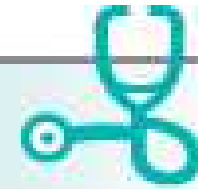


Cerebrovascular accident (CVA)

- third most common cause of death in the developed world
- common cause for physical disability in older age.
- CVA denotes either ischaemia from occlusion of blood vessels (producing cerebral ischaemia and infarction) or haemorrhage through their rupture.

22.52 STROKE RISK FACTORS



Irreversible

- Age
- Gender (male > female, except in the very young and very old)
- Race (Afro-Caribbean > Asian > European)
- Heredity
- Previous vascular event, e.g. myocardial infarction, stroke or peripheral embolism

Modifiable

- Hypertension
- Heart disease (heart failure, atrial fibrillation, endocarditis)
- Diabetes
- Hyperlipidaemia
- Smoking
- Excess alcohol consumption
- Polycythaemia
- Oral contraceptives

Clinical features

- Depend on vascular territory involved.
 - Hemisphere localized or extensive
 - Basal ganglia level (internal capsule and thalamus)
 - Brainstem
 - cerebellum
- Repeated small infarcts may lead to dementia or parkinsonism
- Hemorrhage in to the subarachnoid space may present as sudden onset severe headache associated with vomiting and neck stiffness.

Clinical classification

- Transient ischemic attack (TIA) or minor stroke or transient stroke
- Evolving stroke
- Reversible ischemic neurological deficit (RIND)
- Completed stroke



22.50 DIFFERENTIAL DIAGNOSIS OF ACUTE STROKE

- Primary cerebral tumours
- Metastatic cerebral tumours
- Subdural haematoma
- Cerebral abscess
- Todd's paresis (after epileptic seizure)
- Demyelination
- Hypoglycaemia
- Encephalitis
- Hysterical conversion

TIA

- A signal for major stroke in future
- Clinical features may be hemiparesis, aphasias, sensory disturbances, transient monocular blindness (amaurosis fugax), lower cranial nerve deficit etc.
- Brain imaging is strongly recommended to rule out small hemorrhage.
- Demarcates time for implementation of secondary preventive measures

Completed stroke

- About 85% are due to infarction and remaining 15 % are due to hemorrhage.
- Deficit is maximum at presentation
- Headache vomiting, transient loss of consciousness favor hemorrhage but this distinction is arbitrary

22.51 GENERAL EXAMINATION OF STROKE PATIENTS



Eyes

- Diabetic changes
- Hypertensive changes
- Retinal emboli
- Arcus senilis

Cardiovascular system

- Blood pressure (hypertension, hypotension)
- Heart rhythm (atrial fibrillation)
- Murmurs (sources of embolism)
- Jugular venous pressure (heart failure, hypovolaemia)
- Peripheral pulses and bruits (generalised arteriopathy)

