BLOCK: Mental health care and Neurology

Neurology section lec.3

Stroke 2

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Davidson s principles and practice of medicine

objective

1. How to investigate patient with stroke by blood test and neuroimage?
2. Brain CT or MRI ?
3. Concentrate on the treatment and secondary prevention of srtoke ; minimising the volume of brain that is irreversibly damaged, preventing complications, reducing the patient's disability and handicap through rehabilitation, and reducing the risk of recurrent stroke or other vascular events. With TIA there is no persisting brain damage and disability, so the priority is to reduce the risk of further vascular events.
4. Aspirin or heparin ?
5. Can used thrombectomy?
6. Role of surgery in prevention of recurrent.

Stroke management

1. ABCDE in unconscious patients.

2. History and clinical examinations.

3. Investigations aims to
- confirm the vascular nature of a lesion,
- distinguish infarction from haemorrhage and
- identify the underlying vascular disease and risk factors.

4. Treatment and secondary prevention; minimising the volume of brain that is irreversibly damaged, preventing complications, reducing the patient's disability and handicap through rehabilitation, and reducing the risk of recurrent stroke or other vascular events.
With TIA there is no persisting brain damage and disability, so the priority is to reduce the risk of further vascular events.

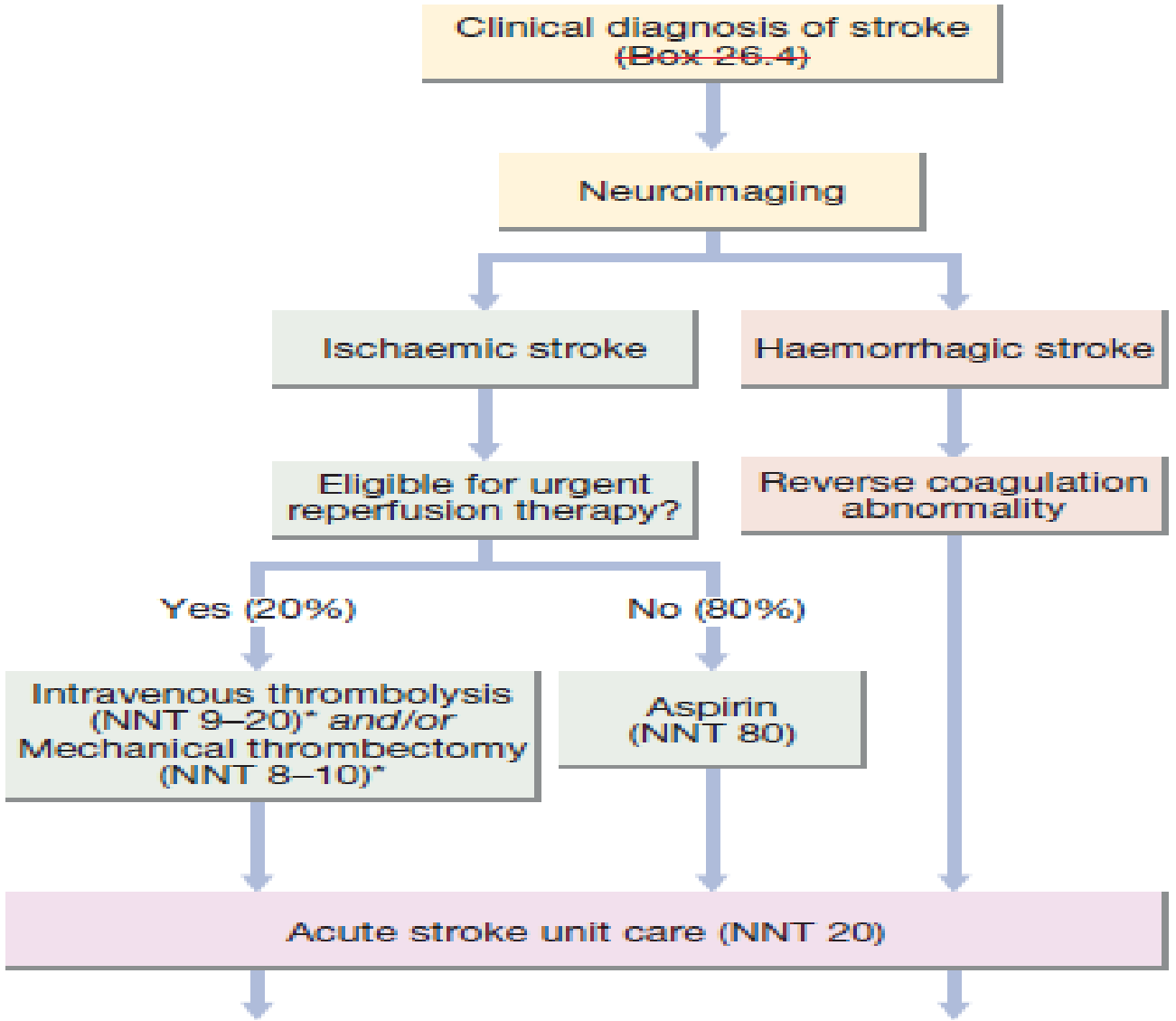


Fig. 26.11 Emergency management of stroke. *Varies with patient selection and delay in treatment. (NNT = number needed to treat to avoid one death or long-term disability)

Investigations

26.5 Investigation of a patient with an acute stroke

Diagnostic question	Investigation
Is it a vascular lesion?	CT/MRI
Is it ischaemic or haemorrhagic?	CT/MRI
Is it a subarachnoid haemorrhage?	CT/lumbar puncture
Is there any cardiac source of embolism?	ECG Holter monitoring Echocardiogram
What is the underlying vascular disease?	Duplex ultrasound of carotids MRA CTA Contrast angiography
What are the risk factors?	Full blood count Cholesterol Blood glucose
Is there an unusual cause?	ESR Serum protein electrophoresis Clotting/thrombophilia screen

Brain imaging with either **CT or MRI** should be performed in **all** patients with acute stroke..

- CT remains the most practical and widely available method of imaging the brain.
- **It will usually exclude non-stroke lesions**, including subdural haematomas and brain tumours, and will demonstrate intracerebral haemorrhage within minutes of stroke onset .

- However, especially within the first few hours after symptom onset, CT changes in cerebral infarction may be completely absent or only very subtle.
