**Stroke**

**Introduction:**

Stroke is the interruption of normal blood flow in one or more of the blood vessels that supply the brain. Stroke interrupts or diminishes oxygen supply and commonly causes damage or necrosis in brain tissues.

Stroke alsorefers to cerebral vascular accident or brain attack.

**According to WHO** Stroke is defined as “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin”.

**According to WHO,**

* 15 million people suffer from stroke worldwide each year among which 5 million dies and another 5 million are permanently disabled.
* Stroke deaths in Nepal reached 8.04% of total deaths.
* The death rate is 67.32 per 100000 of population and ranks 106 in the world.

**Type of Stroke:**

According to “American Stroke Association”.

1. **Ischemic stroke:**

* Ischemic stroke accounts for about 80-85 percent of all cases.
* Ischemic strokes occur because of an obstruction within a blood vessel supplying blood to the brain.
* The underlying condition for this type of obstruction is the development of fatty deposits lining the vessel walls (atherosclerosis). These fatty deposits can cause two types of obstruction:
* Cerebral thrombosis**:** Blood clot that develops at the clogged part of the vessel.
* Cerebral embolism: Refers generally to a blood clot that forms at another location in the circulatory. A portion of the blood clot breaks loose, enters the bloodstream and travels through the brain's blood vessels until it reaches vessels too small to let it pass.

1. **Hemorrhagic Stroke:**

* Hemorrhagic stroke accounts for about 15-20 percent of stroke cases.
* Hemorrhagic stroke occurs when a weakened blood vessel ruptures. Two types of weakened blood vessels usually cause hemorrhagic stroke:
* Aneurysms:

It is a ballooning of a weakened region of a blood vessel. If left untreated, the aneurysm continues to weaken until it ruptures and bleeds into the brain.

* Arteriovenous Malformations (AVMs):

It is a cluster of abnormally formed blood vessels. Any one of these vessels can rupture, also causing bleeding into the brain.

* There are two types of hemorrhagic stroke.
* Intracranial hemorrhage (it is most common types of hemorrhagic stroke. it occurs when artery in brain burst, flooding surrounding tissue with blood).
* Subarachnoid hemorrhage (its less common types of hemorrhage stroke. It refers to bleeding in the area between the brain and thin tissues that cover it).

1. **Transient ischemic attack (TIA):**

* It is sometimes called a mini stroke.
* It is temporary blockage of blood flow to the brain. It is different from major types of strokes that does not cause permanent damage.
* Transient Ischemic Attack (TIA) is a warning sign of a future stroke.
* If TIA don’t get treatment have a major stroke within 1 years.

**Risk Factors of Stroke:**

Non-Modifiable Risk Factors:

* Age: Occurrence doubles each decade with aging after 55 years.
* Gender: Equal for men and women, women die frequently than men.
* Heredity: Family history of stroke
* Prior stroke or history of Transient Ischemic Attack (TIA).
* Race: African Americans, Hispanics, Native Americans, Asian Americans have higher incidence of Stroke.

Modifiable Risk Factors:

* Atherosclerosis
* High blood pressure
* Diabetes
* Smoking, Alcohol consumption
* High sodium, High cholesterol diet
* Stress
* Lack of exercise and Obesity
* Postural hypotension
* Use of certain drugs like aspirin.

**Pathophysiology of Ischemic Stroke:**

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| Atherosclerotic plaque/ thrombus/embolus |

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| Obstruction of cerebral blood vessels |

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| Decreased blood flow to brain tissue |

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| Decreased PaO2 and increased PaCO2 |

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| aerobic respiration converts into anaerobic respiration |

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| Production of lactic acid |

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| Decreased ATP production |

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| Nerve cells unable to depolarize |

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| Diminished or absent nerve function |

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| Infraction of affected brain area |

**Pathophysiology of Hemorrhagic Stroke:**

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| Rupture of blood vessel or aneurysm or other causes |

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| Compression of cranial nerves and brain tissue by blood |

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| Disruption of brain metabolism |

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| Reduced perfusion pressure and vasospasm |

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| Infraction of affected brain area |

**Clinical Manifestations:**

Symptoms of stroke depend on what part of the brain is damaged. Symptoms are usually most severe and may slowly get worse.

