critical care nursing
lecture 6
Cerebral Vascular Accident

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Learning Objectives for Cerebral Vascular Accident (CVA)

- **Define** CVA and its types (ischemic and hemorrhagic).
- **Explain** the pathophysiology of ischemic and hemorrhagic strokes.
- **Identify** risk factors
- **Recognize** the common signs and symptoms.
- **Explain** the diagnostic procedures used.
- **Discuss** the principles of acute management
- **Explain** the role of the nurse in providing emotional support and education to patients and their families.

Anatomy of the Brain:

Major Divisions of the Brain

1. **Cerebrum:** The largest part of the brain, responsible for higher-order functions such as thought, perception, voluntary movement, and personality. It is divided into two hemispheres (left and right) connected by the corpus callosum.
2. **Cerebellum:** Located below the cerebrum, it is primarily responsible for coordinating movement, balance, and posture.
3. **Brainstem:** Connects the brain to the spinal cord. It controls vital functions such as breathing, heart rate, blood pressure, and consciousness. The brainstem consists of three parts: the medulla oblongata, pons, and midbrain.

Lobes of the Cerebrum

Each hemisphere of the cerebrum is divided into four lobes:

- **Frontal lobe:** Located at the front of the brain, it is responsible for voluntary movement, planning, decision-making, personality, and emotions.
- **Parietal lobe:** Located behind the frontal lobe, it processes sensory information such as touch, temperature, and pain.
- **Temporal lobe:** Located on the sides of the brain, it is involved in hearing, memory, and language comprehension.
- **Occipital lobe:** Located at the back of the brain, it is primarily responsible for vision.

Other Important Structures

- **Corpus callosum:** A thick bundle of nerve fibers that connects the two hemispheres of the cerebrum.
- **Thalamus:** A relay station for sensory and motor information.
- **Hypothalamus:** Regulates essential bodily functions such as hunger, thirst, body temperature, and sleep.
- **Pituitary gland:** A small gland located at the base of the brain that secretes hormones.

- **Cerebral Vascular Accident (CVA)**, often referred to as a stroke, occurs when the blood supply to part of the brain is interrupted or reduced. This disruption can lead to brain cell death and lasting damage.
- **Types:**
- **Ischemic stroke:** This is the most common type, caused by a blockage in a blood vessel leading to the brain. This blockage can be due to a blood clot (thrombosis) or a piece of plaque (embolism) that breaks off and travels to the brain.
- **Hemorrhagic stroke:** This type occurs when a blood vessel in the brain bursts and bleeds. This can result from high blood pressure, aneurysms, or blood clotting disorders.

Pathophysiology

- **Ischemic Stroke:**
- **Thrombotic stroke:** A blood clot forms within a cerebral artery, often at a site of atherosclerotic plaque.
- **Embolic stroke:** A blood clot or piece of plaque forms elsewhere in the body, travels through the bloodstream, and becomes lodged in a cerebral artery.
- **Both types:** The lack of blood flow leads to tissue hypoxia and necrosis, resulting in brain damage.

- **Hemorrhagic Stroke:**
- **Intracerebral hemorrhage:** Bleeding occurs within the brain tissue itself, often due to high blood pressure or an aneurysm.
- **Subarachnoid hemorrhage:** Bleeding occurs in the space between the brain and the meninges, often due to a ruptured aneurysm.
- **Both types:** The excess blood pressure can lead to increased intracranial pressure, brain compression, and tissue damage.

Risk Factors

- **Modifiable:**
- High blood pressure
- High cholesterol
- Smoking
- Diabetes
- Atrial fibrillation
- Obesity
- Physical inactivity
- Excessive alcohol consumption
- Drug abuse

- **Non-Modifiable:**
- Age
- Race (African Americans and Hispanics have a higher risk)
- Family history of stroke or heart disease

Impact on the Brain and Its Functions

- **Brain Damage:** Depending on the location and extent of the stroke, brain cells can become damaged or die.

- **Functional Impairment:** The affected areas of the brain control specific functions, so the consequences of a stroke can vary widely. Common impairments include:
- Weakness or paralysis on one side of the body
- Difficulty speaking or understanding speech
- Changes in vision
- Cognitive problems (e.g., memory loss, confusion)
- Emotional disturbances (e.g., depression, anxiety)
- Sensory deficits (e.g., numbness, tingling)

Understanding these aspects of CVA is crucial for recognizing the signs and symptoms, preventing stroke, and providing appropriate care.

Common Signs and Symptoms of CVA (Stroke)

- **Sudden onset of weakness or numbness** in the face, arm, or leg, especially on one side of the body
- **Confusion** or trouble understanding speech
- **Trouble speaking** or understanding speech
- **Changes in vision**, such as blurred or double vision
- **Severe headache** with no known cause
- **Loss of balance or coordination**

Neurologic Assessment Techniques for CVA Patients

A neurologic assessment is a series of tests performed by healthcare professionals to evaluate a patient's nervous system function. When assessing a patient with suspected CVA, the following techniques may be used:

- **Mental status examination:** This assesses the patient's level of consciousness, orientation, memory, and cognitive function.
- **Cranial nerve examination:** This evaluates the function of the 12 cranial nerves, which control various functions such as vision, hearing, facial movement, and swallowing.

- **Motor examination:** This assesses muscle strength, tone, and coordination.
- **Sensory examination:** This evaluates the patient's ability to feel sensations such as touch, pain, and temperature.
- **Reflex examination:** This assesses the presence or absence of reflexes, which are involuntary muscle contractions.

