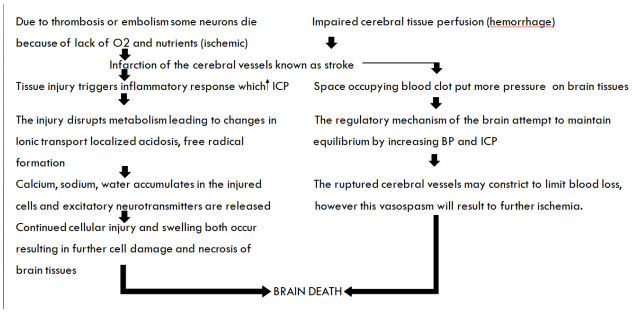

Figure 5:

Table 1: Clinical manifestations of right-brain and left-brain stroke[6]

S.No.	Right brain damage		Left brain damage	
	Book picture	Patient picture	Book picture	Patient picture
1.	Paralyzed left side	Absent	Paralyzed right side	Present
2.	Left-sided neglect	Absent	Impaired speech/ language aphasia	Present
3.	Spatial perceptual deficits	Absent	Impaired right/ left discrimination	Absent
4.	Tends to deny or minimize problems	Absent	Slow performance	Present
5.	Rapid performance, short attention span	Absent	Aware of deficits : depression, anxiety	Present
6.	Impulsive, safety problems	Absent	Impaired comprehension related to language	Present

5. Pathophysiology[6]

6. Warning Signs of Stroke[6]

1. "BE- FAST"
2. B- BALANCE (loss of balance, headache or dizziness)
3. E- EYES (blurred vision)
4. F- FACE (one side of the face is drooping)
5. A- ARMS (arm or leg weakness)
6. S- SPEECH (speech difficulty)
7. T- TIME (time to call for ambulance immediately)

7. Diagnostic Evaluation[7]

1. History taking
2. Physical examination
3. CT scan
4. MRI
5. PET scan
6. MRS
7. Angiography
8. Digital Subtraction Angiography
9. Transcranial Doppler Usg
10. Cardiac tests
11. Blood tests

8. Management

Emergency management of stroke

8.1. Initial Management[6]

1. Ensure patent airway.
2. Call a stroke code or the stroke team.
3. Remove dentures.
4. Perform pulse oximetry.
5. Maintain adequate oxygenation with supplemental oxygen, if necessary.
6. Establish IV access with normal saline.
7. Maintain BP according to guidelines.
8. Remove tight clothing.
9. Obtain CT scan immediately.
10. Perform baseline laboratory tests immediately, and treat if hypoglycaemic.
11. Position head midline.
12. Elevate head of bed 30 degree. If no symptoms of shock or injury, elevate the bed.
13. Initiate seizure precautions.
14. Anticipate thrombolytic therapy for ischemic stroke.

8.2. Ongoing monitoring

1. Monitor vital signs and neurologic status, including level of consciousness (GCS), motor and sensory function, pupil size and reactivity, SpO2 and cardiac rhythm.
2. Reassure patient and family.

9. A Case Study

A case study of a X ,59 years male ,married, hailing from Kokrajhar came to BH admitted in Intensive Care Unit on 13/08/2023 with the complain of Syncope ,Not able to move right side of the body since 4 days,Face drooping at right side since 4 days, Loss of sensation in right side of the body since 4 days, Not able to eat food properly since 4 days, Difficulty speech since 4 days ,Patient was unconscious and was transferred to the ICU in stretcher and after various lab investigation, diagnostic procedures, patient was diagnosed as CVA and was treated with Tissue Plasminogen Activator and is under observation .

9.1. Past history of illness

1. Childhood illness- Patient has no history of childhood illness except seasonal common cold and cough, diarrhoea, fever.
2. Adulthood illness, any current medication- patient has a history of hypertension since 6 years and is under anti-hypertensive medications.
3. Psychiatric illness- No history
4. Injuries, hospitalization- No history
5. Diagnostic and surgical procedures- patient has not undergone any surgical procedures before but has undergone USG, ECG and other blood investigations.
6. History of blood transfusion- No history
7. Use of alcohol and other drugs- patient use to drink occasionally 8 years back.

9.2. Family history of illness

4 members, Family history of hypertension is present. Patient's grandfather, father and mother were hypertensive, Patient's both parents expired and siblings are healthy, wife and children's health status is good,Patient's parents were hypertensive but no history of CVA presen,vaccination and immunization- Patient has been immunized with polio, Hep B, DPT and TT, patient is well- nourished ,Non-vegetarian,Personal hygiene- well- maintained ,Bowel and bladder habit- Normal,no historyAllergy to any drug, patient is engaged in active assisted exercise. Previously, before hospitalization he use to go exercise everyday,patient has insight about the disease and believes that he will be healthy.

9.3. Socio-economic history

Source of income- patient himself is the source of income,Income per month- Approx 50,000/-, patient house is pucca house and well-furnished. patient's house is well-ventilated with doors, windows and proper day light and electricity is available,Govt. supply as well as hand pump is present and drainage is closed drainage system.good and healthy relationship with family members, Govt medical college, private hospitals, nursing homes are available near patient's residence patient beliefs in spirituality and have faith on god and visit temple occasionally. Family origin or ancestors- patient has origin in Assam.

