



CAROTID AND VERTEBRAL ANGIOGRAPHY

Vasculature of Brain

- The brain is supplied by four trunk vessels or great vessels.
- The right and left common carotid arteries, which supply the anterior circulation; and the right and left vertebral arteries, which supply the posterior circulation.
- At the level of C4, each common carotid artery divides into internal and external carotid arteries.
- The external carotid artery contributes blood supply to the extracranial and extra-axial circulation.
- The internal carotid artery enters the cranium through the carotid foramen of the temporal bone and then bifurcates into the anterior and middle cerebral arteries.
- These vessels in turn branch and rebranch to supply the anterior circulation of the respective hemisphere of the brain.

- The vertebral arteries ascend through the cervical transverse foramina and then pass medially to enter the cranium through foramen magnum.
- The vertebral arteries unite to form the basilar artery, which, after a short superior course along the posterior surface of the dorsum sellae, bifurcates into the right and left posterior cerebral arteries.
- The blood supply to the posterior fossa (cerebellum) originates from the vertebral and basilar arteries.
- The anterior and posterior cerebral arteries are connected by communicating arteries at the level of the midbrain to form the circle of Willis.
- The anterior communicating artery forms an anastomosis between the anterior cerebral arteries, which communicate between the right and left hemispheres.
- The right and left posterior communicating arteries each form an anastomosis between the internal carotid artery and the posterior cerebral artery connecting the anterior and posterior circulation.