Respiratory system

- Pulmonary oedema
- Respiratory infection

Abdomen

- Urinary retention



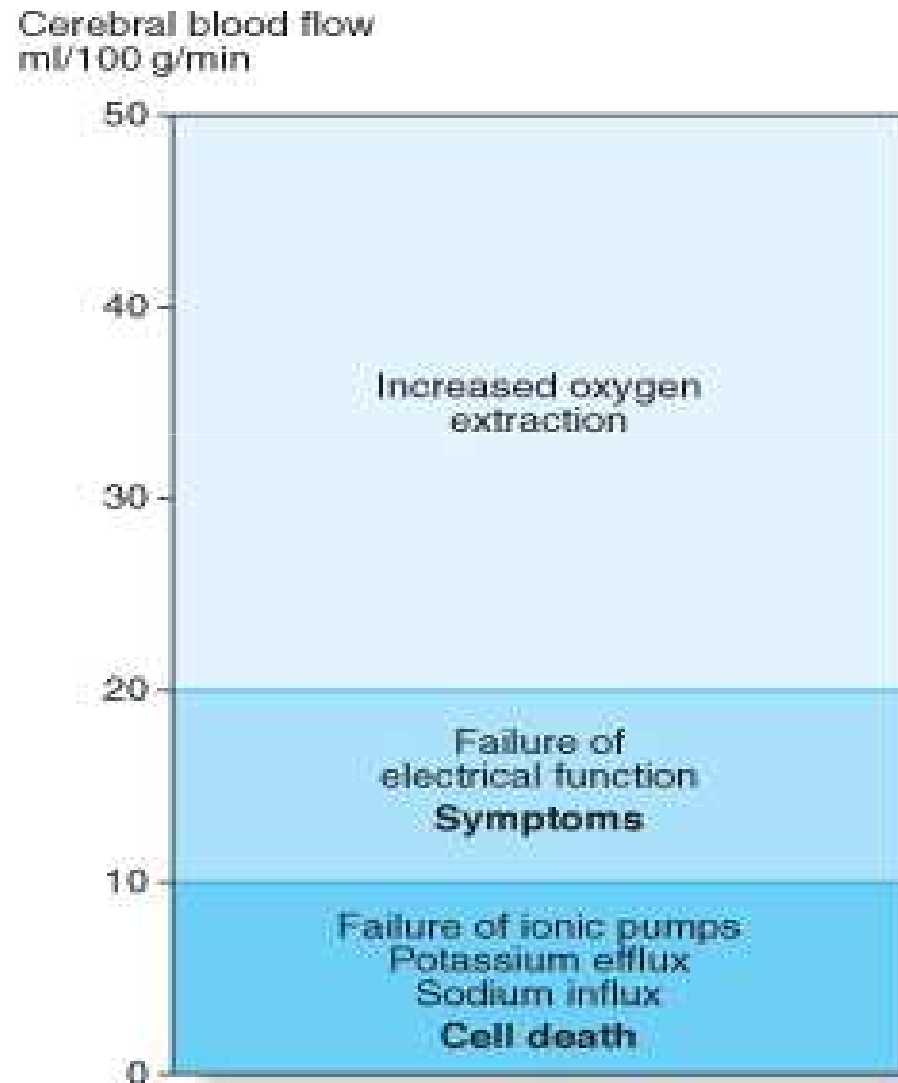
22.54 INVESTIGATION OF A PATIENT WITH AN ACUTE STROKE

Diagnostic question	Investigation
Is it a vascular lesion?	CT/MRI
Is it ischaemic or haemorrhagic?	CT
Is it a subarachnoid haemorrhage?	CT Lumbar puncture
What is the underlying vascular disease?	ECG Cardiac ultrasound MRA Doppler ultrasound Contrast angiography
What are the risk factors?	Blood count Cholesterol Clotting/thrombophilia screen Blood glucose

Cerebral infarction

- Sources of thrombi
 - Carotid bifurcation (embolic-artery to artery)
 - In situ formation (thrombotic)
 - Heart (cardioembolic- atrial fibrillation, Infective endocarditis, left ventricular failure)
- Sequential events after occlusion

Events following cerebral ischemia



Investigations

- **Computed Tomographic Scans**
 - Usually demonstrates the lesion, more ever it is very useful to exclude hemorrhagic lesion.
 - In ischemic stroke, occasionally CT may be normal in first 24 hours.
 - Small posterior fossa or lacunar infarction may be easily missed by CT.
- Other imaging techniques (MRI, angiography, transcranial doppler) can be applied in selected cases.
- Carotid doppler
- ECG, echocardiogram in suspected Cardiac emboli
- Assessment of the risk factors for stroke: blood sugar, serum lipids, polycythemia

Management

- (1) Supportive measures
- (2) Antiplatelet agents
- (3) Thrombolysis
- (4) Anticoagulation
- (5) Secondary prevention

supportive measures

- Treat complications of bedridden patients (pneumonia, UTI, bowel and bladder care, prevention of DVT)
- For those who are unable to swallow or tend to regurgitate or aspirate, put a nasogastric tube and start feeding.
- Control of the blood pressure:
 - Continue regular anti-hypertensive drugs
 - Don't treat new hypertension unless BP is $>185/110$ or ongoing TOD.
- Control of blood sugar, maintenance of hydration and electrolyte balance
- Infarctions are complicated by late cerebral edema (3-10 days after infarction) so judicious use of mannitol, restriction of salt and water is important.

- Anti-platelet agents
 - Aspirin 325 mg per day
 - Contraindicated in associated hemorrhage
 - Active bleeding lesion (e.g. bleeding peptic ulcer)
- Anticoagulation
 - Indicated in cardiac emboli in presence of atrial fibrillation or thrombus in left ventricle
 - Start with heparin infusion continue with warfarin (target INR is 2-3)
 - Complication : hemorrhagic transformation

- Thrombolysis
 - Frequently associated with hemorrhagic transformation of ischemic stroke
 - Still can be tried if patients presents within 6 hours of onset, absence of hypertension, when CT does not show excessive low density, or there are no other obvious contraindication.
 - Drugs that can be used are streptokinase and Rt-PA.
- Secondary prevention
 - Control of risk factors
 - Antiplatelet agent (aspirin, ticlopidine, Dipyridamole, clopidogrel)