General signs and symptoms include:

* Numbness or weakness of face, arm, or leg
* Loss of consciousness, confusion or change in mental status.
* Trouble speaking or understanding speech.
* Visual disturbances
* Loss of balance
* Dizziness
* Difficulty walking
* Headache, vomiting, seizures
* Sudden severe headache – “worst headache of one’s life”, especially if the stroke is hemorrhagic.
* Bladder and bowel dysfunction

Motor, sensory, and cognitive dysfunction include:

* Hemiplegia (paralysis on one side of the body), Hemiparesis (weakness on one side of the body).
* Flaccid paralysis and loss or decrease in the tendon reflexes.
* Dysarthria (difficulty in speaking)
* Dysphagia or aphasia (loss of speech)
* Apraxia (inability to perform a previously learned action).
* Visual perceptual dysfunction
* Slight impairment of touch or more severe with loss of proprioception (ability to perceive the position and motion of body parts).
* Difficulty in interpreting visual, tactile, and auditory stimuli.
* Learning capacity, memory, or other higher cortical intellectual functions may be impaired.

**Diagnostic Investigation:**

* History Taking
* Physical Examination
* CT scan (computed tomography scan)
* MRI (Magnetic resonance imaging)
* Carotid Doppler may detect carotid artery stenosis.
* Cerebral Angiography
* Electroencephalogram
* Electrocardiogram
* Echocardiogram
* Chest x-ray
* Lumber puncture
* Laboratory tests; lipid profile, blood sugar, D-dimer.

**Management of Stroke:**

1. **Immediate care:**

* Use rapid transit to the hospital.
* Monitoring neurological status through GCS.
* Maintain a patient airway and Provide oxygen.
* Position patient in the side to prevent aspiration, with the head of the bed elevated 15-30 degrees.
* Insert urinary catheter if needed.

1. **Radiological Investigation:**

* Identify whether the stroke is ischemic or hemorrhagic form.

1. **Thrombolytic Therapy:**

* tPA (tissue plasminogen activator) administered within 3 hours of symptoms of ischemic CVA which,
* produces localized fibrinolysis by binding to the fibrin in the thrombi,
* plasminogen is converted to plasmin (fibrinolysin)
* enzymatic action digest fibrin and fibrinogen
* If the stroke is caused by hemorrhage instead of clotting, thrombolytic can cause more bleeding.

**Other treatment depends on the cause of stroke:**

* Blood thinner (anticoagulative) such as heparin or warfarin may be used to treat strokes due to blood clots.
* Aspirin may be used.
* Other medicines may be needed to control symptoms such as high blood pressure, high cholesterol.

1. **Surgical Management:**

* Carotid Endarterectomy (removal of material on the inside of an artery.)
* Clipping, wrapping, coiling Aneurysm.
* Evacuation of aneurysm-induced hematomas larger than 3 cm.
* Evacuation of blood clots from cranium through craniotomy.

1. **Nursing Management:**

**Nursing Assessment:**

* Health history and medication in use.
* Characteristics of onset of symptoms
* Presence of headache
* Any sensory deficit
* Visual ability
* Ability to think clearly.
* Any other symptoms
* Assess the GCS (Glasgow coma scale)
* Motor strength
* Change in level of consciousness.
* Signs of increased ICP (intracranial pressure)
* Respiratory status
* Ability to verbalize.
* Bladder and bowel control or incontinence
* Patient’s understanding of disease

**Nursing Diagnosis:**

* Altered cerebral tissue perfusion related to interruption of arterial blood flow.
* Risk for disuse syndrome related to hemiparesis or hemiplegia.
* Self-care deficit: feeding, bathing, toileting related to neuromuscular and sensory perceptual impairment.
* Impaired swallowing related to oral and neck muscle weakness.
* Impaired verbal communication related to residual aphasia.
* Urinary incontinence related to altered neurological stimulation.
* Impaired adjustment related to residual disability necessary changes in lifestyle and independence.
* Risk for pressure sore related to long term immobilization.
* Anxiety related to knowledge deficit about disease Prognosis/ condition.