- Changes often develop over time but small cerebral infarcts may never show up on CT scans.
- For some purposes, a CT scan performed within 24 hours is adequate. but there are certain circumstances in which an immediate CT scan is essential. Even in the absence of changes suggesting infarction, abnormal perfusion of brain tissue can be imaged with CT after injection of contrast media (i.e. CT perfusion scanning). This can be useful in guiding immediate treatment of ischaemic stroke.

Indications for immediate CT/MRI in acute stroke

1. Patient on anticoagulants or with abnormal coagulation.
2. Consideration for reperfusion (thrombolysis) or immediate anticoagulation.
3. Deteriorating conscious level or rapidly progressing deficits.
4. Suspected cerebellar haematoma, to exclude hydrocephalus.

- **MRI is not as widely available** as CT and scanning times are longer. However, MRI diffusion weighted imaging (DWI) can detect ischaemia earlier than CT, and other MRI sequences can also be used to demonstrate abnormal perfusion .

- MRI is more sensitive than CT in detecting strokes affecting the brainstem and cerebellum.

- CT and MRI may reveal clues as to the nature of the arterial lesion. For example, there may be a small, deep lacunar infarct indicating small-vessel disease, or a more peripheral infarct suggesting an extracranial source of embolism. In a haemorrhagic lesion, the location might indicate the presence of an underlying vascular malformation, saccular aneurysm or amyloid angiopathy.

- More recently, CTA is being used to show vessel occlusion suitable for clot retrieval.

i 26.6 Causes and investigation of acute stroke in young patients

Cause	Investigation
Cerebral infarct	
Cardiac embolism	Echocardiography (including transoesophageal)
Premature atherosclerosis	Serum lipids
Arterial dissection	MRI CTA
Reversible cerebral vasoconstriction syndromes	MRI CTA
Thrombophilia	Protein C, protein S Antithrombin III Factor V Leiden, prothrombin
Homocystinuria (p. 369)	Urinary amino acids Methionine loading test
Antiphospholipid antibody syndrome (p. 977)	Anticardiolipin antibodies/lupus anticoagulant
Systemic lupus erythematosus	ANA
Vasculitis (e.g. primary angiitis of the central nervous system)	ESR CRP ANCA
CADASIL	MRI brain
CARASIL	Genetic analysis Skin biopsy
Mitochondrial cytopathy	Serum lactate White cell mitochondrial DNA Muscle biopsy Mitochondrial molecular genetics
Fabry's disease	Alpha-galactosidase levels
Sickle cell disease	Sickle cell studies
Neurovascular syphilis	Syphilis serology
Primary intracerebral haemorrhage	
AVM	MRI/MRA
Drug misuse	Drug screen (amphetamine, cocaine)
Coagulopathy	PT and APTT Platelet count
Subarachnoid haemorrhage	
Saccular ('berry') aneurysm	MRI/MRA
AVM	MRI/MRA
Vertebral dissection	MRI/MRA

