Stroke (Cerebrovascular Accident)

1. Definition

A **stroke** is an acute neurological deficit caused by an interruption of blood supply to a part of the brain, resulting in neuronal injury or death. It is a medical emergency requiring immediate attention.

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2. Epidemiology

- **Global prevalence:** 12 million new strokes annually.
- **Mortality:** Second leading cause of death worldwide.
- **Risk increases with age**, but can occur at any age.

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3. Classification

A. Ischemic Stroke (≈ 80%)

- Caused by obstruction of blood flow.
- Subtypes:
    1. **Thrombotic** – clot formation within cerebral artery (often in atherosclerotic vessels).
    2. **Embolic** – clot from elsewhere (heart, carotid) lodges in brain artery.
    3. **Lacunar** – small vessel stroke, often due to chronic hypertension or diabetes.

B. Hemorrhagic Stroke (≈ 20%)

- Caused by rupture of a blood vessel.
- Subtypes:
    1. **Intracerebral hemorrhage** – bleeding into brain parenchyma.
    2. **Subarachnoid hemorrhage** – bleeding into subarachnoid space, often from aneurysm.

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4. Risk Factors

Modifiable:

- Hypertension
- Diabetes mellitus
- Hyperlipidemia
- Smoking
- Alcohol abuse
- Sedentary lifestyle
- Atrial fibrillation

Non-modifiable:

- Age > 55
- Male sex
- Family history of stroke
- Ethnicity (higher risk in some populations)

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5. Pathophysiology

- **Ischemic stroke:** Occlusion → lack of oxygen → neuronal death → infarct core + surrounding penumbra.
- **Hemorrhagic stroke:** Vessel rupture → increased intracranial pressure → tissue compression and ischemia.

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6. Clinical Features

- **Sudden onset** neurological deficits:
    - Hemiparesis or hemiplegia
    - Facial droop
    - Speech disturbances (aphasia, dysarthria)
    - Vision loss (hemianopia)
    - Vertigo, imbalance
    - Severe headache (more common in hemorrhagic stroke)
- **FAST mnemonic**:
    - **F**: Face drooping
    - **A**: Arm weakness
    - **S**: Speech difficulty
    - **T**: Time to call emergency services

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7. Diagnosis

A. Clinical Assessment:

- Detailed history and neurological examination.
- NIH Stroke Scale (NIHSS) for severity.

B. Imaging:

- **CT scan (non-contrast)**: Differentiates ischemic vs hemorrhagic stroke.
- **MRI**: Detects early ischemic changes.
- **CT/MR angiography**: Detects vessel occlusion or aneurysm.

C. Laboratory Tests:

- Blood glucose, CBC, electrolytes
- Coagulation profile
- Lipid panel
- Cardiac markers if cardioembolic source suspected

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8. Management

A. Acute Ischemic Stroke

- **Within 4.5 hours:** IV thrombolysis (alteplase)
- **Mechanical thrombectomy**: Large vessel occlusion
- Supportive care: Oxygen, fluids, blood pressure control
- Prevent complications: DVT prophylaxis, dysphagia screening

B. Hemorrhagic Stroke

- Blood pressure control

- Neurosurgical intervention for large hemorrhage or aneurysm
- ICP management
- Supportive care

C. Secondary Prevention

- Antiplatelet therapy (aspirin, clopidogrel)
- Statins
- Anticoagulation in atrial fibrillation
- Lifestyle modification

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9. Complications

- Cerebral edema
- Seizures
- Recurrent stroke
- Post-stroke depression
- Dysphagia and aspiration pneumonia

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10. Rehabilitation

- Physical therapy for mobility
- Occupational therapy for daily activities
- Speech therapy for language deficits

- Cognitive rehabilitation

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11. Prognosis

- Depends on type, severity, location, and promptness of treatment.
- Early intervention improves survival and reduces disability.