GENERAL

guide pratique des urgences neurovasculaires

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Guide Pratique des Urgences Neurovasculaires: A Comprehensive Overview

Neurovascular emergencies are medical crises that demand immediate recognition, rapid assessment, and decisive intervention. From ischemic strokes and intracerebral hemorrhages to ruptured aneurysms and arteriovenous malformations, these conditions threaten brain function and life. This **guide pratique des urgences neurovasculaires** offers clinicians, emergency responders, and informed caregivers a clear roadmap for identifying, triaging, and managing these life threatening events. By blending evidence based protocols with practical bedside tips, the guide aims to improve outcomes through timely action and coordinated care.

1. Understanding Neurovascular Emergencies

1.1 What Are Neurovascular Emergencies?

Neurovascular emergencies arise when the brain's blood supply is abruptly compromised or disrupted. The two principal categories are:

- Ischemic events – sudden loss of blood flow due to arterial blockage.
- Hemorrhagic events – bleeding within or around the brain caused by vessel rupture.

Both types can lead to rapid neurological deterioration, seizures, increased intracranial pressure, and death if not addressed promptly.

1.2 Epidemiology and Impact

Stroke is the third leading cause of death worldwide and the leading cause of long term disability. In the United States alone, more than 795,000 people suffer a stroke each year, with approximately 87% being ischemic and 13% hemorrhagic. Intracerebral hemorrhage carries a higher mortality rate ("H40%) and a greater risk of severe disability.

Early recognition and intervention can dramatically reduce morbidity. For instance, administration of intravenous tissue plasminogen activator (tPA) within 3–4.5 hours of symptom onset can restore blood flow in ischemic stroke patients, improving functional outcomes by up to 30%.

2. Recognizing Symptoms: The ABCDE Approach

Prompt identification of neurovascular emergencies hinges on a systematic assessment. The **ABCDE** mnemonic—Airway, Breathing, Circulation, Disability, Exposure—provides a structured framework. While the first three elements address life saving measures**Disability** (neurological status) and **Exposure**(full body exam) are critical for detecting brain related signs.

2.1 Airway and Breathing

Ensure the airway is clear and breathing is adequate. In cases of severe neurological compromise, patients may become unconscious or have impaired respiratory drive, necessitating intubation.

2.2 Circulation

Check pulse, blood pressure, and peripheral perfusion. Hemorrhagic strokes often present with hypotension due to

blood loss, whereas ischemic strokes may have normal or elevated blood pressure.

2.3 Disability (Neurological Assessment)

Rapid neurological evaluation is paramount. Use the **NIH Stroke Scale (NIHSS)** or a simplified bedside check:

1. Level of consciousness – assess using the AVPU scale (Alert, Voice, Pain, Unresponsive).
2. Motor function – check for weakness or paralysis on both sides.
3. Speech and language – look for aphasia or dysarthria.
4. Vision – test for visual fields and acuity.
5. Facial droop – observe for asymmetry.
6. Gait – assess balance and coordination.

Any sudden change in these parameters warrants immediate imaging and intervention.

2.4 Exposure

Perform a full body exam to rule out other causes of altered consciousness, such as hypoglycemia, metabolic encephalopathy, or drug overdose. Check for signs of trauma, which may indicate a traumatic brain injury (TBI) rather than a spontaneous neurovascular event.

3. Immediate Actions and Triage

3.1 Activate the Stroke Team

Once a neurovascular emergency is suspected, call the dedicated stroke team or activate the emergency response system. Time is brain; every minute of delay increases the risk of permanent damage.

3.2 Pre hospital Care

Paramedics should:

- Maintain airway and breathing.
- Administer oxygen to keep SpO , >94%.
- Avoid blood pressure manipulation unless severe hypertension (>220/120 mmHg) is present.
- Collect blood samples for glucose, electrolytes, and coagulation profile.
- Document symptom onset time accurately.

3.3 Rapid Transport

Transport patients directly to the nearest comprehensive stroke center (CSC) or tertiary care hospital with neuroimaging and interventional capabilities. Avoid intermediate stops unless absolutely necessary.

4. Diagnostic Workup

4.1 Neuroimaging

Computed Tomography (CT) is the first line imaging modality. It quickly distinguishes hemorrhagic from ischemic strokes and identifies contraindications for thrombolysis.

