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COURSE: ANA 301

DEPARTMENT: MBBS

QUESTIONS

1. Write an essay on the cavernous sinus
2. Discuss the walls of the nose.

ANSWERS

1.The cavernous sinus is a paired dual venous sinus located within the cranial cavity. It is divided by septa into small ‘caves’ from which gets its name.

Each cavernous sinus has a close anatomical relationship with several key structures in the head, and is arguably the most clinically important venous sinus.

The Dural venous sinuses are channels between the two layers of Dural mater which are responsible for the venous drainage of the brain, skull, orbit and inner ear.

ANATOMICAL LOCATION AND BORDERS

The cavernous sinuses are located within the middle cranial fossa, on either side of the Sella turcia of the sphenoid bone (which contain the pituitary gland). They are enclosed by the endo steal and meningeal layers of the dura mater.

The borders of the cavernous sinus are as follows:

* Anterior- superior orbital fissure.
* Posterior- petrous part of the temporal bone.
* Medial- body of the sphenoid bone.
* Lateral- meningeal layer of the dura mater running from the roof to the floor of the middle cranial fossa.
* Roof- meningeal layer of the dura mater that attaches to the anterior and middle clinoid process of the bone.
* Floor- endosteal layer of dura mater that overlies the base of the greater wing of the sphenoid bone.

Several important structures pass through the cavernous sinus to enter the orbit. They can be sub-classified btw heather they travel through the sinus itself or through its lateral wall.

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| TRAVELS THROUGH CAVERNOUS SINUS | TRAVELS THROUGH LATERAL WALL OF CAVERNOUS SINUS |
| 1. Abduces nerve( CN 6) | OCULOMOTOR NERVE (CN 3) |
| 2. carotid plexus  3. Internal carotid artery | Trochlear nerve (CN 4)  Ophthalmic(V1) and maxillary(V2) branches |

The cavernous sinus is the only sit in the body where an artery passes completely through a venous structure. This is thought to allow for heat exchange between the warm arterial blood and cooler venous circulation.

DURAL VENOUS SINUS SYSTEM

Each cavernous sinus receives venous drainage from;

* Ophthalmic veins
* Central vein of aorta
* Sphenoparietal sinus
* Superficial middle cerebral vein
* Pterygoid plexus

The cavernous sinuses empty into the superior and inferior petrosal sinuses and ultimately into the jugular vein. The left and right cavernous sinuses are connected int the midline by the anterior and posterior intercavernous sinuses. They travel through the Sella turcica of the sphenoid bone.

CLINICAL SIGNIFICANCE

Cavernous sinus thrombosis(CST)

Refers to the formation of clot within the cavernous sinus. The most common cause of CST is infection; which typically spreads from an extracranial location such as the orbit, paranasal sinuses or the danger zone of the face.

**2.** The lateral wall of the nasal cavity is a region of the nasopharynx essential for humidifying and filtering the air we breathe in nasally.

Here we can find a structure called agger nasi. The agger nasi is also referred to as the “nasoturbinal concha” or ‘nasal ridge’. It can be described as a small mound or ridge found in the lateral side of the nasal cavity. The structure is located midway along the anterior aspect of the middle nasal concha.

An abnormally enlarged form may restrict the drainage of the frontal sinus by obstructing the frontal recess area.

* **Nasal septum**

**Bones and cartilages**

The anterior nasal aperture is simply the area where the anterior bony aspects of both the maxilla and the nasal bone terminate and form an opening into the cartilaginous nasal vestibule. The structure is also referred to as the piriform aperture.

Three cartilages contribute to the nasal septum:

Lesser alar cartilages are paired cartilages suspended in the fibro-fatty tissue that forms the lateral aspect of the nostril.

Greater alar cartilages are paired cartilages that forms part of the anterior-superior nostril as well as the nasal tip.

Lateral nasal cartilages are structures that articulate inferiorly with the greater alar cartilages and superiorly with the anterior nasal aperture formed by both the nasal bone superiorly and for a short part of its border with the perpendicular plate of the ethmoid bone.

* **Nasal conchae**

We can find 3 types of nasal conchae in the nasal cavity. Those are:

**Inferior nasal concha** it is the longest and the broadest of the conchae and is formed by an independent bone (of the same inferior concha). The concha is covered by mucous membrane that contains large vascular spaces and is one of the three that work to both humidify and clear the air that passes into the nasopharynx.

**Superior and middle nasal conchae** arise from the perpendicular plate of the ethmoid bone. The middle nasal concha is found in between the superior and inferior nasal concha and plays a role in humidifying and clearing inspired air of micro particles such as dirt.

* **Associated structures**

The nasal surface of the maxilla forms the anterior-lateral part of the bony nasal cavity. It is located inferior to the nasal bone and gives rise in part, to the inferior nasal concha. The sphenopalatine foramen is found in the posterior most region of the nasal cavity, at the back of the middle meatus.

* **Nasal skeleton**
* Ethmoid bone

The ethmoid bone is located on the roof of the nose between two orbits and is lightweight and spongy. It has three parts:

Cribriform plate

Ethmoidal labyrinth

Perpendicular plates

The bone articulates with many others including the frontal and sphenoid bone as part of the neurocranium, and the nasal and lacrimal bones anteriorly as well as the maxilla inferolaterally and the vomer and inferior nasal concha inferiorly. The bone also forms the deep medial part of the orbit.

* Frontal bone

The frontal bone overlies the frontal lobe of the brain and lies anteriorly forming the brow, forehead and one third of the anterior scalp. The bone contains the frontal sinus, which in sinusitis and nasal infections can become filled with fluid. The bone articulates with the bone forming the calvaria as well as the zygomatic bone inferolaterally and the nasal and maxilla bones anteroinferiorly.

* Lacrimal bone

The lacrimal bone is the smallest bone of the face and forms part of the posterior nasal skeleton. The bone has a crest known as the ‘sulcus lacrimali’s on its lateral surface. This crest gives rise to the aptly named lacrimal part of the orbicularis oculi muscle.

Other bones include; the nasal bone, the palatine bone and sphenoid bone.

* CLINICAL SIGNIFICANCE

SINUSITIS

Sinusitis is an inflammation of the different sinuses found in the head. That type of inflammation may result in different symptoms including:

Plugged nose

Nasal mucus

And pain in the facial region

When we talked about the frontal bone we saw that it overlies the frontal lobe of the brain and lies anteriorly forming the brow, forehead and one third of the anterior scalp. The bone contains the frontal sinus, which in sinusitis and nasal infections can become filled with fluid.