Blood supply of the Brain

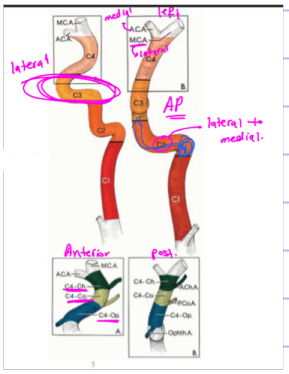
*Arteries of the Brain ___ 2carotid [Ant.]
└___ 2 vertibral (post)

the Branches anastomose on the inf. surface of the base of the brain to form the circle of willis

Internal carotid Artery:-

origin :- at the bifurcation of the CCA

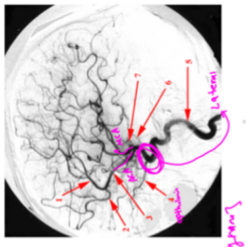
* ascend to the carotid canal of the temporal bone → cavernous sinus → enter the dura and arachnoid [medial to the anterior clinoid]
* Bifurcate to MCA and Act at the level of end of the Sylvian fissure ...

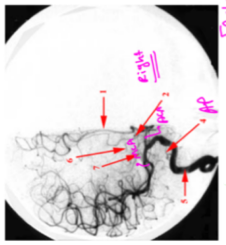


ICA segments; -

1- cervical segment [C1]
2- petrous segment [c2] horizontal in the temporal bone
3- cavernous [c3]
4- intracranial (supra clinoid) [C4]. has 3 parts :-
ophthalmic _ communicating _ choroidal

ACA	MCA
* Smaller * anterior-medial	*larger (ICA continuation] *laterally in the lateral cerebral sulcus [sylvian fissures]
*A com A. join the 2 ACA * Branches; - more anterior perforated sub. part of the lentiform and cudate nuclei and the internal capsule	* supply the lat, surface * Branches; - less anterior perforated sub. part of the lentiform and cudate nuclei and the internal capsule





ICA angiogram AP & Lat

vertebral Artery :-

_ branch of the 1st part of the subclavian artery
_ at the upper 6 vertebrae pass through foramina in the transverse process. [ما بعد ضل ب C7 لل]
_ enter the skull through the foramen magnum and piercess th dura mater and arachnoid
_ pass upward ,forward, medially around the medulla

- At the lower border of the pon, it joins of the opposite side to form the basilar artery.

VA branches:- [intracranial]

- meningeal branches :- small vessels.
- post. Spinal artery 2..
- Ant. spinal artery 1...
- PICA :- from Vertebral and Basilar and supply choro plexus of 4th V.
  injury in the PICA lead to wallenberg syndrome.. [vertigo-diplopia dysarthria, ipsilateral Horner syndrome, numbness , ipsilateral face and contralateral limb. , no limb weakness, no Loc]
- medullary branches.

Basilar Artery:- formed by union of 2 vertebral A.

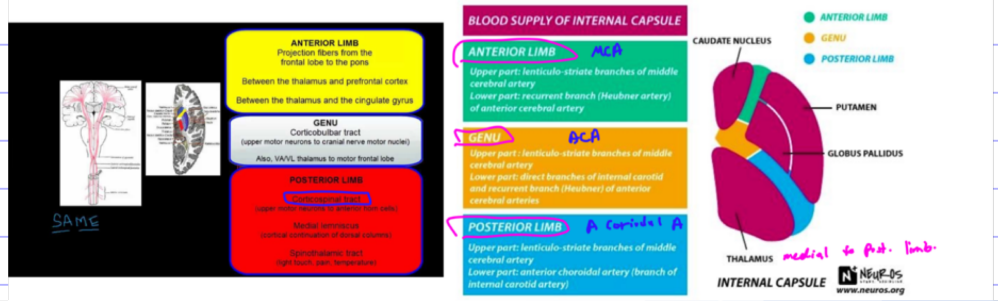
- Ascend in a groove on the Ant surface of the pons.
- divided into 2PCA at the upper border of the pons.

Branches of MA.

1- Pontine A.
2- Labyrinthine A.
3- AICA
4- SCA.
5- PCA suppy the visual cortex, post choroid plexus in inf. horn and 3rd v. and injury in this Artery lead to contralateral hemianopia

circle of willis i10A: Acom.A, 2ACA, 2ICA, 2PcomA ,2PCA, basillar
function:- Blood distribution and variation.