- Non contrast CT (NCCT) – detects acute bleed within minutes.
- CT Angiography (CTA) – visualizes large vessel occlusions and aneurysms.
- CT Perfusion (CTP) – assesses penumbra and core infarct volume.

For patients with contraindications to CT or when higher resolution is needed, Magnetic Resonance Imaging (MRI) with diffusion weighted imaging (DWI) and MR angiography (MRA) can be employed.

4.2 Laboratory Tests

Essential labs include:

- Complete blood count (CBC) – look for anemia or thrombocytopenia.
- Coagulation profile – PT/INR, aPTT.
- Glucose level – hypoglycemia must be corrected.
- Basic metabolic panel – electrolytes and renal function.
- Blood type and crossmatch – in case of hemorrhage requiring transfusion.

4.3 Differential Diagnosis

Always consider alternative causes of acute neurological decline:

- Seizure activity (post ictal state).
- Metabolic derangements (hypoglycemia, hyponatremia).
- Infection (meningitis, encephalitis).
- Cardiac emboli (atrial fibrillation).
- Medication overdose (opioids, sedatives).

5. Treatment Options

5.1 Ischemic Stroke Management

Time is critical. The therapeutic window for intravenous thrombolysis (tPA) is up to 4.5 hours from symptom onset. For patients beyond this window, mechanical thrombectomy may still be viable up to 24 hours in selected cases.

- Intravenous tPA – 0.9 mg/kg (max 90 mg), 10% bolus, remainder over 60 minutes.
- Contraindications include recent surgery, active bleeding, or uncontrolled hypertension.
- Post tPA monitoring for hemorrhagic transformation is essential.

5.2 Hemorrhagic Stroke Management

Goals include controlling bleeding, reducing intracranial pressure (ICP), and preventing re bleeding.

- Blood pressure management – keep systolic
- Reversal of anticoagulation – administer vitamin K, PCC, or fresh frozen plasma as indicated.
- Surgical intervention – craniotomy or endovascular coiling for aneurysmal SAH; hematoma evacuation for large intraparenchymal bleeds.
- ICP monitoring – employ external ventricular drain (EVD) or intraparenchymal monitor.

5.3 Aneurysmal Subarachnoid Hemorrhage (SAH)

Early diagnosis and securement of the aneurysm are lifesaving.

- CT angiography is the diagnostic gold standard.
- Endovascular coiling or surgical clipping within 24 hours reduces re bleeding risk.
- Prevent vasospasm with nimodipine 60 mg orally every 4 hours for 21 days.

5.4 Arteriovenous Malformation (AVM) Emergencies

AVMs can present with hemorrhage or seizures.

- Imaging: CTA, MRA, or digital subtraction angiography (DSA).
- Treatment options: surgical resection, stereotactic radiosurgery, or endovascular embolization.
- Management of acute hemorrhage follows general hemorrhagic stroke protocols.

6. Post Acute Care and Rehabilitation

6.1 Medical Management

After stabilization, patients require secondary prevention:

- Antiplatelet therapy – aspirin 81 mg daily for ischemic stroke.
- For atrial fibrillation, use direct oral anticoagulants (DOACs) or warfarin based on CHA ,DS , VASc score.
- Blood pressure control – target
- Cholesterol management – statins 40–80 mg daily.
- Diabetes control – maintain HbA1c

6.2 Rehabilitation

Early rehabilitation improves functional recovery. Multidisciplinary teams should include physiatrists, occupational therapists, speech language pathologists, and neuropsychologists.

- Physical therapy focuses on strength, balance, and gait training.
- Occupational therapy addresses activities of daily living (ADLs).
- Speech therapy targets aphasia, dysarthria, and dysphagia.
- Neuropsychology addresses cognitive deficits and emotional adjustment.

6.3 Follow up and Monitoring

Regular outpatient visits are essential to monitor for:

- Re bleeding or aneurysm recurrence.
- Stroke recurrence.
- Medication adherence and side effects.
- Functional status and quality of life.

7. Prevention Strategies

7.1 Modifiable Risk Factors

Public health initiatives and individual lifestyle changes can reduce neurovascular event incidence.

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