

# Cerebrovascular Accident

## Definition

Cerebrovascular Accident (CVA), also known as stroke, refers to a sudden interruption of blood supply to the brain, resulting in impaired brain function. There are two main types of CVAs, ischemic stroke and hemorrhagic stroke.

## Causes

The underlying causes of CVA vary depending on the type of stroke. Ischemic stroke is commonly caused by atherosclerosis, a condition in which fatty deposits build up in the arteries and restrict blood flow. Hemorrhagic stroke is often caused by high blood pressure, which weakens the blood vessel walls and makes them more susceptible to rupture.

## Pathophysiology

The pathophysiology of each type differs, so let's discuss them separately:

**Ischemic Stroke:** Ischemic strokes account for the majority of cases (about 85%) and occur due to a blockage or narrowing of blood vessels supplying the brain. The most common cause is the formation of a blood clot (thrombus) within a cerebral artery, leading to the obstruction of blood flow. The pathophysiology of an ischemic stroke involves the following steps:

- a. **Thrombus Formation:** It usually occurs within an atherosclerotic plaque, which is a buildup of fatty deposits and cholesterol on the inner walls of blood vessels. The plaque can rupture, leading to the formation of a blood clot at the site of injury.
- b. **Occlusion of Blood Vessels:** The formed blood clot may completely block the artery (thrombotic stroke) or may travel through the bloodstream until it reaches a smaller vessel and lodges there (embolic stroke). This occlusion restricts blood flow to a specific area of the brain.
- c. **Ischemia and Infarction:** The lack of blood supply to brain tissue causes ischemia, which means a reduction in oxygen and nutrient delivery. Within minutes, brain cells start to undergo irreversible damage. If blood flow is not restored promptly, infarction (tissue death) occurs, leading to permanent brain damage.

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## Pathophysiology Continues

**Hemorrhagic Stroke:** Hemorrhagic strokes occur when a blood vessel ruptures, causing bleeding into the brain tissue or surrounding spaces. There are two main types of hemorrhagic strokes: intracerebral hemorrhage and subarachnoid hemorrhage. The pathophysiology of a hemorrhagic stroke involves the following steps:

- a. **Blood Vessel Rupture:** Hemorrhagic strokes often result from the rupture of weakened, abnormal blood vessels. The most common cause is hypertension (high blood pressure), which can lead to the development of weak spots or aneurysms in the arterial walls.
- b. **Bleeding and Compression:** When a blood vessel ruptures, blood leaks into the brain tissue (intracerebral hemorrhage) or the space between the brain and the surrounding membranes (subarachnoid hemorrhage). The accumulated blood exerts pressure on brain structures, causing compression and damage.
- c. **Secondary Injury:** The initial bleeding triggers an inflammatory response, leading to further damage to brain tissue. Additionally, the presence of blood in the brain can disrupt normal fluid and electrolyte balance, affecting neuronal function.

Regardless of the stroke type, the lack of oxygen and nutrients, along with the release of harmful substances from damaged brain cells, leads to a cascade of events that can exacerbate the injury. These events include excitotoxicity (overactivation of brain cells leading to cell death), inflammation, oxidative stress, and the release of toxic molecules that cause further damage to surrounding brain tissue.

## Manifestations

The clinical manifestations of CVA depend on the location and extent of brain damage. Common symptoms include sudden weakness or numbness on one side of the body, difficulty speaking or understanding language, loss of vision, severe headache, and dizziness or loss of balance.

## Diagnosis

Diagnosis of CVA may involve imaging tests such as CT scans, MRI scans, or angiography. Blood tests may also be used to rule out other potential causes of symptoms.

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## Treatment

The treatment of cerebrovascular accidents (CVAs) or strokes involves different approaches depending on the type of stroke:

### **Ischemic Stroke Treatment:**

- **Thrombolytic Therapy:** Administering clot-dissolving medication (thrombolytics) like tissue plasminogen activator (tPA) to restore blood flow by dissolving the clot.
- **Mechanical Thrombectomy:** A catheter-based procedure to physically remove the clot from the blocked blood vessel.
- **Anticoagulants and Antiplatelet Agents:** Medications like aspirin, clopidogrel, or warfarin may be prescribed to prevent further clot formation.
- **Rehabilitation:** Physical therapy, occupational therapy, and speech therapy to restore lost function and promote independence.

### **Hemorrhagic Stroke Treatment:**

- **Blood Pressure Control:** Managing high blood pressure to reduce the risk of rebleeding.
- **Surgical Interventions:** Clot evacuation or aneurysm clipping/coiling to stop bleeding and prevent further damage.
- **Supportive Care:** Close monitoring, managing intracranial pressure, maintaining oxygenation, fluid and electrolyte balance, and preventing complications.
- **Rehabilitation:** Physical therapy, occupational therapy, and other measures to improve motor skills, cognition, and functional independence.

In both types of stroke, the goal is to minimize brain damage, restore blood flow, prevent complications, and support recovery. Treatment plans may vary based on individual patient factors and the severity of the stroke. Early recognition of stroke symptoms and seeking immediate medical attention are crucial for optimal outcomes.

## Contraindications/Cautions

There are contraindications and cautions to the use of tPA, including a risk of bleeding and the need for prompt administration within a certain time window after the onset of symptoms.

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## Gender and Age Differences

CVA can affect individuals of any age, but the risk increases with age. Men are more likely to experience strokes than women, but women are more likely to die from a stroke. Certain risk factors, such as high blood pressure, smoking, and diabetes, increase the risk of CVA across all age and gender groups.

Gender and age differences in the incidence and outcomes of cerebrovascular accidents (CVAs) have been observed. Men are more likely than women to experience a CVA, although women tend to have worse outcomes and higher rates of disability and mortality. The risk of CVA increases with age, with the highest incidence occurring in individuals over the age of 65.

## Nursing Assessment

This includes monitoring vital signs, assessing for neurological deficits, and evaluating for potential complications such as respiratory distress, aspiration, and deep vein thrombosis. Nurses may also assess risk factors and provide education on lifestyle modifications to reduce the risk of future CVAs.

## Nursing Diagnoses

- Impaired physical mobility
- Impaired verbal communication
- Risk for aspiration
- Risk for impaired skin integrity
- Ineffective coping
- Impaired urinary elimination
- Risk for adult falls
- Impaired swallowing
- Risk for constipation

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## Nursing Management

Nursing management for CVA typically involves a multidisciplinary approach that includes medical management, rehabilitation, and ongoing monitoring and support. As a nurse, your role in managing patients with CVA involves:

1. **Assessment and monitoring:** You will need to assess the patient's neurological status, vital signs, and general condition regularly. You should also monitor for complications such as aspiration pneumonia, deep vein thrombosis, and pressure ulcers.
2. **Medication management:** You will need to administer medications as prescribed, including anticoagulants, antiplatelet agents, and thrombolytics. You will also need to monitor for potential side effects and adverse reactions.
3. **Rehabilitation:** You will work with the rehabilitation team to help the patient regain their physical and cognitive abilities. This may involve assisting with range of motion exercises, mobility training, and speech therapy.
4. **Education and support:** You will need to provide education to the patient and their family regarding CVA prevention strategies, medication management, and lifestyle modifications. You will also need to offer emotional and psychological support to the patient and their family.
5. **Nutrition management:** You will need to assess the patient's nutritional status and develop a plan to address any deficiencies. You may also need to monitor for dysphagia and provide appropriate interventions to prevent aspiration.

Overall, nursing management for CVA involves a holistic approach that addresses the physical, cognitive, and emotional needs of the patient. Effective nursing management can help improve outcomes and quality of life for patients with CVA.