9.4. Investigation

1. Lipid profile-Total cholesterol- 300 mg/dl,Triglyceride- 162 mg/dl,LDL- 156 mg/dl
2. CT scan- Acute ischemic infarct, Left cerebellum,Lacunar infarct, corona radiata and capsuloganglionic region left, Cerebral atrophy

9.5. Physical examination

1. Patient is well-nourished and nutritional status is well-maintained. Body type is mesomorphic.
2. Body movement- patient has hemiplegia at right side.
3. Mental status- patient is conscious but not well oriented to time, place and person
4. Drooping of right side of face is seen
5. Corneal reflex is absent in rt eye
6. Pupil constricts to the light reaction but rt pupil dilates.
7. Restricted ROM due to hemiparesis
8. Rt extremities are not functioning properly, loss of sensation is present.

9.5.1. Glasgow coma scale

1. Best eye response- 3 (To call)
2. Best verbal response- 4 (confused)
3. Motor response- 1(Nil)

   (a) Score- 8/15

10. Preventive Management (Medications)[8,9]

10.1. Tenecteplase

Activates conversion of plasminogen to plasmin. Plasmin breaks down clots (fibrin), fibrinogen, factors V, VII, occlusion of venous access lines.

Dose/Route- 50mg given over 5 sec, IV

Indication- Acute MI, Coronary artery thrombosis

Contraindication- Arteriovenous malformation, aneurysm, active bleeding, intracranial/intraspinal surgery, CNS neoplasm

Side-effects- Dysrhythmias, hypotension, pulmonary embolism, cardiogenic shock, HF, rash, urticaria, retroperitoneal bleeding.

Nursing responsibility- Assess for any allergic reaction, evaluate therapeutic response resolution of MI.

PT, PTT must be done before starting therapy

Teach proper dental care to avoid bleeding and notify prescriber of bleeding.

10.2. Amlodipine

inhibits calcium ion influx across cell membrane during cardiac depolarization; produces relaxation of coronary vascular smooth muscles, peripheral vascular smooth muscle, dilates coronary vascular arteries, increases myocardial oxygen delivery in patients with vasospastic angina.

Dose/Route- 10mg/day per oral

Indication- chronic stable angina pectoris, hypertension, variant angina

Contraindication- hypersensitivity, severe aortic stenosis, severe obstructive CAD

Side-effects- headache, anxiety, peripheral edema, bradycardia, syncope, nausea, vomiting, gingival hyperplasia, nocturia

Nursing responsibility- Assess cardiac status, jugular vein distension

10.3. Atrovastatin

inhibits HMG-COA reductase enzyme, which reduces cholesterol synthesis; high doses lead to plaque regression.

Dose/Route- 10mg HS per oral

Indication- hypercholesterolemia, dysbetalipoproteinemia, elevated triglyceride levels

Contraindication- pregnancy, breast feeding, active hepatic disease

S/E- lens opacities, asthenia, abdominal cramps, UTI, arthralgia, myalgia

Nursing responsibility- Assess hypercholesterolemia, renal studies in pt with compromised renal system

Blood test and eye examination be necessary during treatment.

10.3.1. Medical management

1. Recombinant tissue plasminogen activator (tPA)- it must be administered within 3 hours of the onset of clinical signs of ischemic stroke.
2. Acetylsalicylic acid (Aspirin)- it is used within 48 hours of the stroke complication. Aspirin administration should be done cautiously if the patient has a history of peptic ulcer disease.
3. Platelet inhibitors- Aspirin, ticlopidine, clopidogrel, dipyridamole
4. Anticoagulants and platelet inhibitors are contraindicated in patients with haemorrhagic strokes.
5. Calcium channel blockers (Nimodipine)- given in subarachnoid haemorrhage to decrease the effects of vasospasm and minimize cerebral damage.
6. Seizure occurs in 5% to 7% of stroke patients in the first 24 hours. Anti-seizure drug such a phenytoin is given.

11. Surgical Management [7,10]

1. Transluminal angioplasty and stenting
2. EC-IC Bypass
3. Surgical clipping

12. Nursing Management [11,12]

1. Past health history
2. Addiction- use of oral contraceptives, compliance with anti-hypertensive and anticoagulant therapy.
3. Health perception-health management- positive family h/o stroke, alcohol abuse smoking.
4. Nutritional-metabolic- Anorexia, nausea, vomiting, dysphagia, altered sensation of taste and smell.
5. Activity- loss of movement, syncope, generalized weakness.
6. Cognitive-perceptual- numbness, tingling of one side of the body, loss of memory, alteration in speech and language, visual disturbance, denial of illness.
7. Ineffective cerebral tissue perfusion related to interruption of blood flow secondary to thrombosis as evidenced by GCS 8/15, SpO2 85%
8. Impaired verbal communication related to residual aphasia, loss of facial muscle tone as evidenced by refusal and inability to speak, inappropriate verbalization.
9. Disturbed sensory perception related to neuromuscular dysfunction as evidenced by patient not responding to external stimulus in the rt side of the body.
10. Self-care deficit related to neuromuscular impairment and decreased strength and endurance in the rt side of the body as evidenced by inability to perform ADLs without assistance.
11. Risk for impaired skin integrity related to hemiplegia and decreased mobility.

13. Complications

1. Memory loss
2. Dysphagia
3. Paralysis
4. Dysarthria
5. Tissue ischemia
6. Cardiac dysrhythmia
7. Emotional problem
8. Bed sore

14. General Prevention [10]

1. Controlling high blood pressure.
2. Lowering the amount of cholesterol and saturated fats.
3. Quitting tobacco use.
4. Managing diabetes.
5. Maintaining a healthy weight.

6. Eating a diet rich in fruits and vegetables.
7. Exercising regularly.
8. Treating obstructive sleep apnea.
9. Preventive medications (aspirin, clopidogrel, warfarin)

15. Source of Funding

None.

16. Conflicts of Interest

None.

17. Acknowledgement

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