

NAME: NDAH WISDOM NYEWEIBUROMA

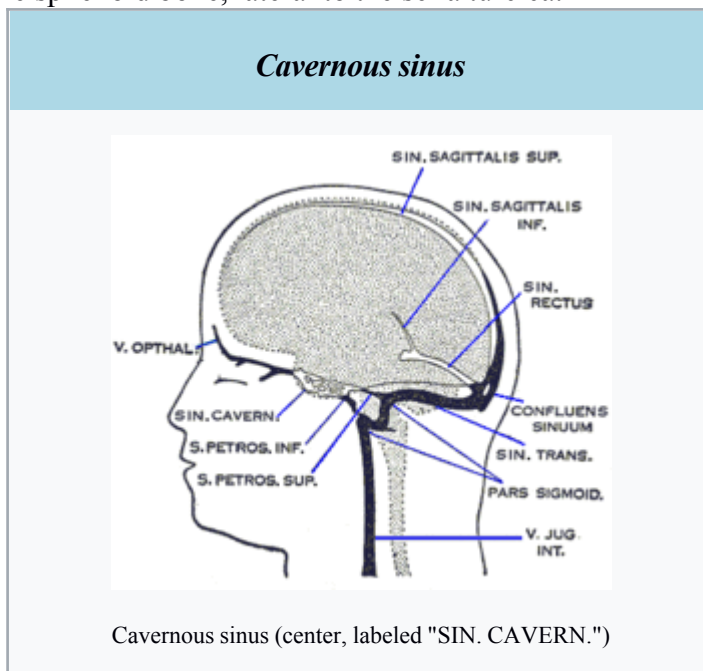
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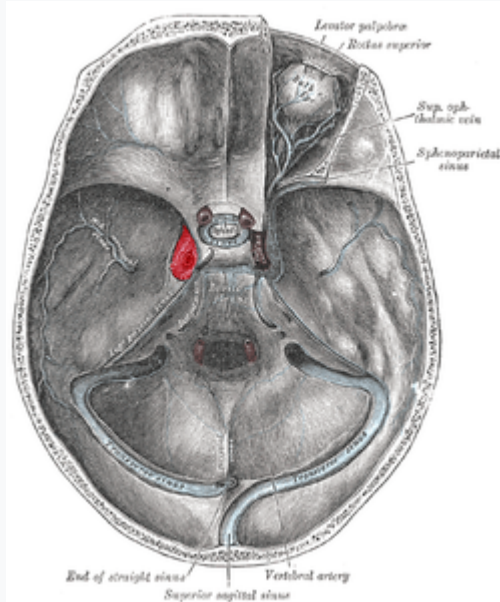
DEPARTMENT: MEDICINE AND SURGERY

1. WRITE AN ESSAY ON THE CAVERNOUS SINUS

Cavernous 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 sinuses at the base of the skull. Cavernous sinus labeled in red

Details

Source middle cerebral vein, sphenoparietal sinus, superior ophthalmic vein, Inferior ophthalmic vein

Drains to inferior petrosal sinus, superior petrosal sinus

Identifiers

Latin *sinus cavernosus*

MeSH D002426

TA A12.3.05.116

FMA 50772

Anatomical terminology



Structure

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 V₁ and V₂) and VI all pass through this blood filled space.

Nearby structures

Above: optic tract, optic chiasma, internal carotid artery.

Inferiorly: Foramen lacerum and the junction of the body and greater wing of sphenoid bone.

Medially: Hypophysis cerebri or (pituitary gland) and sphenoidal air sinus.

Laterally: temporal lobe with uncus.

Anteriorly: superior orbital fissure and the apex of the orbit.

Posteriorly: apex of petrous temporal bone.

Venous connections

The cavernous sinus receives blood from:

Superior and inferior ophthalmic veins

Sphenoparietal sinus

Superficial middle cerebral veins

Inferior cerebral veins

Blood leaves the sinus via superior and inferior petrosal sinuses as well as via the emissary veins through the foramina of the skull (mostly through foramen ovale). There are also connections with the pterygoid plexus of veins via inferior ophthalmic vein, deep facial vein and emissary veins

Contents

Apart from the blood which passes through a venous sinus, several anatomical structures, including some cranial nerves and their branches, also pass through the sinus.