The FAST Screening Tool for CVA

The FAST acronym is a simple and effective way to remember the key signs of a stroke:

- **F:** Face - Ask the person to smile. Does one side of their face droop?
- **A:** Arms - Ask the person to raise both arms. Does one arm hang down?
- **S:** Speech - Ask the person to repeat a simple sentence. Is there slurred speech or difficulty understanding?
- **T:** Time - If you observe any of these signs, call emergency services immediately. Time is of the essence in stroke treatment.

Diagnosis and Treatment of Cerebrovascular Accident (CVA)

Diagnostic Procedures for CVA

- **CT Scan:** A CT scan is a non-invasive imaging test that uses X-rays to create cross-sectional images of the brain. It can help identify bleeding in the brain (hemorrhagic stroke) or blockage of a blood vessel (ischemic stroke).
- **MRI:** An MRI uses magnetic fields and radio waves to create detailed images of the brain. It can be used to confirm the type of stroke, assess the extent of brain damage, and identify any underlying causes of the stroke.

- **Cerebral Angiography:** This invasive procedure involves injecting a contrast dye into a blood vessel in the groin and threading a catheter up to the brain. X-rays are then taken to visualize the blood vessels in the brain and identify any blockages or aneurysms.

Acute Management of CVA

- **Thrombolytic Therapy:** This treatment involves administering a medication called tissue plasminogen activator (tPA) to dissolve the blood clot causing an ischemic stroke. tPA must be administered within a specific time window after the onset of symptoms to be effective.

- **Anticoagulation:** Anticoagulant medications, such as warfarin or heparin, are used to prevent blood clots from forming or growing larger. They are typically used for patients with atrial fibrillation or other conditions that increase the risk of stroke.
- **Antiplatelet Agents:** Antiplatelet agents, such as aspirin or clopidogrel, are used to prevent platelets from sticking together and forming blood clots. They are often used to prevent a second stroke in patients who have already had one.

Rehabilitation for CVA Recovery

Rehabilitation is an essential part of recovery after a stroke. It helps patients regain lost functions and improve their quality of life. Rehabilitation typically includes a combination of the following therapies:

- **Physical Therapy:** Physical therapy helps patients regain strength, balance, and coordination. It may include exercises to improve walking, sitting, and standing.
- **Occupational Therapy:** Occupational therapy helps patients develop skills needed for daily living, such as dressing, bathing, and eating. It may also include training in the use of assistive devices, such as wheelchairs or walkers.

- **Speech Therapy:** Speech therapy helps patients improve their communication skills, including speech, language, and swallowing. It may include exercises to strengthen the muscles used for speech and to improve articulation and language comprehension.

Nursing provides comprehensive guidance on caring for patients with cerebrovascular accidents (CVA, or stroke). Here's a breakdown of key nursing interventions to prevent complications and promote recovery

Preventing Complications

- **Aspiration and Pneumonia:**
- **Elevate Head of Bed (HOB):** Maintain the patient's HOB at 30-45 degrees to reduce the risk of aspiration.
- **Swallowing Assessment:** Conduct regular swallowing assessments to identify any swallowing difficulties.
- **Thickened Liquids:** If necessary, thicken liquids to improve swallowing safety.

- **Oral Hygiene:** Maintain good oral hygiene to reduce the risk of infection.
- **Chest Physiotherapy:** Perform chest physiotherapy techniques like coughing and deep breathing exercises to prevent pneumonia.
- **Deep Vein Thrombosis (DVT):**
- **Early Mobilization:** Encourage early mobilization and movement to promote blood flow.
- **Anticoagulants:** Administer anticoagulant medications as prescribed to prevent blood clot formation.

- **Leg Exercises:** Teach and encourage leg exercises to improve circulation.
- **Compression Stockings:** Apply compression stockings to reduce venous pooling.
- **Pressure Ulcers:**
- **Frequent Repositioning:** Reposition the patient every 2 hours to relieve pressure on bony prominences.
- **Pressure-Relieving Devices:** Use pressure-relieving devices like special mattresses or cushions.

- **Skin Care:** Maintain good skin hygiene and moisturize to prevent skin breakdown.

Early Mobilization and Contracture Prevention

Early mobilization is crucial for CVA recovery. It helps prevent muscle atrophy, contractures, and promotes functional independence. Nursing interventions include:

- **Passive Range of Motion (PROM):** Perform PROM exercises to maintain joint mobility and prevent contractures.

- **Active-Assistive Range of Motion (AAROM):** Encourage the patient to participate in AAROM exercises as tolerated.
- **Functional Activities:** Incorporate functional activities into therapy sessions to promote real-life movement and regain independence.

Emotional Support and Education

Nurses play a vital role in providing emotional support and education to patients and their families. This includes:

- **Active Listening:** Listen attentively to the patient and family's concerns and fears.
- **Empathy and Compassion:** Show empathy and understanding towards their situation.

- **Education:** Provide clear and concise information about the CVA, treatment options, and recovery process.
- **Coping Strategies:** Teach coping strategies to manage stress and anxiety.
- **Support Groups:** Refer the patient and family to support groups or resources for additional support.

Additional Considerations

- **Individualized Care Plan:** Develop a comprehensive care plan tailored
- **Interdisciplinary Collaboration:** Work closely with other healthcare pro
- **Regular Assessment:** Monitor the patient's progress and adjust the car

Thank you for listening