

PHB



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Chapter– 5 Central Nervous System

Topic: STROKE DISEASE

5.1

Introduction

A stroke, also known as a cerebrovascular accident (CVA), occurs when blood flow to a part of the brain is interrupted, leading to brain damage and neurological deficits.

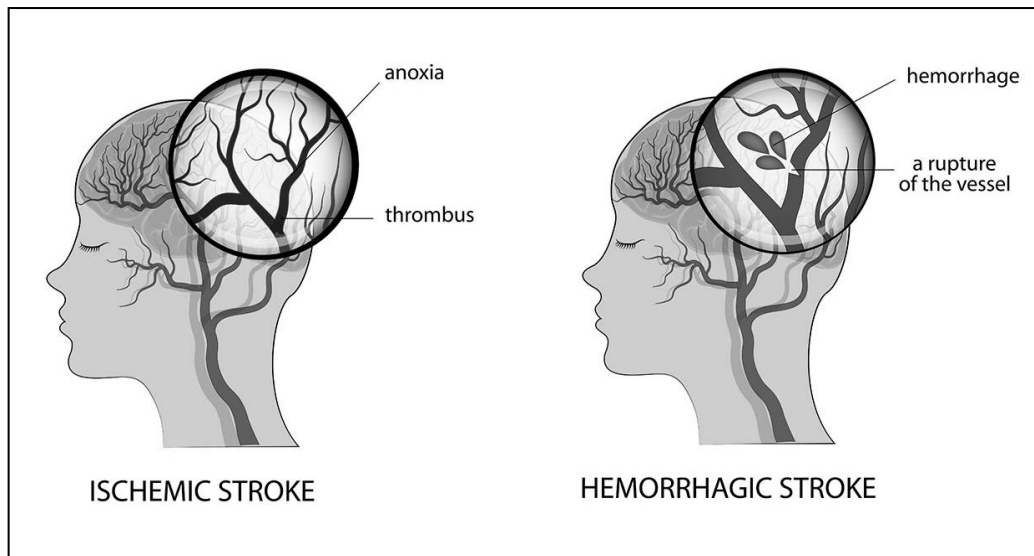


Fig 5.1 Ischemic Stroke and Hemorrhagic stroke

5.2

Etiopathogenesis

Stroke, also known as cerebrovascular accident (CVA), occurs when there is a disruption of blood flow to the brain, leading to brain cell injury or death. Ischemic stroke is caused by deficient blood and oxygen supply to the brain; hemorrhagic stroke is caused by bleeding or leaky blood vessels. Ischemic occlusions contribute to around 85% of casualties in stroke patients, with the remainder due to intracerebral bleeding.

5.3

Types

The two main types of stroke are ischemic stroke and hemorrhagic stroke.

- **Ischemic Stroke:** This type of stroke occurs when a blood clot or plaque blocks a blood vessel supplying oxygen-rich blood to the brain. It accounts for the majority of strokes and can result from various underlying conditions, including atherosclerosis, embolism, or thrombosis.
- **Hemorrhagic Stroke:** Hemorrhagic stroke occurs when a blood vessel in the brain ruptures, leading to bleeding within the brain tissue (intracerebral hemorrhage) or into the space surrounding the brain (subarachnoid hemorrhage). Causes of hemorrhagic stroke include hypertension, aneurysm rupture, arteriovenous malformations (AVMs), or trauma.

5.4

Symptoms

The symptoms of stroke can vary depending on the type and location of the brain affected but commonly includes:

- Loss of vision, strength, sensation, or speech, or trouble understanding speech.
- Fainting briefly.
- Sudden dim vision, especially in one eye.
- Sudden loss of balance, sometimes along with vomiting, nausea, or trouble swallowing.
- Sudden and severe headache with no other cause.
- Dizziness or sudden falls with no clear cause.

5.5

Diagnosis

Diagnostic procedures may include:

- Physical examination, assessment of neurological signs, vital signs, and overall clinical status.
- Computed tomography (CT) scan or magnetic resonance imaging (MRI) to visualize brain anatomy and detect signs of ischemia or hemorrhage.

- Laboratory tests include blood tests to assess coagulation parameters, lipid profile, glucose levels, and other metabolic markers.
- ECG test, evaluation of heart rhythm and signs of arrhythmias or cardiac abnormalities that may predispose to stroke.

5.6**Pharmacological managements**

Pharmacological management of stroke depends on the type and underlying cause but may include:

1. Ischemic Stroke:

- **Thrombolytics: e.g.** Alteplase (tPA); is administered to dissolve blood clots and restore blood flow to the affected area of the brain. It is most effective when administered within the first few hours after the onset of symptoms.
- **Antiplatelet Agents: e.g.** Aspirin, Clopidogrel, and Dipyridamole; are used to prevent the formation of blood clots and reduce the risk of recurrent stroke.
- **Anticoagulants: e.g.** Warfarin or direct oral anticoagulants (DOACs) may be prescribed to prevent the formation of blood clots in patients with certain underlying conditions like atrial fibrillation.
- **Statins: e.g.** Atorvastatin and Simvastatin; are often prescribed to lower cholesterol levels and reduce the risk of recurrent stroke and cardiovascular events.