Function & Blood supply of Internal Capsule



Supply	Area
Mainly by the medial and lateral striate central branches of MCA. ACA	Corpus striatum & internal capsule
P Com A, Basilar, PCA	Thalamus
PCA, Basilar, SCA	Midbrain
Basilar, SCA, AICA	Pons
VA, PICA, Basilar, Anterior & Posterior spinal art.	Medulla oblongata
SCA, AICA, PICA	Cerebellum

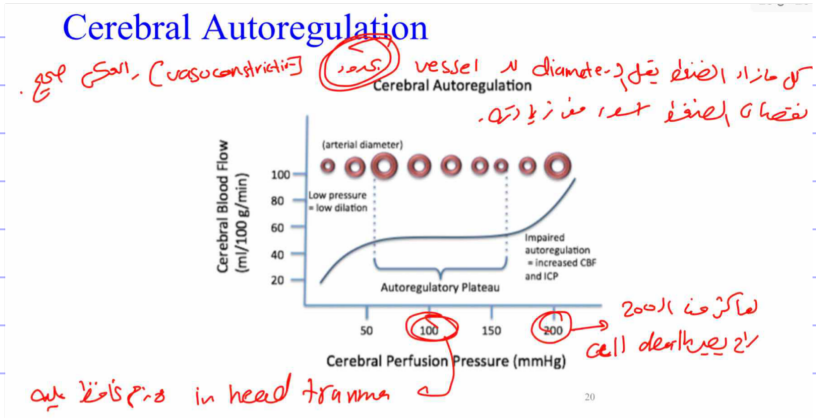
control of cerebral Bf.

↑ CO_2 , ↑ H^+ , ↓ O_2, parasympathetic → vasodilation

↓ CO_2 , ↓ H^+ , ↑ O_2, sympathetic → Vasoconstriction.

veins of the brain: has thin wall, no muscular tissue, no valves.

drain into the cranial venous sinuses.



spinal cord arteries: longitudinal..

- 2 post. Spinal A. (1/3) :small in upper thoracic
- 1 Ant. spinal A. (2/3):- small in upper and lower thoracic.

* reinforced by small segmentally arranged A:- great anterior medullary A. of Adamkiewicz ..

↳ from the aorta, in the lower thoracic [T10-L2], unilateral, left side and supply the lower 2/3 of cord..

clinical Notes; -

- cerebrovascular disease: 50% Of all adult neurologic hospital admission
- if the Brain Blood flow completely cut due to cardiac arrest for example lead to:-
  - 5-10 sec;-loss of conscious
  - 1min:- neuronal function cease
  - 4min: irreversable damage

Arterial occlusion

ACA occlusion	MCA occlusion	PCA occlusion
* sensory loss * Contralateral leg and foot weakness * personality changes [distal to A.com. A]	* contralateral hemiparesis * hemisensory loss in face and arm. * Aphasia mostly if Lf. side affected * contralateral homonymous hemianopia [optic radiation]	* contralateral homonymous hemianopia with macular sparing [occipital] * impairment of memory [temporal]

ICA Occlusion	vertebral Artery occlusion
* contralateral hemiparesis * hemisensory loss in face and arm. * Aphasia mostly if Lf. side affected * contralateral homonymous hemianopia [optic radiation]	* pain, temp. sensory loss [ipsilateral face, contralateral Body] * Hemianopia or complete cortical Blindness * ipsilateral loss of the gag reflex, dysphagia and hoarseness. * vertigo, nystagmus, nausea, vomiting, coma * ipsilateral Horner syndrome * unilateral or bilateral hemiparesis * ipsilateral ataxia and other cerebellar signs

cerebral Blood flow impairment

causes; -* disease that lead to alteration in BP [postural hypotension , heart disease....etc]

* disease of arterial walls [atheroma]
* disease due to Blockage of the arterial lumen [thrombus, fat globules]..

cerebral Aneurysms:- * dilatation of the arterial wall and may be ruptured .

* usually occur at branching points of major Arteries.

presentation :-pressure symptoms, subarachnoid hemorrhage

cerebral hemorrhage:-* rupture of the thin walled lenticulostriate arteries

* (most commonly) basal ganglia hemorrhage
* Damage to corticonuclear and corticospinal fiber,
* coma, contralateral hemiplegia, HTN