Structures within the outer (lateral) wall of the compartment from superior to inferior:

- Oculomotor nerve
- Trochlear nerve
- Ophthalmic and maxillary branches of the trigeminal nerve

Structures passing through the midline (medial) wall:

- Abducens nerve
- Internal carotid artery accompanied by the Internal carotid plexus

These nerves, with the exception of CN V₂, pass through the cavernous sinus to enter the orbital apex through the superior orbital fissure. The maxillary nerve, division V₂ of the trigeminal nerve travels through the lower portion of the sinus and exits via the foramen rotundum. The maxillary branch passes external to, but immediately adjacent to, the lateral wall of the sinus)

A mnemonic exists to remember the orientation of the vertical and horizontal content of the sinus: O TOM CAT. (OTOM are the lateral wall contents from superior to inferior; CAT are the horizontal contents from medial to lateral)

The optic nerve lies just above and outside the cavernous sinus, superior and lateral to the pituitary gland on each side, and enters the orbital apex via the optic canal.

Function

Venous drainage

As a venous sinus, the cavernous sinus receives blood from the superior and inferior ophthalmic veins and from superficial cortical veins, and is connected to the basilar plexus of veins posteriorly. The cavernous sinus drains by two larger channels, the superior and inferior petrosal sinuses, ultimately into the internal jugular vein via the sigmoid sinus, also draining with emissary vein to pterygoid plexus.

Clinical significance

It is the only anatomic location in the body in which an artery travels completely through a venous structure. If the internal carotid artery ruptures within the cavernous sinus, an *arteriovenous fistula* is created (more specifically, a carotid-cavernous fistula). Lesions affecting the cavernous sinus may affect isolated nerves or all the nerves traversing through it.

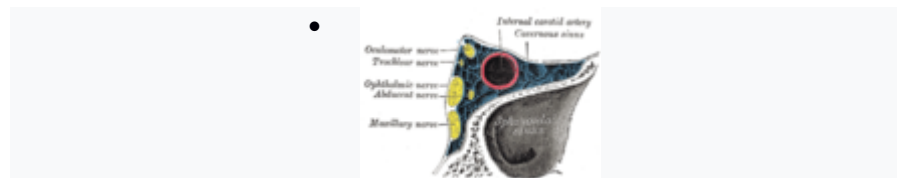
The pituitary gland lies between the two paired cavernous sinuses. An abnormally growing pituitary adenoma, sitting on the bony sella turcica, will expand in the direction of least

resistance and eventually compress the cavernous sinus. **Cavernous sinus syndrome** may result from mass effect of these tumors and cause ophthalmoplegia (from compression of the oculomotor nerve, trochlear nerve, and abducens nerve), ophthalmic sensory loss (from compression of the ophthalmic nerve), and maxillary sensory loss (from compression of the maxillary nerve). A complete lesion of the cavernous sinus disrupts CN III, IV, and VI, causing total ophthalmoplegia, usually accompanied by a fixed, dilated pupil. Involvement of CN V (V_1 and variable involvement of V_2) causes sensory loss in these divisions of the trigeminal nerve. Horner's syndrome can also occur due to involvement of the carotid ocular sympathetics, but may be difficult to appreciate in the setting of a complete third nerve injury.

Because of its connections with the facial vein via the superior ophthalmic vein, it is possible to get infections in the cavernous sinus from an external facial injury within the danger area of the face. In patients with thrombophlebitis of the facial vein, pieces of the clot may break off and enter the cavernous sinus, forming a cavernous sinus thrombosis. From there the infection may spread to the dural venous sinuses. Infections may also be introduced by facial lacerations and by bursting pimples in the areas drained by the facial vein.

Potential causes of cavernous sinus syndrome include metastatic tumors, direct extension of nasopharyngeal tumours, meningioma, pituitary tumors or pituitary apoplexy, aneurysms of the intracavernous carotid artery, carotid-cavernous fistula, bacterial infection causing cavernous sinus thrombosis, aseptic cavernous sinus thrombosis, idiopathic granulomatous disease (Tolosa-Hunt syndrome), and fungal infections. Cavernous sinus syndrome is a medical emergency, requiring prompt medical attention, diagnosis, and treatment.

Additional images



Oblique section through the cavernous sinus.



Veins of orbit.



Cavernous sinus

2. DISCUSS THE WALLS OF THE NOSE

External nose

The external nose presents a root (or bridge), a dorsum, and a free tip or apex. The two inferior openings are the nostrils (or nares), bounded laterally by the ala and medially by the nasal septum. The superior part of the nose is supported by the nasal, frontal, and maxillary bones; the inferior part includes several cartilages. The continuous free margin of the nasal bones and maxillae in a dried skull is termed the piriform aperture.

