

NOSE I AND II

In green are the new notes

Anatomy of the nose:

1. External nose:
 - a. Pyramidal in shape.
 - b. Bony constituents.
 - nasal process of the frontal bones
 - two nasal bone
 - ascending process of the maxillae
2. Nasal fossae:
 - two cavities separated by the nasal septum
 - **floor:** hard palate
 - **Roof:** the nasal process of frontal bone , cribriform plate of ethmoid bone (olfactory Nerve), body of sphenoid bone.
 - **medial wall:** nasal septum
 - **Lateral wall:** mainly made up by the maxilla connect the nose to the sinuses.
 - The three conchae or turbinates have been removed to show the bony structure that form the lateral wall and almost completely occlude the large ostium in the maxilla.
 - Middle turbinate is the most important it contains the opening of anterior and middle ethmoid, maxillary and upper frontal.(osteomeatal complex area) major area of sinusitis
 - During examination we can see the inferior and middle turbinate only
 - Inferior only one opening: nasolacrimal duct
 - Anterior part of nasal cavity is called vestibule and is covered with sq. epithelium.

Bony part:

- It consists of 2 nasal bones which meet in midline.
- Rest on the upper part of the nasal process of the frontal bone (held between frontal processes of maxillae).

Cartilaginous part:

1. Upper lateral cartilage.
2. Lower lateral cartilage (alar cartilage).
3. Lesser alar cartilage (sesamoid).
4. septal cartilage.

Nasal septum:

consists of three parts:

- 1- Membranous septum: double layer of skin (no bone or cartilage).

- 2- Cartilaginous septum: quadrangular cartilage.
- 3- Bony septum: perpendicular plate of the ethmoid vomer.

Vascular anatomy:

- **The external carotid artery** supplies blood to the nose via: **most of the supply**

- 1- The facial (the superior labial artery).
- 2-The internal maxillary.
- 3-sphenopalatine artery supply the lateral nasal wall.

- **The internal carotid artery** supplies blood to the nose via:

- 1- Branches of the anterior and posterior ethmoid arteries from the ophthalmic artery.
- 2- **(MCQ)** The Kiesselbach plexus or little area is located on the antero-inferior part of the cartilaginous septum, **where four arteries anastomose to form a vascular plexus:**
 - Anterior ethmoidal artery (from the ophthalmic artery)
 - Sphenopalatine artery (from the maxillary artery)
 - Greater palatine artery (from the maxillary artery)
 - Septal branch of the superior labial artery (from the facial artery)
 - (except the posterior ethmoidal artery)
 - It is the location of the most anterior epistaxis
- 3- angular vein in eye is valvless will transmit the infection from nose to brain (it's the dangerous zone)
- 4- To treat the posterior epistaxis :ligation of sphenopalatine artery.

Nerve supply of the nose:

The sensation of the nose is derived from the first 2 branches of the **trigeminal nerve**:

- **Ophthalmic division:**

The ophthalmic division includes the following:

- 1- Lacrimal - Skin of lateral orbital area except lacrimal gland.
- 2- Frontal - Skin of forehead and scalp, including the supraorbital (eyelid skin, forehead, scalp) and supratrochlear (medial eyelid, medial forehead) skin
- 3- Nasociliary - Skin of the nose and mucous membrane of anterior nasal cavity (Anterior ethmoid, Posterior ethmoid, Infratrochlear) these are branches of nasociliary nerve

- **Maxillary division:**

The maxillary division includes the following:

- 1- Maxillary.
- 2- Infraorbital.
- 3- Zygomatic
- 4- Superior posterior dental.
- 5- Superior anterior dental - Mediates sneeze reflex.
- 6- Sphenopalatine.

Parasympathetic nerve supply.**Functions of the nose:**

- 1- Nasal respiration.
- 2- protective functions of the nose
- 3- Purification
(vibrissae, cilia, lysozymes (anti bacterial, reflex sneezing, warming 37 degree, smell).
- 4- Moistening.
- 5- Transudation of fluid through the epithelium.
- 6- Secretion from the mucosal gland.

Diseases of the nose:**Congenital Atresia:**

The nose of the embryo is blocked, but once their born they open but if a bilateral blockage continues it's an emergency.

atresia and stenosis of anterior nares which is rare is caused by non canalization of an epithelial plug between the median and lateral nasal process treated by excision.
atresia of posterior nares (congenital choanal atresia)

Type:

- 1- bony: most commonly
- 2- membranous.
- 3-mixed

Degree:

- 1- complete unilateral is the most common usually asymptomatic Diagnosed by history of rhinorrhea from one side.
 - 2-complete bilateral
 - 3-incomplete unilateral
 - 4-incomplete bilateral
- Females are more commonly than affected than males.

Clinical features:

Unilateral atresia: nasal obstruction, excessive nasal discharge.
Bilateral atresia: asphyxia, nasal discharge.

