

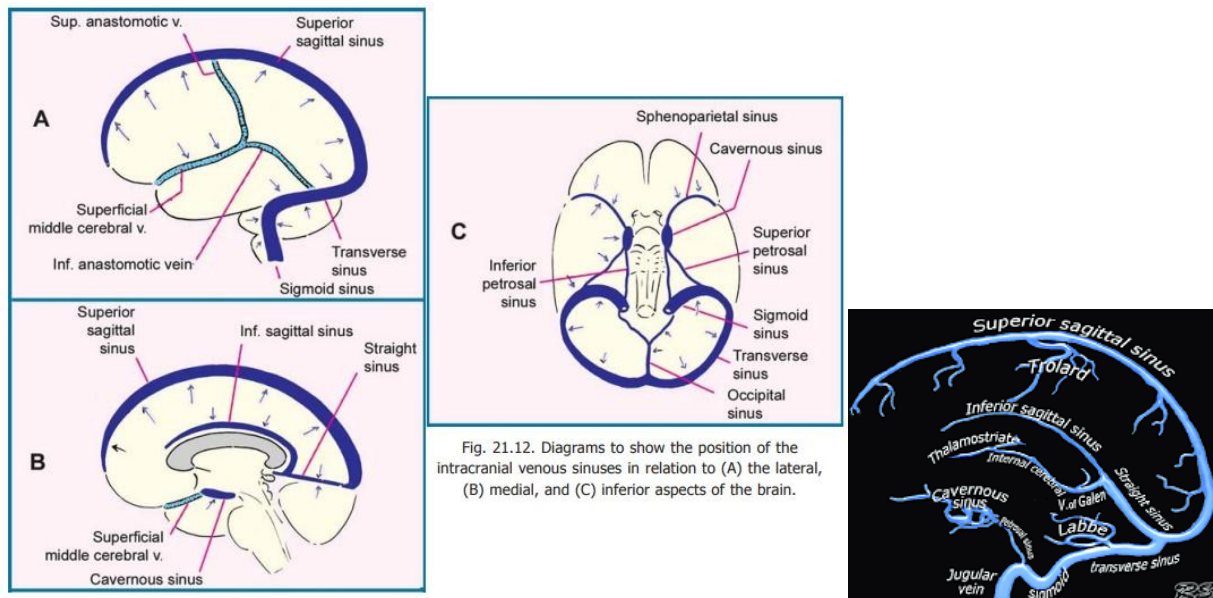


2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM

Cerebral venous anatomy and Applied Radiology - 1

The cerebral venous system is a freely communicating and interconnected system comprised of dural sinuses and cerebral veins. Venous outflow from the cerebral hemispheres consists of two groups of valveless veins, which allow for drainage: the superficial cortical veins and the deep or central veins.



The cortical veins lie superficially, unlike cortical arteries, and are adherent to the deep surface of the arachnoid mater so that they keep the sulci open. Cortical veins then drain to the nearest dural venous sinus, such as the superior sagittal sinus (which drains the superolateral surface of the hemisphere) and the straight sinus, to the torcula Herophili which lies inferiorly (the confluence of sinuses), then to the transverse sinuses, and sigmoid sinuses and internal jugular veins.

Drainage of the inferior and medial surfaces occur through the straight sinus to the great cerebral vein (of Galen) to the internal cerebral vein and choroid plexus vein, thalamostriate vein and veins of septum pellucidum. The great cerebral vein (of Galen) also gives off two basal veins (of Rosenthal) and with the inferior sagittal sinus, joins the straight sinus.

Cerebral veins have thin walls with no muscular tissue and possess no valves. They emerge from the brain and lie in the subarachnoid space, coursing over the surface of the brain, aggregating into larger channels until they pierce the arachnoid mater and the meningeal layer of the dura mater and drain into the dural venous sinuses.

The whole system may be divided into some sections:

- **cerebral veins**
 - **superficial**
 - **deep**
- **dural venous sinuses**

Cerebral Veins

Superficial venous system

The **superficial venous system** is comprised of the sagittal sinuses and cortical veins. The cortical veins course along the cortical sulci, drain the cortex and some of the adjacent white matter. There are numerous cortical veins, and most of them are unnamed; however, the large cortical veins can be identified according to their locations, the cortical venous system can be subdivided into superior, middle and inferior groups. Important veins of the superficial cerebral venous system are:

- **superficial middle cerebral vein** (Sylvian vein)
- **superior anastomotic vein** (of Trolard)
- **inferior anastomotic vein** (of Labbé)