The Nasal Cavity

The **nose** is an olfactory and respiratory organ. It consists of nasal skeleton, which houses the nasal cavity. The nasal cavity has four functions:

- **Warms** and **humidifies** the inspired air.
- Removes and traps **pathogens** and particulate matter from the inspired air.
- Responsible for sense of **smell**.
- **Drains** and clears the paranasal sinuses and lacrimal ducts

Divisions

The nasal cavity is the most superior part of the **respiratory tract**. It extends from the vestibule of the nose to the nasopharynx, and has three divisions:

- **Vestibule** – the area surrounding the anterior external opening to the nasal cavity.
- **Respiratory region** – lined by a ciliated psudeostratified epithelium, interspersed with mucus-secreting goblet cells.
- **Olfactory region** – located at the apex of the nasal cavity. It is lined by olfactory cells with olfactory receptors.

By TeachMeSeries Ltd (2020)

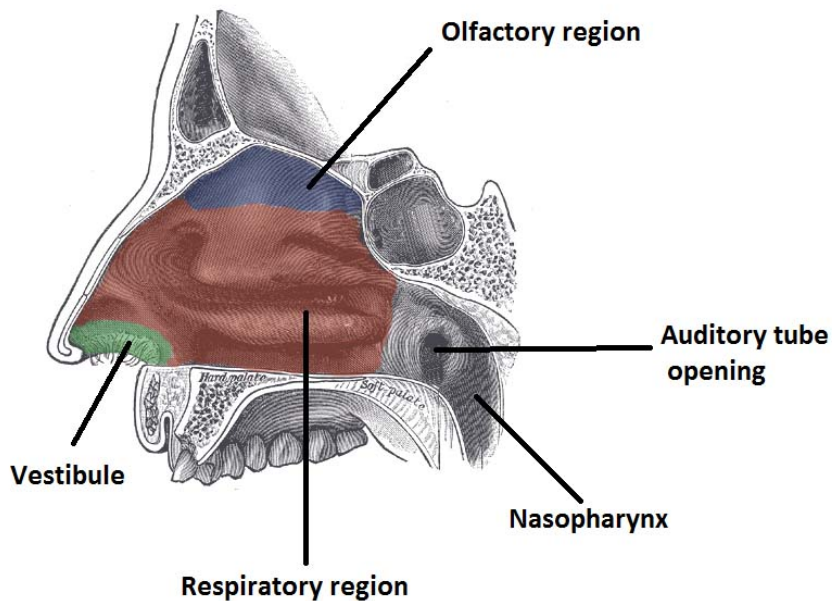


Fig 1 – Sagittal section of the nasal cavity. Conchae are present on the lateral walls

The roof:

The roof of the nasal cavity is formed by nasal cartilages and several bones, chiefly the nasal and frontal bones, the cribriform plate of the ethmoid, and the body of the sphenoid. The floor, wider than the roof, is formed by the palatine process of the maxilla and the horizontal plate of the palatine bone, i.e., by the palate. The medial wall, or nasal septum, is formed (from anterior to posterior) by (1) the septal cartilage (destroyed in a dried skull), (2) the perpendicular plate of the ethmoid bone, and (3) the vomer. It is usually deviated to one side. The lowest part of the septum (the columella) is membranous and mobile.

Floor:

Formed by the maxilla and the palatine bones. The **incisive foramen** transmits branches of the sphenopalatine artery and the nasopalatine nerve for general sensation from the nasal cavity and palate.

Medial wall (nasal septum):

Formed by the perpendicular plate of the ethmoid bone, the vomer bone, and the septal cartilage.

The lateral wall:

The lateral wall is uneven and complicated and is formed by several bones: nasal, maxilla, lacrimal and ethmoid, inferior nasal concha, perpendicular plate of palatine, and medial pterygoid plate of sphenoid. The lateral wall presents three or four medial projections termed nasal conchae, which overlie passages (meatuses). The inferior concha is a separate bone; the others are portions of the ethmoid bone. The conchae were formerly known as turbinates. The lateral wall contains the following openings:

Sphenoethmoidal recess. The space between the superior nasal concha and the sphenoid bone, with openings from the sphenoid sinus.

Superior meatus. The space inferior to the superior nasal concha, with openings from the posterior ethmoidal air cells.

Middle meatus. The space inferior to the middle nasal concha, with openings for the frontal sinus via the **nasofrontal duct**, the middle ethmoidal air cells on the **ethmoidal bulla**, and the anterior ethmoidal air cells and maxillary sinus in the **hiatus semilunaris**.

Inferior meatus. The space inferior to the inferior nasal concha, with an opening for the **nasolacrimal duct**, which drains tears from the eye into the nasal cavity.

Sphenopalatine foramen. An opening posterior to the middle nasal concha receives the nasopalatine nerve and the sphenopalatine artery from the **pterygopalatine fossa** into the nasal cavity.