(ANA = antinuclear antibody; ANCA = antineutrophil cytoplasmic antibody; APTT = activated partial thromboplastin time; AVM = arteriovenous malformation; CADASIL/CARASIL = cerebral autosomal dominant/recessive arteriopathy with subcortical infarcts and leucoencephalopathy; CRP = C-reactive protein; CTA = computed tomographic angiography; ESR = erythrocyte sedimentation rate; MRA = magnetic resonance angiography; MRI = magnetic resonance imaging; PT = prothrombin time)

Management

Supportive care

Rapid admission of patients to a specialized stroke unit facilitates coordinated care from a specialized multidisciplinary team, and has been shown to reduce both mortality and residual disability amongst survivors.

Consideration of a patient's rehabilitation needs should commence at the same time as acute medical management. Dysphagia is common and can be detected by an early bedside test of swallowing. This allows hydration, feeding and medication to be given safely, if necessary by nasogastric tube or intravenously.

In the acute phase, a checklist may be useful to ensure that all the factors that might influence outcome have been addressed.

- **Blood pressure, Unless there is heart or renal failure, evidence of hypertensive encephalopathy or aortic dissection, do not lower blood pressure abruptly in first week as it may reduce cerebral perfusion. Blood pressure often returns towards patient's normal level within days.**

➢ Blood glucose

• Check blood glucose and treat when levels are ≥11.1 mmol/L (200 mg/dL) (by insulin infusion or glucose/potassium/insulin (GKI)
• Monitor closely to avoid hypoglycaemia.

➢ Temperature

• If pyrexic, investigate and treat underlying cause
• Control with antipyretics, as raised brain temperature may increase infarct volume.

➢ Pressure areas

• Reduce risk of skin breakdown:

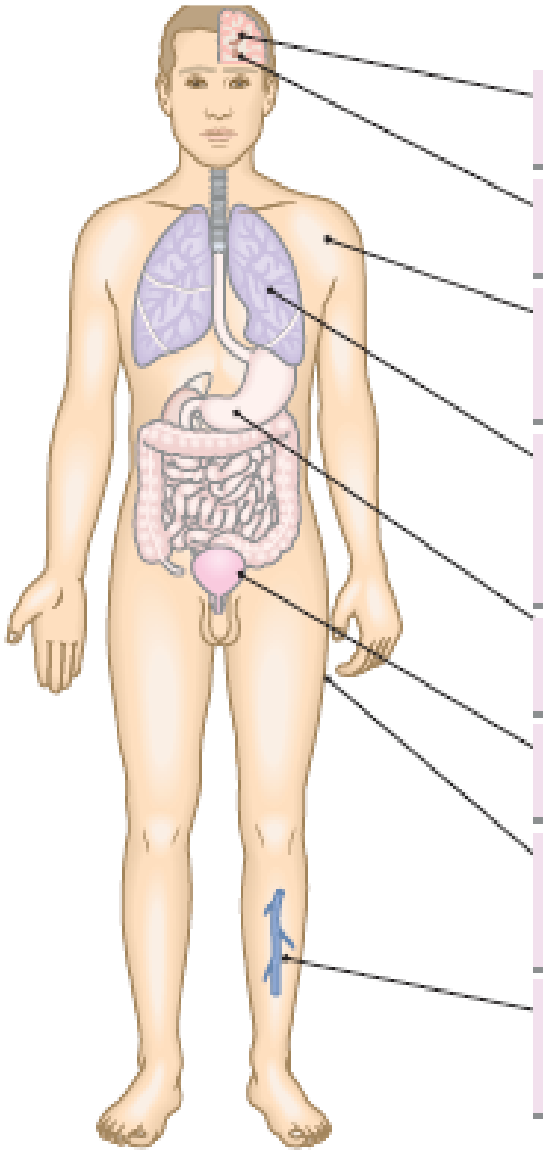
1. Treat infection
2. Maintain nutrition
3. Provide pressure-relieving mattress
4. Turn immobile patients regularly

➢ Incontinence

- Check for constipation and urinary retention; treat these appropriately
- Avoid urinary catheterization unless patient is in acute urinary retention or incontinence is threatening pressure areas

➢ Mobilization

- Avoid bed rest.