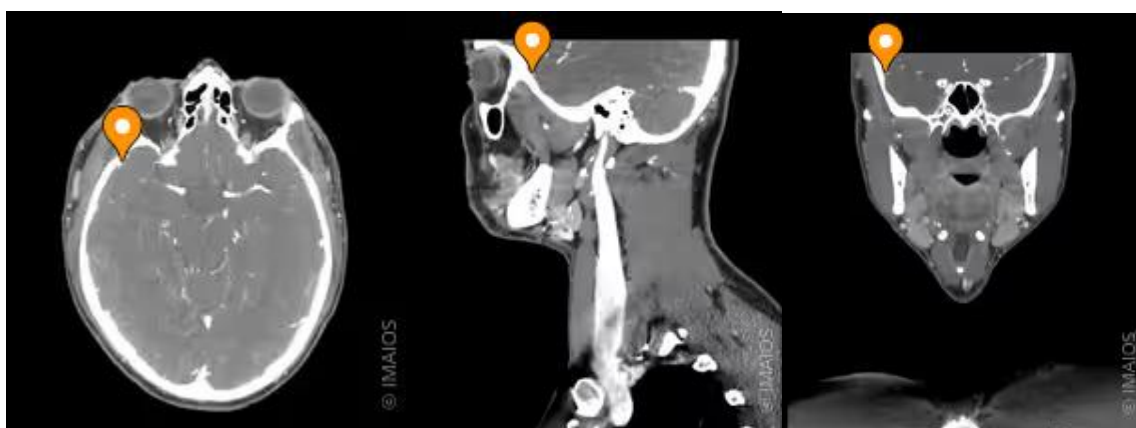
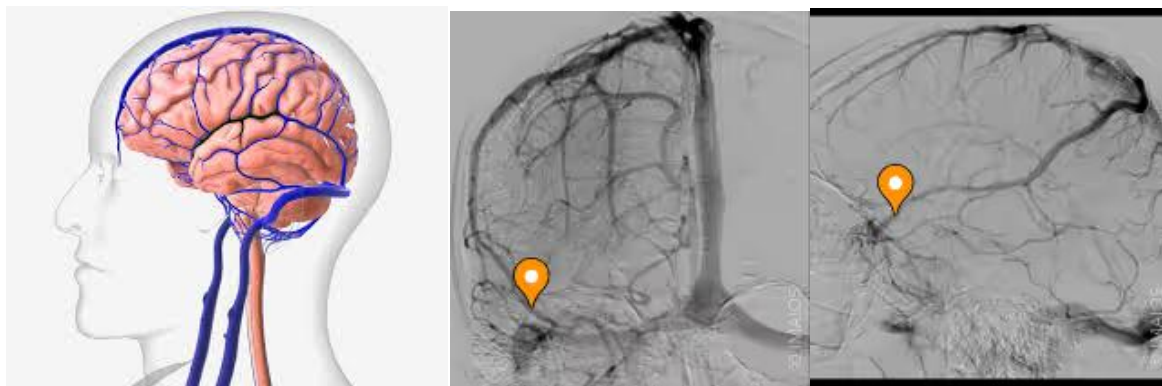
Superficial middle cerebral vein

The superficial middle cerebral vein (SMCV), also known as the Sylvian vein, is one of the superficial cerebral veins. It usually courses along the Sylvian fissure posteroanteriorly and drains numerous small tributaries from the opercular areas around the lateral sulcus. It curves anteriorly around the tip of the temporal lobe and drains into the sphenoparietal sinus or directly into the cavernous sinus. There is however, significant variation .

It may have connections to other dural venous sinuses by anastomotic veins:

to the superior sagittal sinus by the superior anastomotic vein (of Trolard)

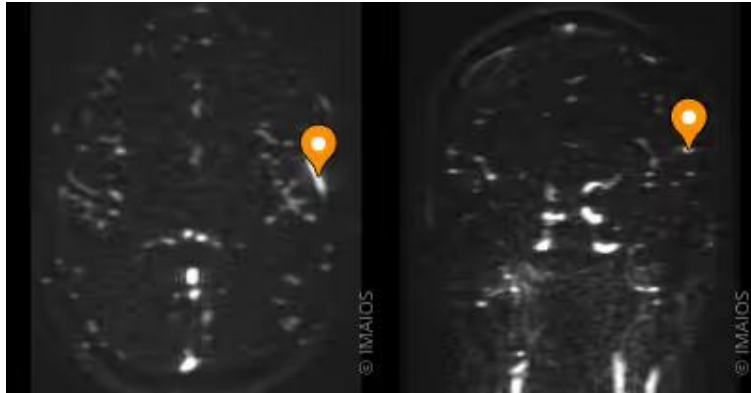
to the transverse sinus by the inferior anastomotic vein (of Labbé)