Diagnosis:

- 1- Total absence of the nasal air flow.
- 2- Plastic catheter can not be passed through the nose (suction at birth)
- 3-Post-rhinocopy.
- 4-Radiographs with contrast.

Treatment:

- 1- Emergency. Keep the neonates mouth open because they don't know how.
- 2-Transnasal perforation.

3-Transplatal excision.

Congenital nasal disorders:

- Nasal glioma.
- Encephalocele.
- Nasal dermoid.
- Choanal atresia :close or atresia at posterior naris.

Nasal glioma:

- Glioma is unencapsulated collections of glial cells situated outside the CNS.
- Present in childhood as intranasal (30%), extra nasal (60%) or combined masses (10%).
- Glioma form a noncompressible mass that does not increase in size on valsalva testing and does not transilluminate.
- 15% of gliomas connect with the dura.
- Patients may present with unilateral nasal mass, epistaxis or cerebrospinal rhinorrhea.
 - If a less than 6 months baby present with snoring and breathing from the mouth it's not adenoid because adenoid is lymph and the immunity until 6 months is from the mother so you need to rule out congenital cause.
- Simultaneous bilateral digital compression on the internal jugular veins does not lead to distention of the mass (Furstenberg sign).

Management: surgical excision of the mass.

Encephalocele:

- encephalocele signify the herniation of the nasal tissue through defect in skull.
- They may contain meninges (meningiocyte), brain matter and meninges. (encephalomeningiocyte) or they may communicate with a ventricle (encephalomeningocystocele).
- 20% of all encephaloceles occur in the cranium, 15% nasal.
- encephaloceles typically present as soft compressible masses over the glabella or inside the nose.
- Tx: surgery

Nasal dermoids :

- Nasal dermoids are epithelial lined cavities or sinus tracts.
- They constitute the most common congenital nasal anomaly
- These nasal lesions account for 3% of dermoids in the head and neck and 1% of all body dermoids.
- Dx: CT to know the tissue type
- Tx: surgery

Furunculosis of nasal vestibulae:

Acute staphylococcal infection of hair follicle

Clinical feature:

pain – tenderness – indurated swelling in the vestibulae

Treatment:

systemic antibiotics or topical depends if the patient is immune-compromised or extreme of age

Complication:

cavernous sinus thrombosis, cellulitis of upper lip

Rhinitis:

- Not used anymore we say rhino-sinusitis because they are both covered by mucous membrane.
- In rhinitis turbulent is small in same side.

Definition: inflammation of the mucosa of the nasal fossae.

Type: acute or chronic rhinitis.

Acute Rhinitis: common cold (resolves in 3 weeks)**Symptoms:**

- low grade Fever
- Rhinorrhea
- nasal obstruction
- cough worst at night
- fetid breath (bad)
- painless periorbital swelling
- rarely facial pain.

Etiology: virus, bacteria, conveyed by contact or air borne droplets

Usually viral that's why we don't give Abx but sometimes it progress to bacterial when symptoms stays more than 10 days or discharge become greenish blue so we give Abx

Clinical feature:

- Ischemic stage:
 - 1-3 days incubation period.
 - Burning sensation in the nasopharynx.
 - Sneezing, loss of smell.
- hyperaemic stage:
 - Profuse rhinorrhea.
 - Nasal obstruction.
 - Pyrexia.
- Stage secondary infection: discharge becomes yellow or green.
- Stage resolution: resolution occurs 5-10 days.

Chronic Rhinitis: (lasting more than 3 months)

Non specific or specific.

Non Specific:**Simple chronic rhinitis**

Etiology: neighboring infections e.g.

- chronic tonsillitis
- adenoids
- vasomotor rhinitis: dripping of nose due to smell something like perfume.
- chronic irritation (dust, smoker)
- swelling of inferior turbinate

Treatment: correction of any predisposing factor

Hypertrophic rhinitis**Etiology:**

permanent hypertrophic changes due to advanced stage of simple chronic rhinitis.

Medicamentosa

Clinical features: like simple chronic rhinitis

Treatment : like simple chronic rhinitis + reduction of inferior turbinate

Definition: chronic inflammation of nasal mucosa with atrophy of various nasal constituents.

Atrophic rhinitis (MCQ)**Etiology:**

not fully known, infection, endocrine or vitamin disturbances

Type: primary or secondary

- **Primary atrophic rhinitis**

Clinical features:

foul stench, epistaxis , sensation of obstruction

Pathology :

1- degeneration of epithelium glands :

- thick crust in the nose --> infected
- Foul smell from the nose.

2- atrophy of the turbinal bones

- Removal of the crusts.
- Glucose 25%in glycerine drop.
- Local or systemic antibiotics.
- Surgical measures.

Specific:

Syphilis, lupus vulgaris , tuberculosis , sarcoidosis , aspergillosis , others

Nasal allergy: MCQ

Allergy is an abnormal reaction of the tissues to certain substances.