2. Hemorrhagic Stroke:

- **Antihypertensive Agents:** Controlling blood pressure is crucial in the management of hemorrhagic stroke to prevent further bleeding and reduce the risk of complications. Medications **like** Labetalol, Nicardipine, or Nitroprusside may be used to lower blood pressure.
- **Anticonvulsants:** Seizures can occur following a hemorrhagic stroke, so anticonvulsant medications **like** Phenytoin or Levetiracetam may be prescribed to prevent or control seizures.
- **Surgical Interventions:** In some cases, surgical interventions such as aneurysm clipping or coiling may be necessary to repair blood vessel abnormalities and prevent rebleeding.
- **Symptomatic Management:** Other medications may be prescribed to manage symptoms such as pain, fever, or swelling.

5.7

Non - Pharmacological managements

Non-pharmacological interventions for stroke may include:

- **Acute stroke unit care:** Specialized units providing comprehensive stroke care, including close monitoring, early mobilization, rehabilitation, and secondary prevention measures.
- **Rehabilitation therapy:** Physical therapy, occupational therapy, speech therapy, and cognitive rehabilitation to optimize functional recovery, regain independence, and improve quality of life.
- **Lifestyle modifications:** Management of modifiable risk factors such as hypertension, diabetes, dyslipidemia, smoking cessation, healthy diet, regular exercise, and weight management.
- **Stroke education and support:** Patient and caregiver education about stroke warning signs, risk factors, medication adherence, lifestyle modifications, and community resources for ongoing support and rehabilitation services.

5.8

Complications

Complications of stroke may include:

- Persistent weakness, sensory loss, speech impairment, or cognitive dysfunction resulting from brain injury.
- Loss of mobility, activities of daily living (ADLs), independence, and quality of life.
- Depression, anxiety, post-stroke fatigue, social isolation, and adjustment difficulties for both patients and caregivers.
- Secondary complications such as pneumonia, urinary tract infections, deep vein thrombosis (DVT), pressure ulcers, or recurrent stroke events.

Practice Questions

MULTIPLE CHOICE QUESTIONS

- Stroke is defined as:
 - A sudden loss of consciousness
 - A sudden onset of severe headache
 - A disruption of blood flow to the brain
 - A transient episode of neurological dysfunction
- Which of the following is NOT a major type of stroke?
 - Ischemic stroke
 - Hemorrhagic stroke
 - Thrombotic stroke
 - Transient ischemic attack (TIA)
- Ischemic stroke occurs due to:
 - Rupture of a blood vessel in the brain
 - Blockage of a blood vessel supplying the brain
 - Excessive bleeding within the brain tissue
 - Accumulation of amyloid plaques in the brain
- The most common risk factor for ischemic stroke is:
 - Hypertension
 - Diabetes mellitus
 - Smoking
 - Hypercholesterolemia
- Which imaging technique is commonly used to confirm the diagnosis of ischemic stroke and assess the extent of brain damage?
 - Computed tomography (CT) scan
 - Magnetic resonance imaging (MRI)
 - Positron emission tomography (PET) scan
 - Electroencephalogram (EEG)
- Hemorrhagic stroke occurs due to:
 - Blockage of a blood vessel supplying the brain

- B) Rupture of a blood vessel in the brain
C) Excessive bleeding within the spinal cord
D) Compression of the brain by a tumor
7. Which of the following is a common symptom of stroke?
A) Seizures
B) Vertigo
C) Sudden numbness or weakness of the face, arm, or leg
D) Muscle stiffness and rigidity
8. The acronym "FAST" is used to recognize the signs of stroke and stands for:
A) Face, Arms, Speech, Time
B) Fever, Anxiety, Shortness of breath, Tingling
C) Fatigue, Appetite loss, Swelling, Tremors
D) Fainting, Abrupt onset of headache, Slurred speech, Tachycardia
9. Thrombolytic therapy with tissue plasminogen activator (tPA) is indicated for the management of ischemic stroke within:
A) 3 hours of symptom onset
B) 6 hours of symptom onset
C) 12 hours of symptom onset
D) 24 hours of symptom onset
10. Which of the following is a potential complication of stroke?
A) Migraine headaches
B) Deep vein thrombosis (DVT)
C) Hypoglycemia
D) Urinary tract infection

FILL IN THE BLANKS

1. A stroke occurs when the blood supply to the _____ is interrupted. (**Brain**)
2. Ischemic strokes are caused by a _____. (**Blocked blood vessel**)
3. Hemorrhagic strokes are caused by _____. (**Bleeding in the brain**)
4. FAST is an acronym used to recognize stroke symptoms: Face, _____, Speech, Time. (**Arms**)
5. Treatment for ischemic strokes may include administering _____. (**Tissue plasminogen activator**)

SHORT ANSWER TYPE QUESTIONS

1. Define stroke.
2. What are the two main types of stroke?
3. What are the common risk factors for stroke?
4. What is the role of thrombolytic therapy in the treatment of ischemic stroke?
5. How does a hemorrhagic stroke differ from an ischemic stroke?

LONG ANSWER TYPE QUESTIONS

1. Describe the pathophysiology of ischemic and hemorrhagic stroke.
2. Discuss the risk factors associated with stroke and their management.
3. Explain the clinical manifestations and symptoms of stroke.
4. Outline the diagnostic approach to evaluating a patient suspected of having a stroke.
5. Discuss the acute management and treatment options for stroke.

MCQ Answer

1.	C	3.	B	5.	A	7.	C	9.	A
2.	D	4.	A	6.	B	8.	A	10.	B