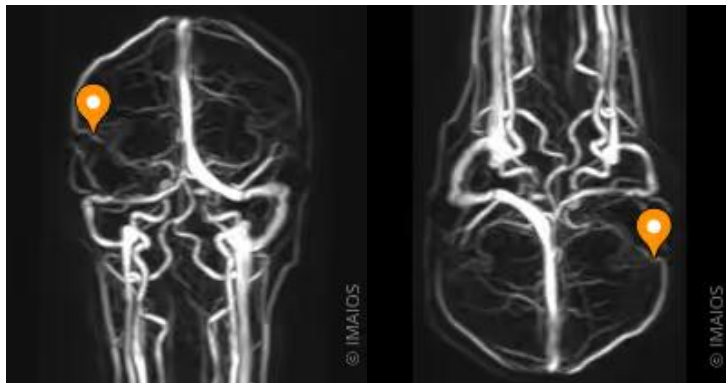
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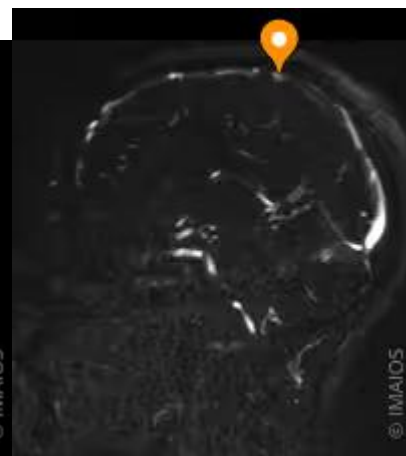
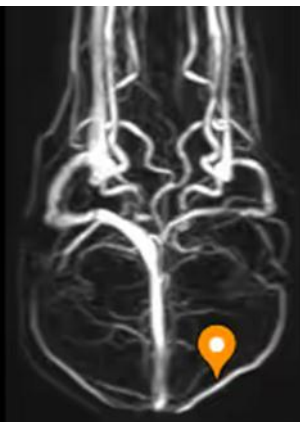
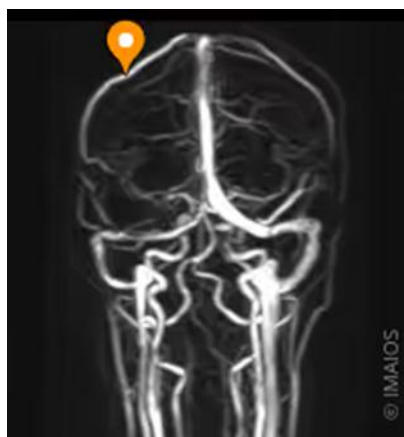
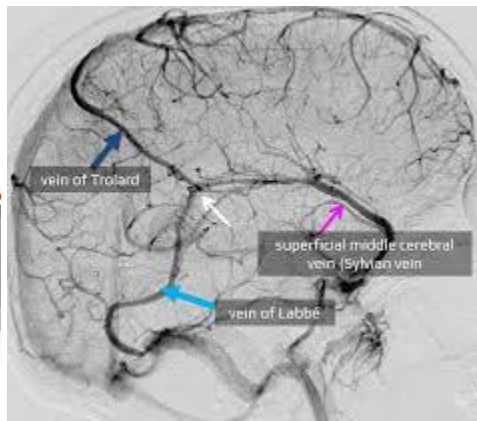
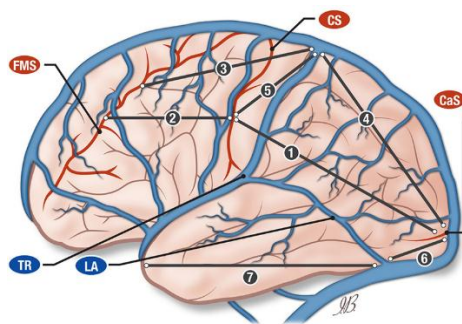
Superior anastomotic vein (of Trolard)

The superior anastomotic vein, also known as the vein of Trolard, is part of the superficial venous system of the brain.

