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**LEVEL: 300 MBBS**

**Assignment Title:** Assignment 2  
**Course Title:** Gross Anatomy of Head and Neck  
**Course Code:** ANA 301

**Question**

1) Write an essay on the carvenous sinus

2) discuss the walls of the nose

**ANSWERS**

1. Cavernous sinus is part of the brain’s dural venous sinus and contains multiple neuro-vasculatures.The paired cavernous sinuses are against the lateral aspect of the body of the sphenoid bone on either side of the sella turcica. They are of great clinical importance because of their connections and the structures that pass through them. The cavernous sinuses receive blood not only from cerebral veins, but also from the ophthalmic veins (from the orbit) and emissary veins (from the pterygoid plexus of veins in the infratemporal fossa). *These connections provide pathways for infections to pass from extracranial sites into intracranial locations. In addition, because structures pass through the cavernous sinuses and are located in the walls of these sinuses they are vulnerable to injury due to inflammation.*

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| * Structures passing through each cavernous sinus are:   the internal carotid artery;  the abducent nerve [VI]. |

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| * Structures in the lateral wall of each cavernous sinus are, from superior to inferior:   the oculomotor nerve [III];  the trochlear nerve [IV];  the ophthalmic nerve [V1];  the maxillary nerve [V2].  Connecting the right and left cavernous sinuses are the intercavernous sinuses on the anterior and posterior sides of the pituitary stalk. Sphenoparietal sinuses drain into the anterior ends of each cavernous sinus. These small sinuses are along the inferior surface of the lesser wings of the sphenoid and receive blood from the diploic and meningeal veins.  c v.JPG |

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**Clinical Significance**

**Cavernous Sinus Syndrome**

Cavernous sinus syndrome is a medical emergency and life-threatening disorder that presents with different symptoms depending on what structure is affected. A severe lesion involving the entire sinus will present with total ophthalmoplegia, due to CN III, IV, and VI injury, accompanied with fixed and dilated pupils due to compression of the superficial parasympathetic fibers of the CN III. Cavernous sinus syndrome can lead to Horner’s syndrome. Horner’s syndrome occurs when the sympathetic plexus around the internal carotid is damaged. When CN V1 and CN V2 are involved, sensory loss in the face, scalp, maxilla, nasal cavity, sinuses, and palate occurs. There are several causes of cavernous sinus syndrome, including metastatic tumor, meningioma, pituitary tumor, extension of nasopharyngeal tumors, granulomatous diseases, cavernous sinus thrombosis, and aneurysms of the cavernous part of the internal carotid artery. In case of rupture of a cavernous aneurysm, a carotid-cavernous fistula is created, leading to a pulsating exophthalmos on physical examination.

**Surgical Considerations**

Performing surgery in the cavernous sinus is challenging given the fact that it contains vital neuronal structures and elevated risk of hemorrhage. Direct exposure of the cavernous sinus is possible, but it is considered to be a morbid procedure, even for experienced neurosurgeons. However, other approaches such as a transorbital pathway may provide found to be less morbid. The transorbital pathway provides less-invasive access to the cavernous sinus. This approach provides the entire lateral wall of the cavernous sinus to be exposed, without entering its neurovascular compartment, while also providing a favorable angle for performing procedures. Also, this angle allows for procedures to be performed without injuring cranial nerves, temporal lobes, or having to open venous spaces, and the procedure has proven to be quick. Although the transorbital pathway is an unfamiliar approach and requires proper equipment for retraction, it has demonstrated to be feasible and safe in more than 1500 orbital decompressions. The transorbital pathway may provide access to the inside of the lateral wall of the cavernous sinus in a minimally invasive manner; however, more surgeries are needed to provide more clinical advantages and disadvantages of this novel approach.

2. WALLS OF THE NOSE

The nose is the part of the respiratory tract superior to the hard palate and contains the peripheral organ of smell. It includes the external nose and nasal cavity, which is divided into right and left cavities by the nasal septum. The functions of the nose are olfaction (smelling), respiration (breathing), filtration of dust, humidification of inspired air, and reception and elimination of secretions from the paranasal sinuses and nasolacrimal ducts.