right common
carotid artery

left common
carotid artery

right
subclavian
artery

left subclavian
artery

brachiocephalic
artery

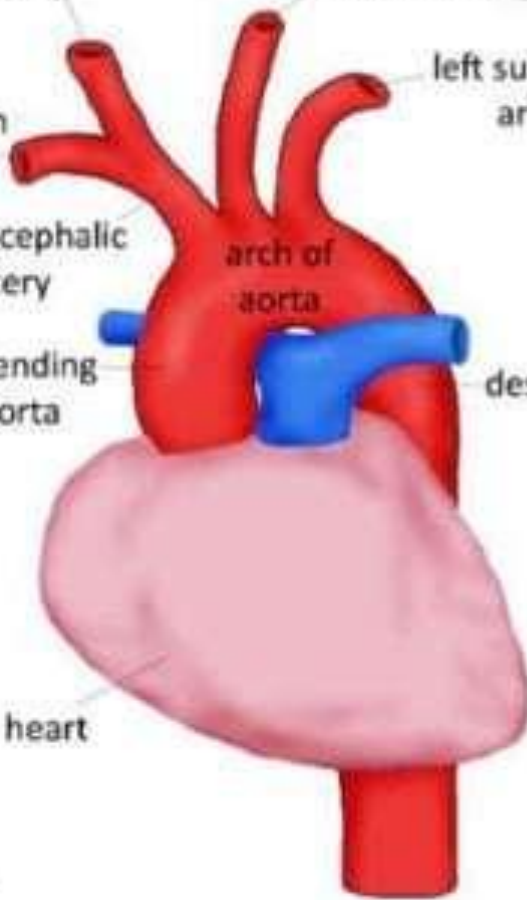
arch of
