- Heart
  - Atrial Myxoma
  - LA (mitral stenosis, AF)
  - LV (AMI)
  - Valves (Endocarditis)
- Carotid Artery
- Aortic Arch
- DVT w septal defect

Embolism
- 25% CVA

Extracranial Occlusion
- Carotid a. (MCA infarct)

Intracranial Occlusion
- Origin of MCA @ end of basilar a.

Occlusion
- 50% CVA

Vessel Obstruction

Hypotension

Ischaemia most prominent in areas of vascular overlap

Venous Obstruction

↑ back Pressure

Arteriovenous Malformation

Ischaemia in area supplied by artery

Watershed Zone

Global Ischaemia

Severe local Ischaemia

Superior Sagital Sinus Haemorrhage

Subarachnoid Haemorrhage

Berry Aneurysm
- 2% population
- Outpouching at bifurcation of artery

Cessation of blood flow

Intracerebral Haemorrhage

- Systemic disorder
- Brain tumour
- Vascular malformation
- Amyloid

↓ **Cerebral Perfusion**
- 30% flow
  - Electrical failure
- 15% flow
  - Membrane failure

Haemorrhage
- 20% CVA

Rupture of small penetrating vessels

Hypertension

TIA
- Focal neurological deficit lasting < 2hrs due to inadequate, usually minimal blood supply to brain
- 8-10% risk of stroke within 7 days

Ischaemic Penumbra
- Functionally impaired but potentially salvageable ischaemic brain tissue surrounding irreversibly damaged infarcted core

Perfusion normalises & tissue may receover

Ischaemia persists & infarcted core & penumbra extend

Stroke

↓ Available ATP

- Swelling
- Neutrophils
- Ischaemic "red cell"

Acute

↑ICP

Subacute

- Cavitation
- Fomary macrophages
- Reactive astrocytes

Glial Scar

- Prolonged focal neurological deficit or death of sudden onset due to a vascular cause
- Defect depends on artery effected & therefore CNS tissue
- 3rd leading cause of death in developed countries

Impaired Ca ATPase
- Normally pumps Ca out of cell

Infarction

↑ ICF Ca

Ca Overload
- Mitochondrial injry
- Activation of capsases, etc.

Necrotic cell death

Impaired Na/K ATPase

↑ Vascular Resisitance

↑ Perfusion pressure required to maintain cerebral perfusion

Risks
- HT
- Athersclerosis
- Heart Disease
- DM
- Family Hx
- Smoking
- Hyperlipidaemia
- Obesity
- Hypercoaguability
- Male > Female

12 months post stroke
- 1/3 dead
- 1/3 recovered
- 1/3 permanent disability

↑ ICF Na

Reperfusion of Area

Impaired cerebral autoregulation combined with hypotensive agents may lead to worsened cerebral perfuaion

HT

△ in Membrane Potential

Dysfunction of EAA transporter
- Reverse pumping

↑ Ca influx into cell

Toxic Oxygen Free Radicals

Cerebral Autoregulation
- Perfusion pressure maintained constant over a rand of systemic pressures via arteriolar (resistance) vessel diameter
- Metabolic regulation via vasodilation in presence of hypercapnia
- SNS (cervical ganglion) & PSNS (CN VII) innervate cerebral vessels but small physiological role

EAA Transporter
- Aspartate, Glutamate
- Removes EAA from synapse

Massive release of glutamate into synapse (Excitatory)

Excitotoxicity

Reperfusion Injury