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| Medial wall |

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| 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. |

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| The nasal septum consists of:   * the **septal nasal cartilage** anteriorly; * posteriorly, mainly the vomer and the perpendicular plate of the ethmoid bone; * small contributions by the nasal bones where they meet in the midline, and the nasal spine of the frontal bone; * contributions by the crests of the maxillary and palatine bones, rostrum of the sphenoid bones, and the incisor crest of the maxilla  |  | | --- | | Floor |  |  | | --- | |  |  |  | | --- | | The floor of each nasal cavity is smooth, concave, and much wider than the roof. It consists of:   * soft tissues of the external nose; * the upper surface of the palatine process of the maxilla, and the horizontal plate of the palatine bone, which together form the hard palate. |  |  | | --- | |  |  |  | | --- | | The naris opens anteriorly into the floor, and the superior aperture of the incisive canal is deep to the mucosa immediately lateral to the nasal septum near the front of the hard palate. |  |  | | --- | |  |  |  | | --- | | Roof |  |  | | --- | |  |  |  | | --- | | The roof of the nasal cavity is narrow and is highest in central regions where it is formed by the cribriform plate of the ethmoid bone. |  |  | | --- | |  |  |  | | --- | | Anterior to the cribriform plate the roof slopes inferiorly to the nares and is formed by:   * the nasal spine of the frontal bone and the nasal bones; * the lateral processes of the septal cartilage and major alar cartilages of the external nose. |  |  | | --- | |  |  |  | | --- | | Posteriorly, the roof of each cavity slopes inferiorly to the choana and is formed by:   * the anterior surface of the sphenoid bone; * the ala of the vomer and adjacent sphenoidal process of the palatine bone; and * the vaginal process of the medial plate of the pterygoid process. |  |  | | --- | |  |  |  | | --- | | Underlying the mucosa, the roof is perforated superiorly by openings in the cribriform plate, and anterior to these openings by a separate foramen for the anterior ethmoidal nerve and vessels. |  |  | | --- | |  |  |  | | --- | | The opening between the sphenoidal sinus and the spheno-ethmoidal recess is on the posterior slope of the roof. |  |  | | --- | |  |  |  | | --- | | **Lateral wall** |  |  | | --- | |  |  |  | | --- | | The lateral wall of each nasal cavity is complex and is formed by bone, cartilage, and soft tissues. |  |  | | --- | |  |  |  | | --- | | Bony support for the lateral wall is provided by:   * the ethmoidal labyrinth and uncinate process; * the perpendicular plate of the palatine bone; * the medial plate of the pterygoid process of the sphenoid bone; * the medial surfaces of the lacrimal bones and maxillae; * the inferior concha. |  |  | | --- | |  | |  |  |  | | --- | | In the external nose, the lateral wall of the cavity is supported by cartilage (lateral process of the septal cartilage and major and minor alar cartilages) and by soft tissues. The surface of the lateral wall is irregular in contour and is interrupted by the three nasal conchae. |  |  | | --- | |  |  |  | | --- | | The inferior, middle, and superior conchae extend medially across the nasal cavity, separating it into four air channels, an inferior, middle, and superior meatus, and a spheno-ethmoidal recess. The conchae do not extend forward into the external nose. The anterior end of each concha curves inferiorly to form a lip that overlies the end of the related meatus. |  |  | | --- | |  |  |  | | --- | | Immediately inferior to the attachment of the middle concha and just anterior to the midpoint of the concha, the lateral wall of the middle meatus elevates to form the dome-shaped ethmoidal bulla. This is formed by the underlying middle ethmoidal cells, which expand the medial wall of the ethmoidal labyrinth. |  |  | | --- | |  |  |  | | --- | | Inferior to the ethmoidal bulla is a curved gutter (the hiatus semilunaris), which is formed by the mucosa covering the lateral wall as it spans a defect in the bony wall between the ethmoidal bulla above and the uncinate process below. |  |  | | --- | |  |  |  | | --- | | The anterior end of the hiatus semilunaris forms a channel (the ethmoidal infundibulum), which curves upwards and continues as the frontonasal duct through the anterior part of the ethmoidal labyrinth to open into the frontal sinus. |  |  | | --- | |  | |  |  |  | | --- | | The nasolacrimal duct and most of the paranasal sinuses open onto the lateral wall of the nasal cavity:  the nasolacrimal duct opens onto the lateral wall of the inferior nasal meatus under the anterior lip of the inferior concha-it drains tears from the conjunctival sac of the eye into the nasal cavity and originates at the inferior end of the lacrimal sac on the anteromedial wall of the orbit;   * the frontal sinus drains via the frontonasal duct and ethmoidal infundibulum into the anterior end of the hiatus semilunaris on the lateral wall of the middle nasal meatus-the anterior ethmoidal cells drain into the frontonasal duct or ethmoidal infundibulum (in some cases, the frontal sinus drains directly into the anterior end of the middle nasal meatus and the frontonasal duct ends blindly in the anterior ethmoidal cells); * the middle ethmoidal cells open onto or just above the ethmoidal bulla; * the posterior ethmoidal cells usually open onto the lateral wall of the superior nasal meatus; * the large maxillary sinus opens into the hiatus semilunaris, usually just inferior to the center of the ethmoidal bulla-this opening is near the roof of the maxillary sinus. |  |  | | --- | |  |  |  | | --- | | The only paranasal sinus that does not drain onto the lateral wall of the nasal cavity is the sphenoidal sinus, which usually opens onto the sloping posterior roof of the nasal cavity. | |