aorta

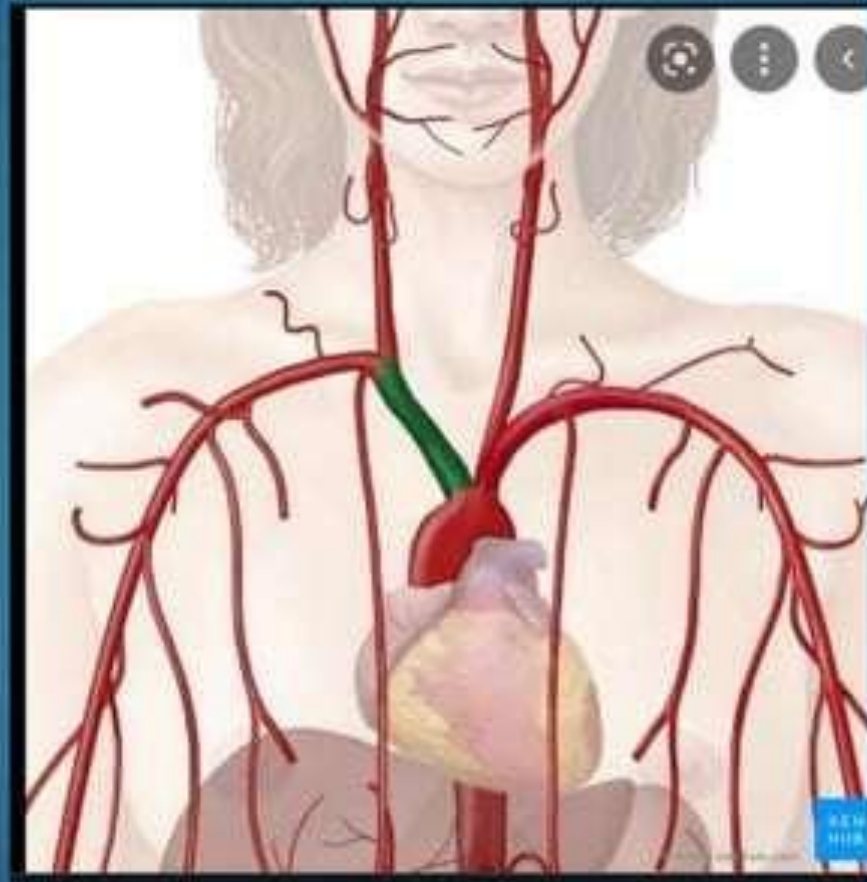
ascending
aorta

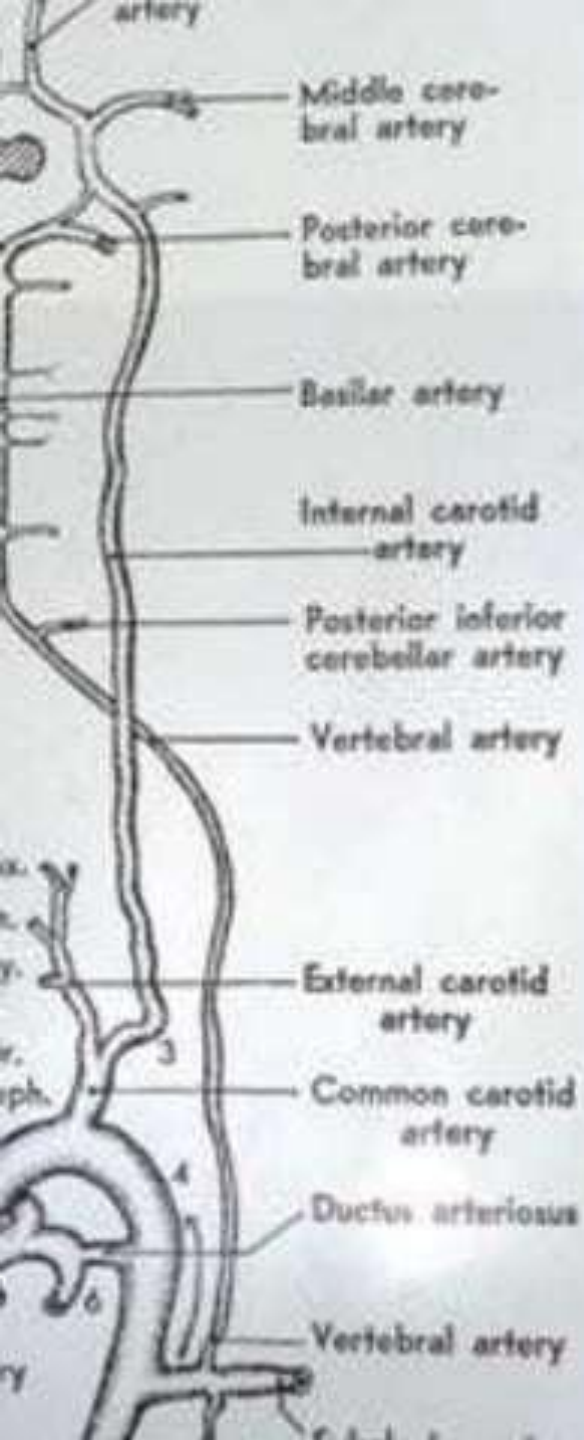
descending
aorta

heart

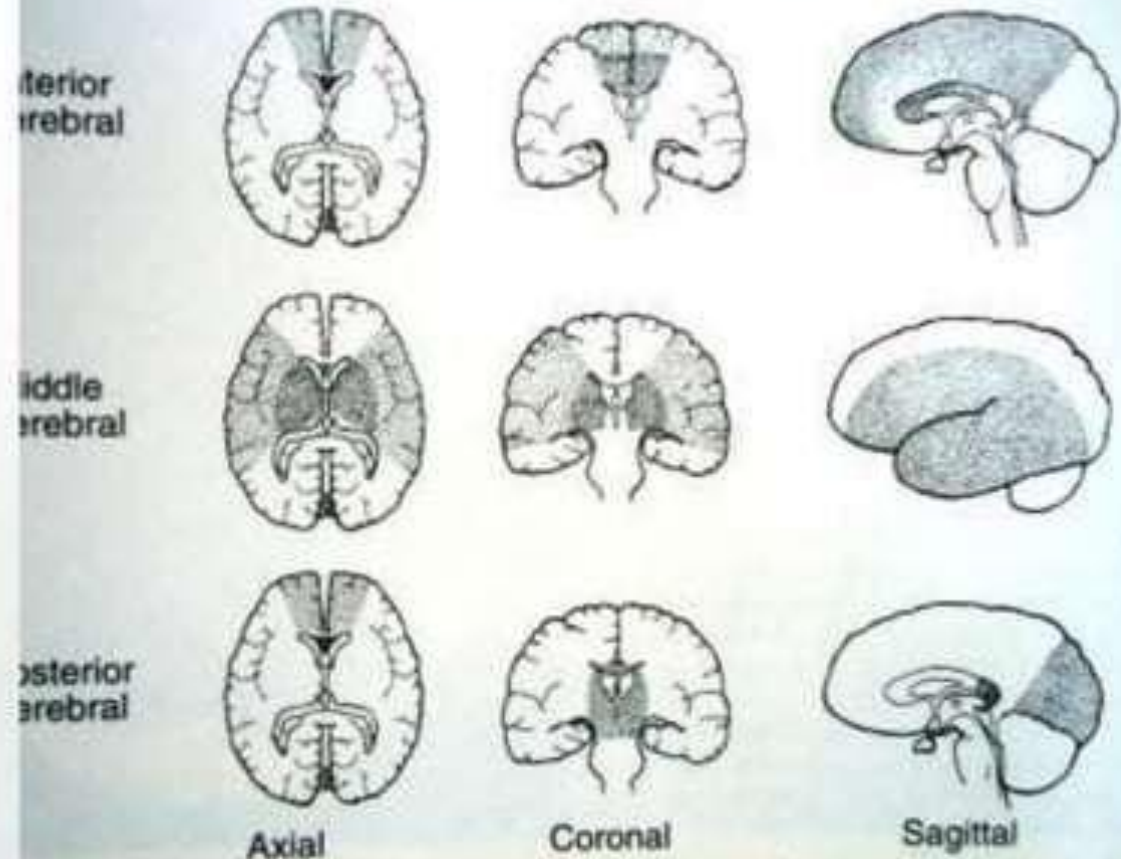
