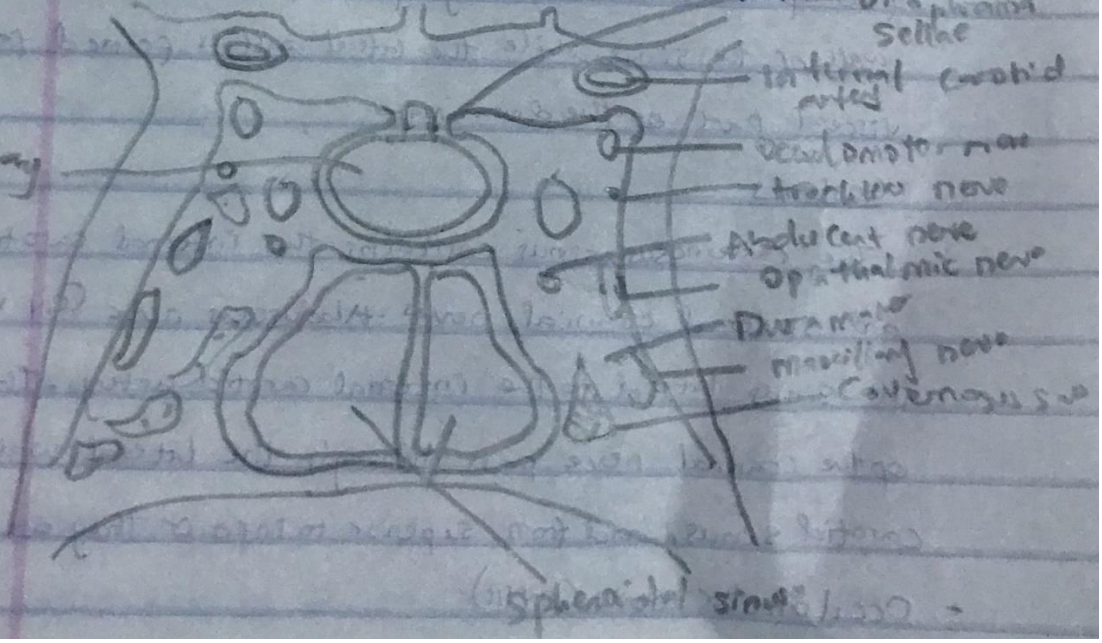
1) Write an essay on the Cavernosus sinus

The cavernosus sinuses are one of the several drainage pathways for the brain that sits in the middle. In addition to receiving venous drainage from the brain, it also receives tributaries from parts of the face. The left and right cavernosus sinuses communicate through the anterior and posterior intercavernous sinuses. The cavernous sinus drains to the superior and inferior petrosal sinuses, which then join the sigmoid sinus.

The cavernous sinus within the human head is one of the dural venous sinuses creating a cavity called the lateral sellar compartment bordered by the temporal bone of the skull and the sphenoid bone, lateral to the sella turcica



The cavernous sinus is one of the dural venous sinuses of the head. It is a network of veins that sit in a cavity, approximately 1 x 2 cm in size in an adult - The carotid siphon of the internal carotid artery, and cranial nerves III, IV, V (branches V_1 and V_2) and VI and pass through this blood filled space.

They are bilaterally paired collections of venous plexuses that sit on either side of the sphenoid bone. The cavernous sinus is roofed by an inner layer of dura mater that continues with the diaphragma sellae that covers the superior part of the pituitary gland. The roof of the sinus also has several other attachments - Anteriorly, it attaches to the tentorium (at its attachment to the posterior clinoid process). part of the periosteum of the greater wing of the sphenoid bone forms the floor of the sinus. The body of the sphenoid acts as the medial wall of the sinus while the lateral wall is formed from the visceral part of the dura mater

Contents

The cavernosus sinus contains the internal carotid artery and several cranial nerves - Abducens nerve (CN VI) travels the sinus lateral to the internal carotid artery - The remainder of the cranial nerve pass through the lateral wall of the carotid sinus, and from superior to inferior they are:

- Occulomotor nerve (CN III)

- Trochlear nerve (CN IV)

Trigeminal nerve (CN V) - Ophthalmic and maxillary divisions.

Internal carotid artery - In addition to the thin walled veins that traverse the cavernous sinus, a large arterial vessel also uses the area as a conduit. The internal carotid artery along with its postganglionic sympathetic plexus from the superior cervical ganglion gains access to the cavernous sinus posteriorly

Abducent nerve (CN VI) - It has access to the cavernous sinus by way of the petrosal sinus, adjacent to the clivus. Within the cavernous sinus, it takes an inferolateral course, relative to the internal carotid artery. It exits the sinus by way of the superior orbital fissure.

Occulomotor nerve (CN III) - This is the most superior of the four nerves in the lateral wall. At the posterior aspect of the roof of the cavernous sinus, the free and attached edges of tentorium cerebelli form a space through which CN III enters the lateral wall of the sinus. It takes an anterior, inferomedial course towards the anterior extremity of the sinus, where it bifurcates into the superior and inferior rami that pass through the superior orbital fissure

Trochlear nerve : This is the smallest of the cranial nerve - It enters the posterior part of the cavernous sinus after leaving the posterior part of the trochlea. It continues anteriorly in the lateral

wall of the cavernosus sinus, inferior to CN III and passes through the superior orbital fissure at the anterior aspect of the sinus

Trigeminal nerve (CN V) - 2 of the 3 branches pass through the cavernosus sinus, the ophthalmic and maxillary travel through the lateral wall of the sinus. Both take courses inferior to CN III and CN IV, however the maxillary nerve is the most inferior of them all. The maxillary nerve leaves the sinus through foramen rotundum, while the three branches of ophthalmic exit the cranial fossa through the superior orbital fissure

Relations

There are numerous structures surrounding the cavernosus sinus

Medially - the sinus is adjacent to the lateral walls of the pituitary fossa with the pituitary gland, the sphenoid bone and its air sinus

The ~~cavernous~~ part of the internal carotid artery courses superiorly laterally - the medial aspect of the temporal lobe of each hemisphere lies adjacent to the sinus

Posterosuperiorly - the uncus of the temporal lobe has a relation to the sinus.