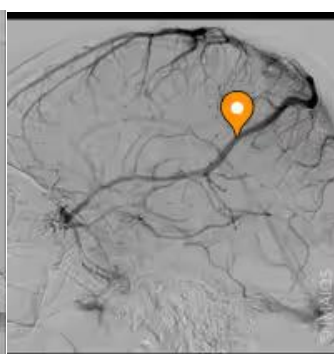
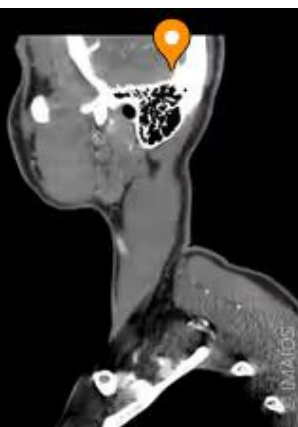
It is the largest superficial vein on the lateral surface of the parietal or frontal lobe that connects the superior sagittal sinus and the superficial middle cerebral vein (of Sylvius). It usually runs in the post-central sulcus 1 draining the adjacent cortex, but can be found in the central sulcus or anterior to it .

Its size is dictated by the relative size of the superficial middle cerebral vein and the inferior anastomotic vein of Labbé. The vein of Trolard is usually smaller than both of these. It has more variability than the vein of Labbé and is said to be the most variable of all the superficial veins of the brain .

As can be surmised by first principles, there is an inverse relationship between the size of the terminal Sylvian vein, the vein of Trolard, and the vein of Labbé, as all three share a similar drainage territory . Usually either the vein of Trolard or Labbé are dominant, both are small with the Sylvian vein being dominant or both are co-dominant with a small Sylvian vein. Occasionally the veins of Labbé and Trolard anastomose with themselves and bypass the Sylvian vein.



MRV



Inferior anastomotic vein (of Labbé)

The inferior anastomotic vein, also known as the vein of Labbé, is part of the superficial venous system of the brain.

The frequency with which the vein of Labbé is identified varies across publications and modalities and is anywhere between 25-97% of cases. Its location is also highly variable