1,694 x 2,008







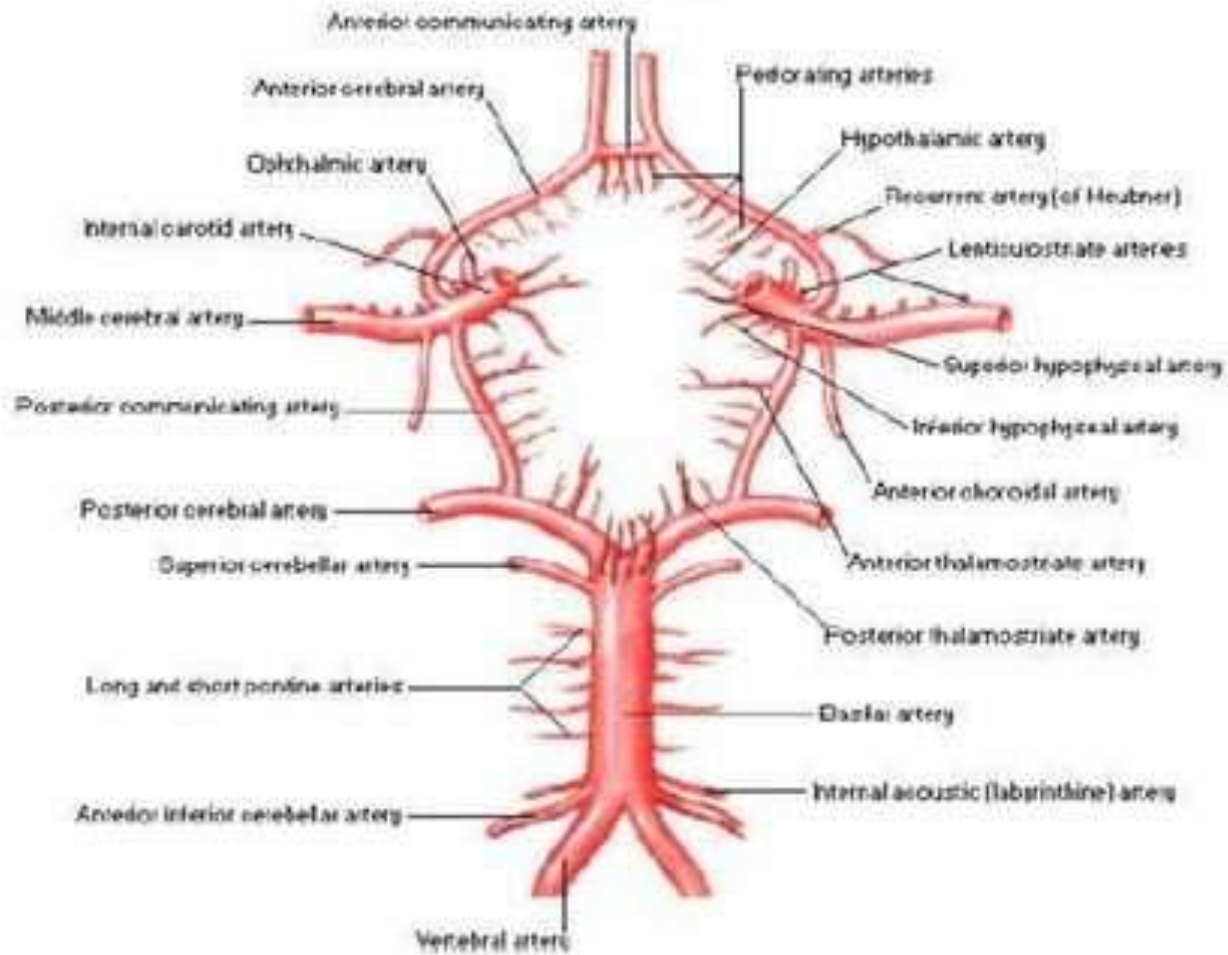
Cerebral Arterial Distribution



The arterial tributaries of brain as visualized on axial, coronal and sagittal views.