Communications

The cavernosus sinus does not have a unidirectional flow of blood, due to the fact that there are no valves in the sinus and its connected vein, the direction of blood flow is dependent on the venous pressure.

The veins that communicate with the cavernous sinus are

Superior opthalmic vein

Inferior opthalmic vein

Superficial middle cerebral vein

Middle meningeal vein

Hypophyseal veins

Superior opthalmic vein- receives blood from the ethmoidal, nasofrontal, vorticose, and central retinal veins. It drains into the anterior part of the sinus via the superior orbital fissue.

Inferior opthalmic vein- collects blood from the eyelids, lacrimal sc, and some vorticose commissures, as well as the anterior floor and medial wall of the orbit. It drains to the cavernous sinus and the pterygoid plexus

Superficial middle cerebral vein - at the point where the internal carotid artery emerges, the superficial middle cerebral vein pierces the roof of the sinus. It drains blood from the cortical that are adjacent to it as it courses through the lateral sulcus

Middle meningeal vein - branches of the middle meningeal vein may join the sphenoparietal ~~vein~~ sinus

Hypophyseal veins - efferent hypophyseal veins of both the adeno-hypophysis and neurohypophysis drain to the cavernous sinus

Intercavernous Sinuses and drainage

The left and right cavernous sinuses communicate by way of the anterior and posterior intercavernous sinuses. These vessels travel around the

infundibulum of the pituitary gland, deep to the diaphragm sella, between the layers of dura mater. the cavernosus sinus in turn drains to the superior and inferior petrosal sinuses. Both sinuses join the sigmoid sinus, which then becomes the internal jugular vein.

clinical significance

1) Carotid cavernosus fistula

Head trauma resulting in rupture of the cavernosus part of the internal carotid artery can produce what is known as carotid cavernosus fistula. A pulsating exophthalmos can result as the venous pressure in the sinus would increase and reverse the blood flow in the ophthalmic

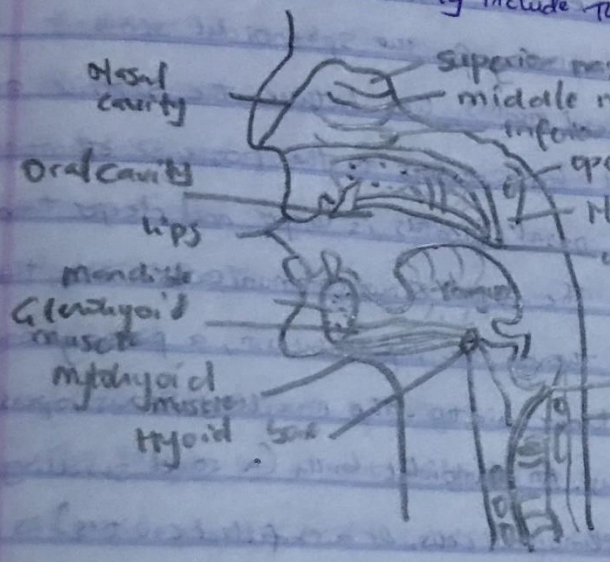
2) cavernosus sinus thrombosis

The sinus also has communicating branches at the nasolabial crease and at the crease between the ala of the nose and cheek, an infection can spread to the cavernosus sinus which can result in a cavernous sinus thrombosis

2. discuss the walls of the nas

The nasal cavity

The nares serve as the entryway to the nasal cavities, which open posteriorly into the nasopharynx through the choanae. The walls of the nasal cavity include the following features



- Roof: The roof is divided into three parts fronto nasal, ethmoidal and sphenoidal. Each part corresponds to the underlying bone of the same name.
- Floor: The floor consists of the palatine process of the maxilla and the horizontal plate of the palatine bone
- Medial wall: This wall is the nasal septum, which is formed by the perpendicular plate of the ethmoid bone, the vomer, cartilage and the nasal crests of the maxillary and palatine bones

- lateral wall: this wall is hallmarked by three nasal conchae (superior, middle, and inferior) that project inferiorly from the walls. They divide the nasal cavity into four passages that have openings to the paranasal sinuses:
  - The sphenoethmoid recess lies posterior to the superior concha and has the opening for the sphenoidal sinus.
  - The superior nasal meatus lies between the superior and middle conchae and has openings to the posterior ethmoidal sinuses.
  - The middle nasal meatus is longer and deeper than the superior nasal meatus. The frontal sinus communicates with the middle nasal meatus through the infundibulum, a passageway that opens into the semilunar hiatus. The maxillary sinus opens into the semilunar hiatus. An ethmoidal bulla (a round swelling formed by the middle ethmoidal cells, or air-filled cavities) is formed just above the semilunar hiatus. The middle and anterior ethmoidal sinuses drain into the middle nasal meatus.
  - The inferior nasal meatus is found below the inferior nasal concha. The nasolacrimal duct opens into this meatus.