Types:

- Seasonal.
- Non seasonal (perennial).

Etiology:

25-30% in Saudi Arabia, 26% unknown cause (genetic factors or environment factors e.g. cat, mite, cockroach)

Clinical features:

nasal obstruction, rhinorrhea, sneezing, nasal irritation.

Diagnosis:

environmental history, eosinophilia, skin test, blood test

Treatment:

avoidance of precipitating factors, antihistamine drugs, desensitization, surgery

Nasal polypi:**Definition:**

pendunculated portion of oedematous mucosa of the nose.

Etiology:

allergy, inflammation, neoplastic. **You need to rule out cancer**

Site of origin:

Ethmoidal (commonest sites **due to gravity**), antral (antrochoanal polyps).

Clinical features:

Nasal obstruction, sneezing, clear rhinorrhea, expansion of the nasal bones (frog face)

• Nasal polyps are common in child (8-9 yrs) with cystic fibrosis (especially in middle turbinate).

Treatment:

antibiotic, antihistaminic, topical and systemic steroid therapy, surgical excision (FESS) Functional Endoscopic Sinus Surgery.

Anatomy of paranasal sinus:

- There are 4 paired of paranasal sinus (maxillary, ethmoid, frontal, sphenoid)
- lined by pseudostratified columnar epithelium (respiratory epithelium) which is continuous with the nasal epithelium.
- The mucosa secretes the mucous which traps bacteria, it is naturally extruded through sinus ostia to be expectorated or swallowed.
- The damage of the maxillary and frontal sinuses follows a circular pattern through the natural ostia.
- **Mucosa has a specific pattern of secretions if it's disturbed it leads to sinusitis**
- **Some sinuses develops after birth.**
- **-The amount of postnasal mucus drip (through cilia) :0.5 L/day (like a small bottle of water)**

The Ethmoid sinus: anterior - posterior

- Appear as invagination's of the lateral nasal wall around the third month of the fetal gestation.
- Are present at birth small , adult size at age 12.
- Are separated by the ground (base) lamella into anterior and posterior ethmoidal
- which drains into the middle and superior meatus, respectively.
- Consist of the vertical and horizontal plates.
- The vertical plate is divided into two portions, the perpendicular plate of the ethmoid and the crista galli.
- The horizontal plate is known laterally as the fovea ethmoidalis and medially as the cribriform plate.
- Lamina papyracea (very thin) what divides the orbit from the nose medial to the ethmoid so you need to be careful when performing a surgery on a child
- Injury in medial lamina papyracea perforates the eye.
- Injury in fovea ethmoidalis perforates the brain.
- Blood supply is from both the external and internal branches of the carotid, through the sphenopalatine and the anterior and posterior ethmoidal arteries Innervation is from V2 and V3.

The Maxillary sinuses:

- The largest sinus.
- Pyramidal shaped with apex near zygomatic arch.
- In child, inferior border near nasal floor. In adult, 1 cm below nasal floor.
- Floor over maxillary dentition, which is often thin and dehiscent over tooth roots.
- The infra-orbital nerve runs along roof, and is often dehiscent. At risk during antral procedures.
- Sinus ostia located anteriorly in the middle meatus.
- Accessory ostia are usually more posterior and are a sign of chronic disease.
- Blood supply is from divisions of the maxillary artery.
- Innervation is via V2.
- Postganglionic sympathetic fibers are from VII via the sphenopalatine ganglion and the greater superficial petrosal nerve.

Frontal Sinus:

- Drain into frontal recess in the middle meatus near the upper portion of the infundibulum.
- Like the maxillary sinus have a circular muco ciliary clearance.
- the blood supply from supraorbital and superior ophthalmic arteries innervations from nerves of the same name.
- Begins as evagination of the anterior nasal capsule around the fourth month of development.
- Rarely present at birth; usually not visible until age 2.
- Great variability in size; congenitally absent in 5%.

Sphenoid sinus:**Very dangerous**

- Began as outpuchings of superior nasal vaults around the fourth months of gestation
- Rarely present at birth usually seen around age 4
- drain into the superior meatus in the sphenoidal recess cistia of variable size
- The optic nerve lie superiorly
- The poas (?) lie posteriorly.
- The cavernous sinus is lateral ,along with CNIII,IV and VI and the carotid artery
- The carotid artery is dehiscant in 50% of specimens
- Blood supply from both internal and external arteries via the sphenopalatine (floor)and the posterior ethmoidal arteries (roof)
- Innervations from V2 and V3
- Patient with sphenoid sinus disease come with headache.

Functions of paranasal sinus :

- Provide mucus to upper airway, vehical to trapping viruses, bacteria, foreign material for removal
- Humidifying and warming inspired air
- Lubrication.
- Give characteristics to voice /resonance.
- Lessen skull weight regulation of intranasal pressure.
- Increasing surface area for olfaction.
- absorpting shock.
- Contribute to facial growth.

GOOD LUCK

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