**NAME: MOTAJO OLAKUNLE OLUWATOSIN**

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**DEPARTMENT: MEDICINE AND SURGERY**

**COURSE: GROSS ANATOMY OF HEAD AND NECK**

**COURSE CODE: ANA 301**

**1) Write an essay on the cavernous sinus**

**Answer:**

The **cavernous sinus** is a paired dura venous sinus located within the cranial cavity. It is divided by septa into small ‘caves’, from which it gets its name. The cavernous sinuses lie within the middle cranial fossa. They are placed anteroposteriorly on either side of the body of the sphenoid bone. Anteriorly each sinus reaches the superior orbital fissure. Posteriorly it reaches the apex of the petrous part of the temporal bone. They are enclosed by the endosteal 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. ***Medially*** – body of the sphenoid bone. ***Laterally*** – 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 processes of the sphenoid bone. ***Floor*** – endosteal layer of dura mater that overlies the base of the greater wing of the sphenoid bone.

***Contents***

Several important structures pass through the cavernous sinus to enter the orbit. The can be sub-classified by whether they travel through the sinus itself, or through its lateral wall. Structures passing through the cavernous sinus includes: i) Internal carotid artery ii) Abducens nerve (CNVI) Structures passing through its lateral wall includes: i) Occulomotor nerve (CNIII) ii) Trochlear nerve (CNIV) iii) Opthalmic division of the Trigerminal Nerve (CNV1) iv) Maxillary division of the Trigerminal nerve (CNV2)

***Each cavernous sinus receives venous drainage from:***

i) Ophthalmic veins (superior and inferior) – these enter the cavernous sinus via the superior orbital fissure. ii) Central vein of the retina – drains into the superior ophthalmic vein, or directly into the cavernous sinus. iii) Sphenoparietal sinus – empties into the anterior aspect of the cavernous sinus. iv) Superficial middle cerebral vein – contributes to the venous drainage of the cerebrum. v) Pterygoid plexus – located within the infratemporal fossa. vi) Emissary veins. It is important to note that the superior ophthalmic vein forms an anastomosis with the facial vein. Therefore, the ophthalmic veins represent a potential route by which infection can spread from an extracranial to an intracranial site.

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

***Clinical Significance - Cavernous Sinus Thrombosis***

Cavernous sinus thrombosis (CST) refers to the formation of a clot within the cavernous sinus. This 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. Infection is able to spread in this manner due to the anastomosis between the facial vein and superior ophthalmic veins. Common clinical features include headache, unilateral periorbital edema, proptosis (eye bulging), photophobia and cranial nerve palsies. The abducens nerve (CN VI) is most commonly affected.

Treatment is typically with antibiotic therapy. Where the cause is infection, thrombosis of the cavernous sinus can rapidly progress to meningitis.

**2) Discuss the walls of the nose**

**Answer:**

***Medial wall***

The medial wall of each nasal cavity is the mucosa-covered surface of the thin nasal septum, which is oriented verti­cally in the median sagittal plane and separates the right and left nasal cavities from each other. The nasal septum consists of: i) The septal nasal cartilage anteriorly. ii) Mainly the vomer and the perpendicular plate of the ethmoid bone posteriorly. iii) Small contributions by the nasal bones where they meet in the midline, and the nasal spine of the frontal bone. iv) Contributions by the nasal crests of the maxillary and palatine bones, rostrum of the sphenoid bone, and the incisor crest of the maxilla.

***Lateral wall***

The skeletal basis of the lateral wall of the nasal cavity is constituted by the maxilla (medial surface), the ethmoid bone, the palatine bone, the inferior nasal concha and the lacrimal bone. There are three anteroposterior elevations on the lateral wall. These are the superior, middle, and inferior nasal conchae. Each concha has a core of bone covered by mucous membrane. The bony core of the superior and middle conchae is formed by parts of the ethmoid bone, while that of the inferior conchae is independent. Each concha has an upper border attached to the rest of the lateral wall and a free lower margin. The spaces deep to the superior, middle and inferior meatuses respectively. There is a triangular space above the superior concha, this is the sphenoethmoidal recess. Occasionally an additional concha may be present on the lateral wall of the sphenoethmoidal recess. The part of the nasal cavity just above the anterior nares is called the vestibule. The vestibule is lined by skin. At the upper limit of the vestibule (where the skin meets mucous membrane) there is a curved elevation called the ***limen nasi***. Above the ***limen nasi*** there is a depression called the ***atrium***. The ***atrium*** represents a forward continuation of the middle meatus beyond the anterior end of the middle concha. The upper limit of the atrium is marked by another curved ridge called the ***aggar nasi***. Some structures in the lateral wall of the nose can only be seen when the conchae are cut away. In the middle meatus we see a rounded elevation called the bulla ethmoidalis. Below and in front of the bulla there is a curved groove called the hiatus semilunaris. The anterior end of the hiatus is continuous with a depression called the ethmoidal infundibulum. The upper end of the infundibulum is usually continuous with the frontonasal duct that connects the frontal sinus to the nasal cavity.