Stroke

- ***Stroke*** is a clinical syndrome of rapidly developing focal or global cerebral dysfunction, lasting more than 24 hours or leading to death, of presumed vascular origin.

- Someone in the UK has a stroke every 3.5 minutes; 1 in 4 of those will die within a year and half of survivors will have a permanent disability.

- Stroke is a heterogeneous clinical syndrome. The main pathological subtypes are,

- ischaemic stroke - 80-85%

- haemorrhagic stroke (primary intracerebral haemorrhage) - 10-15%

- subarachnoid haemorrhage - 5%

- Thrombosis is considered to arise from the interplay between the three factors that make up Virchow's triad:
    1. changes in blood flow (stasis or turbulence)
    2. vessel wall dysfunction
    3. changes in blood components, leading to hypercoagulability.

Risk factors

- *Disease-related risk factors*

- hypertension

- diabetes

- hyperlipidaemia

- heart disease - atrial fibrillation, ischaemic heart disease, valvular heart disease

- metabolic syndrome

- carotid artery stenosis

Risk factors

- *Life style -related factors*

-Smoking

- obesity/overweight

- unhealthy diet

- physical inactivity

- alcohol excess

Risk factors

- Male sex, older age and amyloid angiopathy (in elderly) are the most important non-modifiable risk factors for haemorrhagic stroke.

- Hypertension is the most important modifiable risk factor.

Differentials

- Head injury
- hypo/hyperglycaemia
- subdural haemorrhage
- intracranial tumours
- hemiplegic migraine
- post-ictal (Todd's palsy)

Differentials

- CNS lymphoma
- Wernicke's encephalopathy
- hepatic encephalopathy
- Encephalitis
- Toxoplasmosis
- cerebral abscesses
- drug overdose

Signs

- Worst at onset. *Pointers to bleeding (unreliable!):* meningism, severe headache, coma.
- *Pointers to ischaemia:* carotid bruit, Atrial Fibrillation, past Transient Ischemic Attack, Ischemic Heart Disease.

Signs

- *Cerebral infarcts:* (50%.)
  - Depending on site there may be contralateral sensory loss or hemiplegia—initially flaccid (floppy limb, falls like a dead weight when lifted), becoming spastic (UMN); dysphasia; homonymous hemianopia; visuo-spatial deficit.

Signs

- *Brainstem infarcts:* (25%.) Varied; include quadriplegia, disturbances of gaze and vision, locked-in syndrome (aware, but unable to respond).

Signs

- *Lacunar infarcts:* (25%). Basal ganglia, internal capsule, thalamus, and pons.)
- Five syndromes:

1. ataxic hemiparesis
2. pure motor
3. pure sensory
4. Sensorimotor
5. dysarthria/clumsy hand.
   Cognition/consciousness are intact except in thalamic strokes.

Acute management

1. ***Protect the airway:*** This avoids hypoxia/aspiration.

2. ***Maintain homeostasis:*** Blood glucose: keep between 4–11 mmol/L. Blood pressure: only treat if there is a hypertensive emergency (eg encephalopathy or aortic dissection) or thrombolysis is considered (ideally aim for 185/110) as treating even very high BP may impair cerebral perfusion.

3. ***Screen swallow:*** 'Nil by mouth' until this is done (but keep hydrated).

Acute management

***4. CT/MRI** within 1h:* Essential if: thrombolysis considered, high risk of haemorrhage (GCS, signs of raised ICP, severe headache, meningism, progressive symptoms, bleeding tendency or anti coagulated), or unusual presentation (eg fluctuating consciousness, fever).

Otherwise imaging less urgent (aim <24h).

Difusion-weighted MRI is most sensitive for an acute infarct, but CT helps rule out primary haemorrhage .

Acute management

5. Antiplatelet agents: Once haemorrhagic stroke is excluded, give aspirin 300mg (continue for 2 weeks, then switch to long-term antithrombotic treatment).

Thrombolysis

- Consider this as soon as haemorrhage has been excluded, provided the onset of symptoms was ≤4.5h ago.

- The benefits of thrombolysis outweigh the risks within this window, though best results are within 90min.

- Alteplase is the agent of choice and must be given by trained staff , ideally within an expert acute stroke team.

Thrombolysis

- **DOSE**

0.9mg/kg alteplase (r-TPA) (maximum 90mg) over 60 minutes (10% given as a bolus)

- Always do CT 24h post-lysis to identify bleeds.

Contra indications for thrombolysis

- Major infarct or haemorrhage on CT
- Mild/non-disabling deficit
- Recent surgery, trauma, or artery or vein puncture at uncompressible site
- Previous CNS bleed
- AVM/aneurysm
- Severe liver disease, varices, or portal hypertension
- Seizures at presentation

Contra indications for thrombolysis

- Blood glucose (<3 or >22)
- Stroke or serious head injury in last 3 months
- GI or urinary tract haemorrhage in the last 21 days
- Known clotting disorder
- Anticoagulants or INR >1 . 7.
- Platelets <100 ≈ 109 /L
- History of intracranial neoplasm.
- Rapidly improving symptoms
- BP >180/105.

Thrombectomy

- Intra-arterial mechanical thrombectomy provides additional benefit for those with large artery occlusion in the proximal anterior circulation.