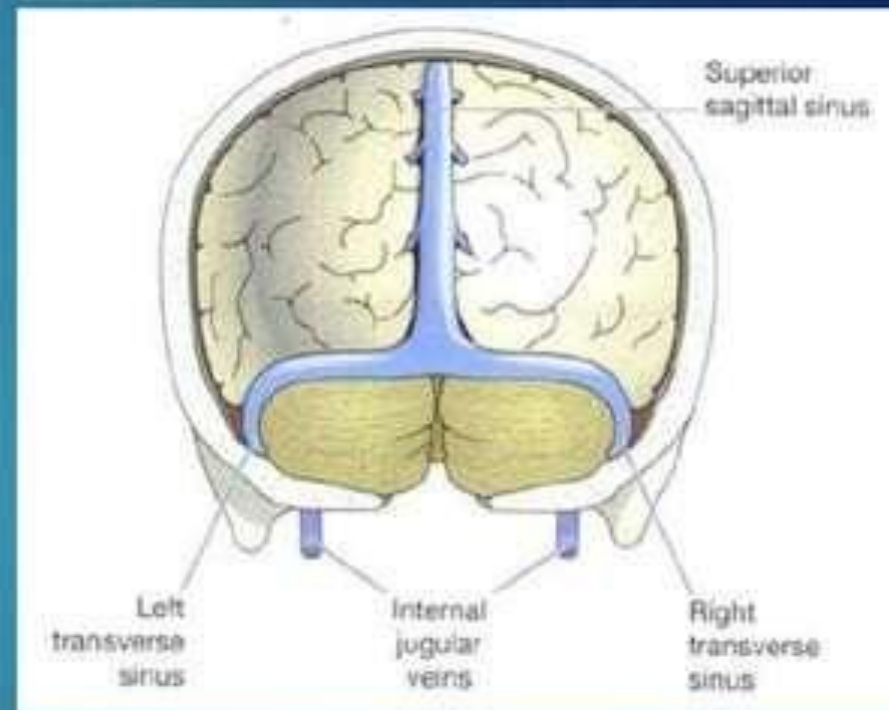
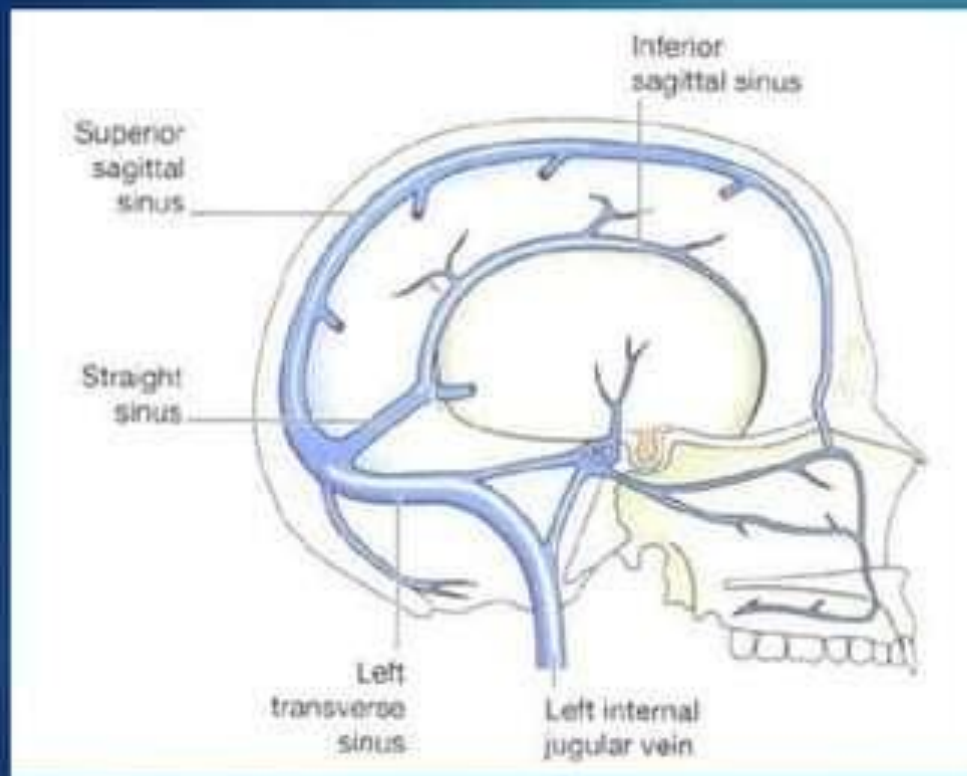
Circle of Willis