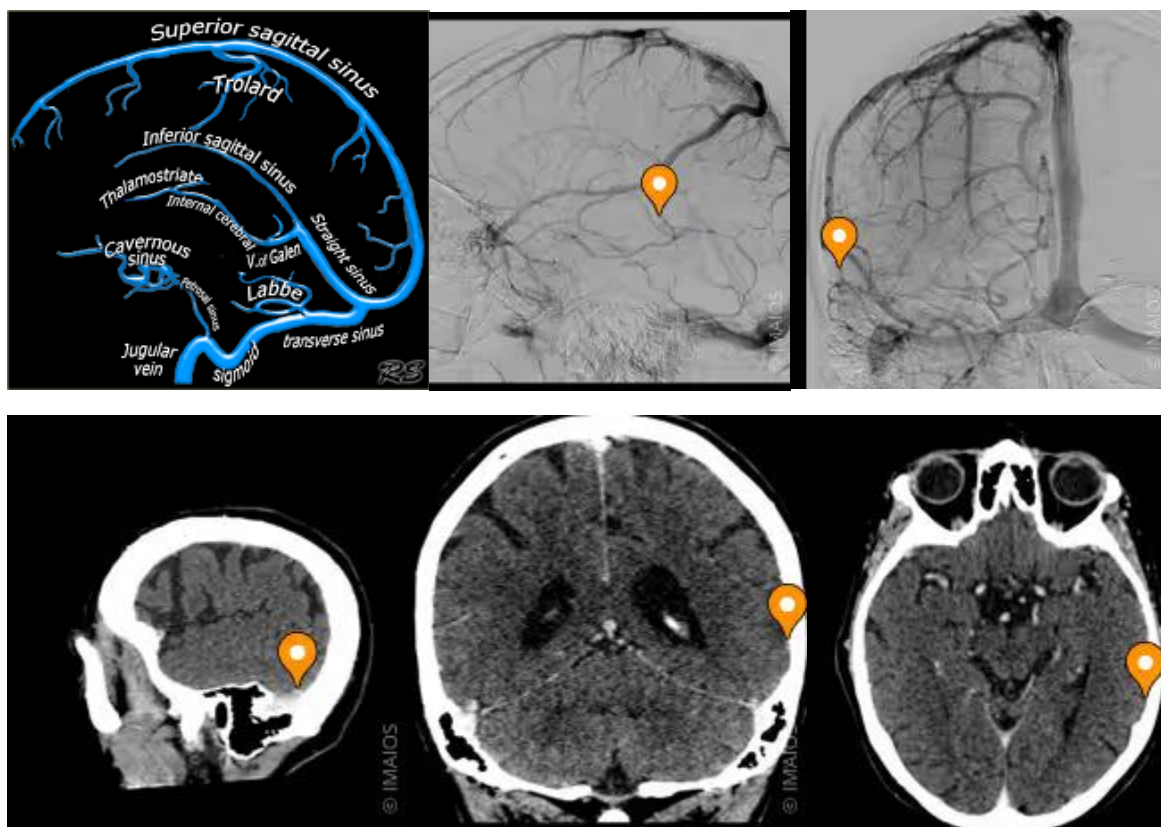
mid-temporal region: 60%

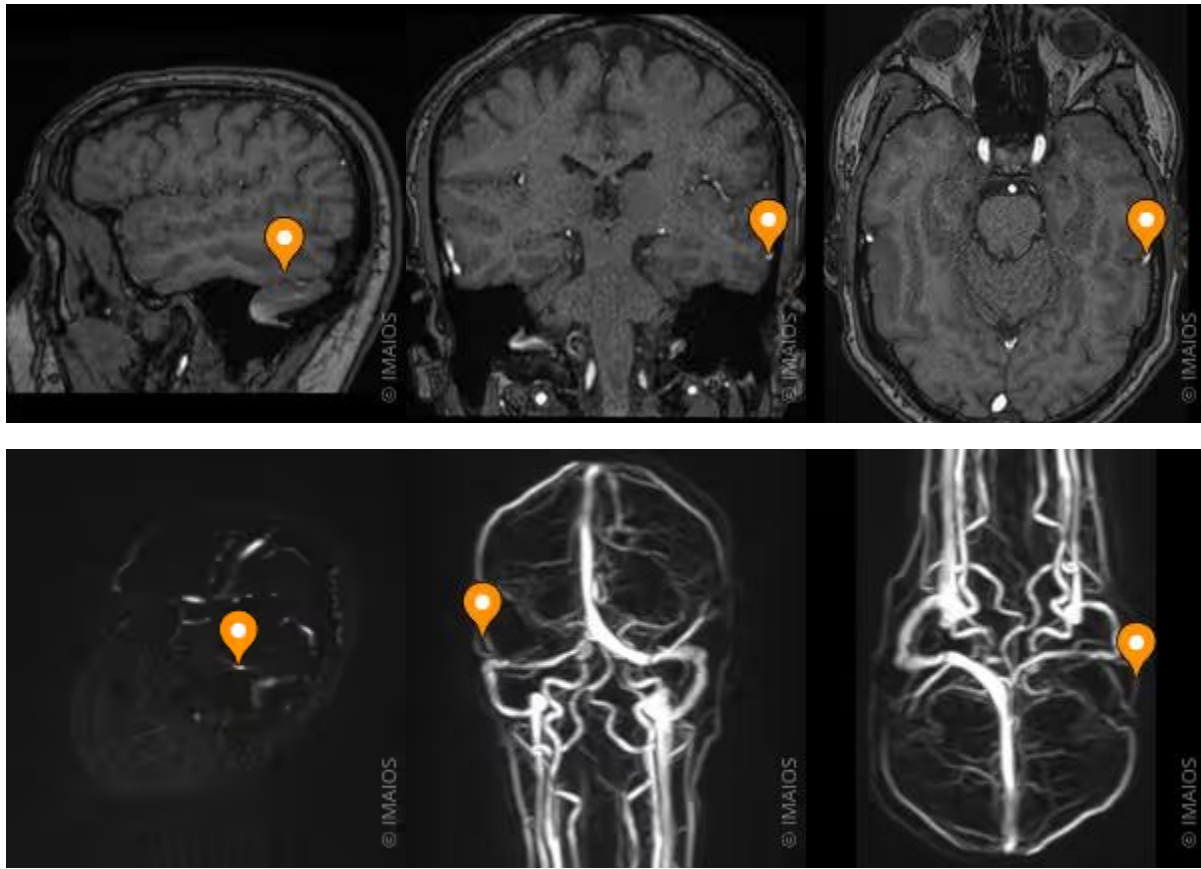
posterior temporal: 30%

anterior temporal: 10%

The anatomy of the vein itself is also variable, with a dominant single channel, multiple branching channels and even venous lakes having been described. It may drain directly into the transverse sinus or indirectly via the tentorium and its presence is less variable than the superior anastomotic vein of Trolard.

Along with draining the brain immediately adjacent to it, the vein of Labbé also gathers draining tributaries from medial, anteroinferior, and posteroinferior temporal lobe in 80% of cadaveric dissection.





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