**Nursing Implication:**

1. Monitoring cerebral perfusion:

* Monitoring neurological status continuously through GCS.
* Maintain patent airway and is essential to support oxygenation and cerebral perfusion.
* Frequent assessment of airway patency, suctioning, patient’s mobility, positioning of the patient to prevent aspiration and encouraging deep breathing coughing exercises.
* All activities that are known to increase ICP such as coughing, lying prone, emotional upsets and abrupt head or neck flexion are avoided.

1. Prevention of the complication of immobility and disuse:

* Appropriate positioning is the key concern.
* Maintain alignment with support of pillows and footboard.
* Administer active or passive range of motion exercises to affected extremities.
* According to procedures teach and assist family and patient with positioning techniques to prevent contractures.

1. Promoting independence in self -care:

* Assess level of self -care to determine extent of problem and plan appropriate intervention.
* Encourage independence.
* Provide supervision or assistance as needed to avoid development of dependency.

1. Promoting safe swallowing and adequate nutrition:

* The protective swallowing and gag reflex usually return within a few days after the stroke.
* Place the patient upright in bed for meals.
* Offer mouth care or liquid to increase calorie and nutrient intake before meal to stimulate saliva flow.
* Most patient tolerate a mechanically soft diet than liquids.
* Keep an accurate intake and output.
* Monitor patient’s weight weekly.
* Add supplements to diet.

1. Supporting communication:

* Allow the patient adequate time to respond.
* Establish non hurried atmosphere.
* Be supportive and encourage patient’s effort to communicate.
* Involve family or significant others in exercise to name object used for routine self-care.
* Face the patient and speak slowly and distinctly.
* Don't raise volume.
* Use appropriate gesture to support your verbal message.

1. Promote effective coping:

* The effects of stroke are usually life altering and can be devastating to the patient and family.
* The patient may experience significant difficulty in responding appropriately to any situation.
* Distraction and shifting the patient attention can be successful strategies for assisting to regain control.

1. Reduce Anxiety:

* Explain disease Prognosis to the patients/visitors.
* Encourage visitor to participate to the care of the patient.

1. Help patient sit up:

* Help the patient out of bed remember, however, that hemiplegia can severely affect balance. Assistance is needed to provide security and safety.
* Raise the head of the bed slowly to reduce orthostatic hypotension.
* Assist the patient to sit up and closely monitor for balance and safety awareness.
* When the patient first sits up, support the affected side, especially the back and the head.
* When the patient is sitting in a chair, support weakside with pillows.

1. Teach the patient how to use wheelchair:

* Lock the wheelchair for safety and keep it beside the bed on unaffected side.
* Use of unaffected arm and leg to move affected arm and leg.
* As your legs drop over the edge of the bed, swing torso up to a sitting position.
* Push yourself up to a standing position by using unaffected arm and leg.
* Reach across the wheelchair to grasp the far arm of the chair and turn to seat yourself.
* Shading on the right side of the patient indicates the affected side.

1. Promote walking:

* A tilt table may be used in physical therapy to help the patient assume a standing position if difficulty with balance is a problem.
* The patient can begin standing as soon as the quadriceps muscles on the unaffected side have normal strength.
* Have the patient seated on the edge of the bed and encourage to rise by using the muscle power of the unaffected leg.
* The patient may tend to swing around toward the affected side. Gradually the patient will learn to take increasing amounts of weight onto the weaker side.

**Prevention of Stroke:**

* Eat healthy food.
* Keep a healthy weight.
* Get regular physical activity.
* Don't Smoke
* Limit Alcohol
* Check cholesterol.
* Control blood pressure and diabetes.