Inferior View




- The venous blood from the deep areas of the brain is collected into channels called the dural venous sinuses.
- The dural venous sinuses of the brain are formed by layers of dura mater lined with endothelium.
- The main venous sinuses are:
 - i. 1 superior sagittal sinus
 - ii. 1 inferior sagittal sinus
 - iii. 1 straight sinus
 - iv. 2 transverse or lateral sinuses
 - v. 2 sigmoid sinuses.

- The superior sagittal sinus carries the venous blood from the superior part of the brain. It begins in the frontal region and passes directly backwards in the midline of the skull to the occipital region where it turns to the right side and continues as the right transverse sinus.
- The inferior sagittal sinus lies deep within the brain and passes backwards to form the straight sinus.
- The straight sinus runs backwards and downwards to become the left transverse sinus.
- The transverse sinuses begin in the occipital region. They run forward and medially in a curved groove of the skull, to become continuous with the sigmoid sinuses.
- The sigmoid sinuses are a continuation of the transverse sinuses. Each curves downwards and medially and lies in a groove in the mastoid process of the temporal bone.
- Inferiorly they continue as the internal jugular vein.

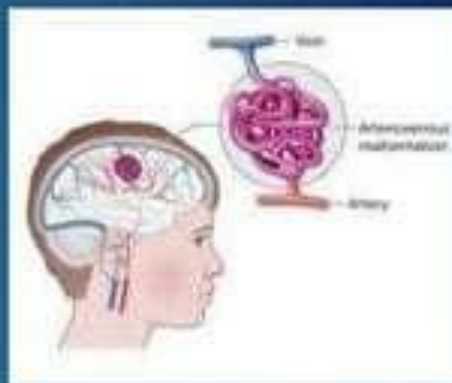


Venous Sinuses of the brain as viewed from the right side and above.

- 
- ▶ The radiological examination that involves the study of the vessels in head and neck. It involves study of:
 - I. Right and left common carotid arteries
 - II. Right and left internal carotid arteries
 - III. Vertebral arteries

Indication:

- ▶ To confirm the presence of aneurysm
- ▶ Arteriosclerosis
- ▶ To confirm the location of angioma
- ▶ Arteriovenous malformation
- ▶ Stenosis of vessel
- ▶ Cavernous sinus syndrome
- ▶ Cartico-cavernous fistula



contraindication

- Patient unsuitable for surgery.
- Patient in whom vascular access would be impossible or excessively risky.
- ▶ History of contrast media reaction
- ▶ Abnormal blood reports

Contrast media

- LOCM
- Dosage:
 - I. Common carotid: 7ml
 - II. Internal carotid injection – 6ml
 - III. Vertebral artery- 6ml

Equipment and patient preparation:

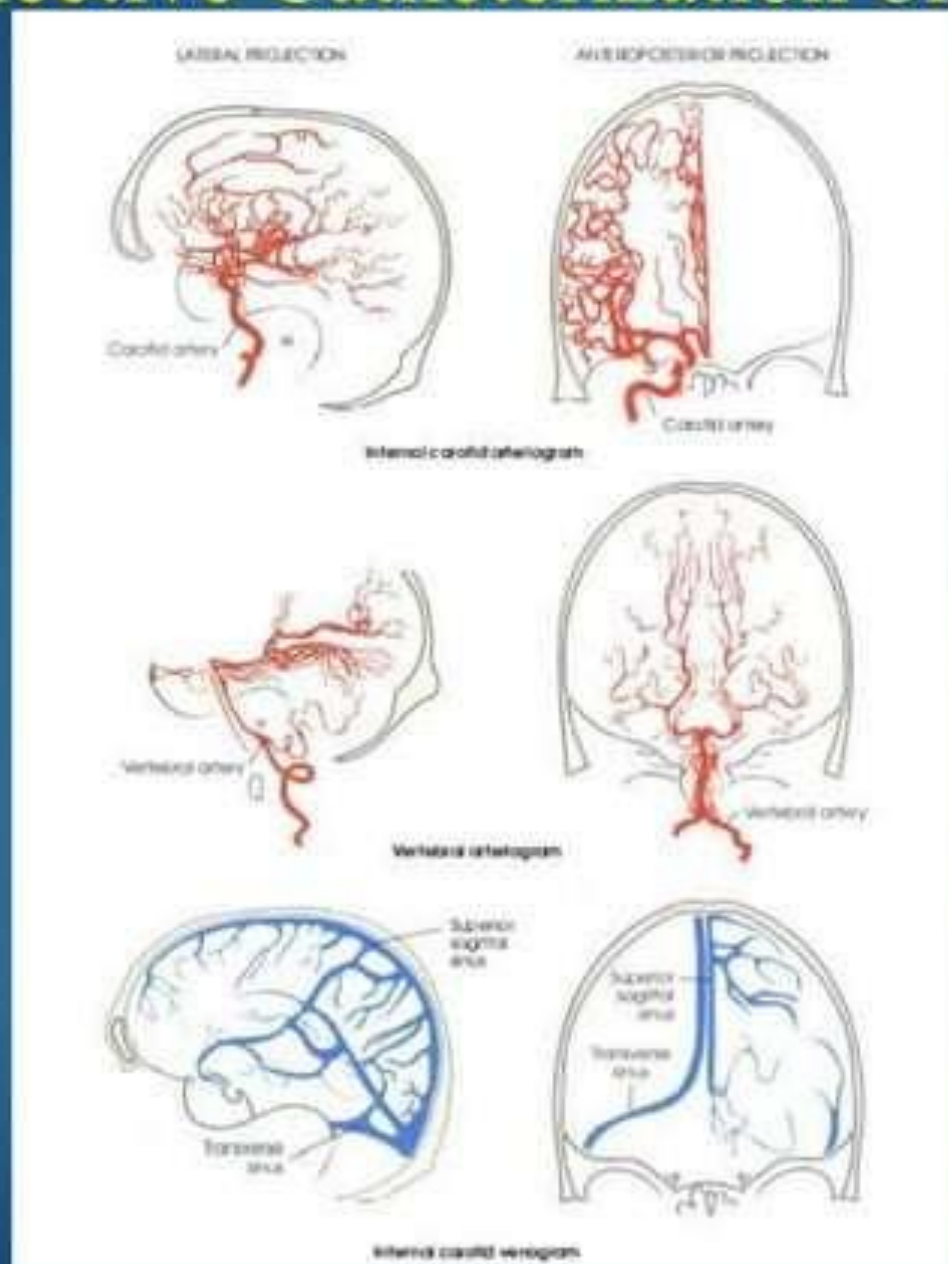
- ▶ Same for all angio procedures

Technique:

- ▶ Using standard percutaneous catheter introduction technique (Seldinger's method), the femoral artery (usually the right side for convenience) is catheterized.
- ▶ The progress of the catheter is monitored by intermittent fluoroscopy and advanced until it is in the aortic arch, finally to the desired vessel and a test dose is given.
- ▶ When the catheter is in the position, the patient is repositioned and contrast agent is injected and a series of lateral and oblique views are taken.

Selective Catheterization of Vessels

17



Risk Vs Benefits

➤ Benefits :

- ❑ It is gold standard technique for angiography.
- ❑ It is cheaper.
- ❑ Both daignostic and interventional procedure can be done while the patient is in same position.
- ❑ Selective catheterization of vessels allows to use less volume of contrast medium.

➤ Risks :

- ❑ It is invasive procedure.
- ❑ Post procedure complication rate is higher.
- ❑ It is time consuming.