Complications	Prevention	Treatment
Epileptic seizures	Maintain cerebral oxygenation Avoid metabolic disturbance	Anticonvulsants
Depression and anxiety	Maintain positive attitude and provide information	Antidepressants
Painful shoulder	Avoid traction injury Shoulder/arm supports Physiotherapy	Physiotherapy Local glucocorticoid injections
Chest infection	Nurse semi-erect Avoid aspiration (nil by mouth, nasogastric tube, possible gastrostomy)	Antibiotics Physiotherapy
Constipation	Appropriate aperients and diet	Appropriate aperients
Urinary infection	Avoid catheterisation if possible Use penile sheath	Antibiotics
Pressure sores	Frequent turning Monitor pressure areas Avoid urine damage to skin	Nursing care Pressure-relieving mattress
Deep vein thrombosis/ pulmonary embolism	Maintain hydration Early mobilisation Heparin (for high-risk patients only)	Anticoagulation (exclude haemorrhage first)

Fig. 26.12 Complications of acute stroke.

Reperfusion (thrombolysis and thrombectomy)

Rapid reperfusion in ischaemic stroke can reduce the extent of brain damage. Intravenous thrombolysis with **recombinant tissue plasminogen activator (rt-PA)** increases the risk of haemorrhagic transformation of the cerebral infarct with potentially fatal results.

The main contraindications are bleeding risk (recent haemorrhage, anticoagulant therapy) and delay to treatment; the earlier treatment is given, the greater the benefit.
However, if given within 4.5 hours of symptom onset to carefully selected patients, the haemorrhagic risk is offset by an improved overall outcome.

Recently **mechanical clot retrieval (thrombectomy)** in patients with a large-vessel occlusion can greatly improve the chances of avoiding disability.

Aspirin

In the absence of contraindications, aspirin (300 mg daily) should be started immediately after an ischaemic stroke unless rt-PA has been given, in which case it should be withheld for at least 24 hours.

Aspirin reduces the risk of early recurrence and has a small but clinically worthwhile effect on long-term outcome.

it may be given by rectal suppository or by nasogastric tube in dysphagic patients.

Heparin

Anticoagulation with heparin has been widely used to treat acute ischaemic stroke in the past.

While it reduces the risk of early ischaemic recurrence and venous thromboembolism, it increases the risk of both intracranial and extracranial haemorrhage.

Furthermore, routine use of heparin does not result in better long-term outcomes, and therefore it should not be used in the routine management of acute stroke.

Anticoagulant

Warfarin should not be started before 2 weeks.

Patients with AF is indicated for anticoagulant according to CHADS2 score and CHA2DS2-VASc

score ≥2: recommend oral anticoagulation.

$CHADS_2$ -> CHA_2DS_2VASc

CHADS2 Risk	Score
CHF	1
Hypertension	1
Age > 75	1
Diabetes	1
Stroke or TIA	2

CHA2DS2-VASc Risk	Score
CHF or LVEF ≤ 40%	1
Hypertension	1
Age ≥75	2
Diabetes	1
Stroke/TIA/ Thromboembolism	2
Vascular Disease	1
Age 65 - 74	1
Female	1

From ESC AF Guidelines http://escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/guidelines-afib-FT.pdf

Carotid endarterectomy and angioplasty

A small proportion of patients with a carotid territory ischaemic stroke or TIA will have more than 50% stenosis of the carotid artery on the side of the brain lesion. Such patients have a greater than average risk of stroke recurrence.
For those without major residual disability, removal of the stenosis has been shown to reduce the overall risk of recurrence, although the operation itself carries about a 5% risk of stroke.

Surgery is most effective in patients with more severe stenoses (70–99%) and when it is performed within the first couple of weeks after the TIA or ischaemic stroke. Carotid angioplasty and stenting are technically feasible but have not been shown to be as effective as endarterectomy for the majority of eligible patients.

Endarterectomy of asymptomatic carotid stenosis has been shown to reduce the subsequent risk of stroke but the small absolute benefit does not justify its routine use.

Thanks