PHARYNX I & II

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PHARYNX

- Introduction
- Sites
- Histology
- Anatomy
- Applied anatomy
- Diseases & management
The pharynx is situated behind the nasal cavities, the oral cavity and the larynx.

It divided into nasal, oral, and laryngeal parts.

Its upper end, wider end lying under the skull.

Its lower, narrow end becoming continuous with the oesophagus opposite the sixth cervical vertebra.
ANATOMY SITES

- Nasopharynx
- Oropharynx
- Hypopharynx
It is a musculo-membranous wall, composed of:

- Mucosa & submucosa.
- Pharyngobasilar fascia.
- Muscles: circular & longitudinal.
- Buccopharyngeal fascia (middle layer of deep cervical fascia).

** Pathology might originate from above mentioned layers
ANATOMY
HISTOLOGY

Mucosa:

- Epithelium:
  - Stratified squamous epithelium
  - Pseudostratified ciliated columnar with goblet cells (pharyngeal tonsil i.e. adenoid)
- Lamina propria:
  - Minor salivary gland
  - Lymphoid tissue (adenoid, tonsil)

Pathology: SCC, Adenocarcinoma, Lymphoma, salivary gland tumors.
ANATOMY NASOPHARYNX BOUNDARIES

• Anterior: **nasal cavity** at the choanae

• Inferior: **oropharynx** at the lower border of the soft palate.

• Superior: **body of sphenoid** & basal part of the occipital bone, contain **adenoid**.

• Posterior: supported by anterior arch of **atlas (C1)**.
ANATOMY
NASOPHARYNX
LATERAL WALL

- Opening of auditory tube
- Tubal elevation (produced by posterior margin of tube)
- Pharyngeal recess
- Tubal tonsil
- Salpingopharyngeal fold (raised by salpingo-pharyngeus muscle)

Nerve supply:
Maxillary division of trigeminal (CNV)
NASOPHARYNX
LYMPHATIC DRAINAGE

- Parotid LN
- Retropharyngeal LN
- Level II & V

** NP carcinoma metastatic LN
  - Neck mass.

Retropharyngeal LN
ANATOMY NASOPHARYNX SUBSITES

- Posterior wall
- Lateral wall
- Soft palate

Landmarks:
- Eustachian tube. (Serous otitis media, adenoid hypertrophy).
- The fossa of Rosenmuller,
  (most common site of NP carcinoma)
ANATOMY NASOPHARYNX SUBSITES

Eustachian tube

fossa of Rosenmüller
ANATOMY
NASOPHARYNX
SUB STIES

Adenoid hypertrophy

Nasopharyngeal CA
ANATOMY
OROPHARYNX

• Extends from soft palate to upper border of epiglottis.
ANATOMY OROPHARYNX

- **Anterior wall**: opening of the oral cavity.
- **Posterior wall**: supported by body of C2 and upper part of body of C3 vertebra.
- **Superior**: soft palate and pharyngeal isthmus.
ANATOMY OROPHARYNX
BOUNDARIES

• Inferior:

  ➢ Posterior one third of tongue.
  ➢ Median & lateral glossoepiglottic folds.
  ➢ Valleculae.
ANATOMY OROPHARYNX
BOUNDARIES

• Lateral wall
  ➢ Palatopharyngeal folds.
  ➢ Palatoglossal folds.
  ➢ Palatine tonsil.
ANATOMY OROPHARYNX SUBSITES

- Soft Palate.
- Tongue base
- Tonsil:
  - Tonsillar hypertrophy
  - Most common site of oropharyngeal Carcinoma.
- Lateral Pharyngeal Wall.
- Posterior Pharyngeal Wall.

**Nerve supply: glossopharyngeal (CN IX).**
Subepithelial lymphoid tissue.

Located in the palatine fossa, in the lateral wall of the oropharynx.

Reaches its maximum size during early childhood, but after puberty diminishes in size.

Lateral surface: covered by a fibrous capsule. *(peritonsillar space)*
Palatine aponeurosis: skeleton where muscle inserted.

- Tensor veli palatine.
- Levator veli palatine.
- Uvular.
- Palatoglossus.
- Palatopharyngeal.

** Cleft palate.

** Nasal regurgitation & aspiration
**OROPHARYNX**
**BASE OF TONGUE (BOT)**

**Tongue muscles (extrinsic):**
- Palatoglossus.
- Styloglossus.
- Genioglossus.
- Hyoglossus.

**Deep invasion by tumor:**
- Tongue movement restriction
- Advanced tumor stage
OROPHARYNX
NERVE SUPPLY

• Palate muscles supplied by (CN IX & X)
  ➢ Tensor veli palatine by (CN V3)

• Tongue muscles supplied by (CN XII)
  ➢ Palatoglossus (CN IX & X)

**Referred otalgia**
OROPHARYNX
BLOOD SUPPLY

ECA:

• Superior thyroid
• Lingual
• Occipital
• Facial
• Ascending pharyngeal
• Post auricular
• Internal maxillary
• Superficial temporal;
• Surgical ligation or embolization
  ➢ Post tonsillectomy bleeding

• Lymphatics
  ➢ (jugulodigastric node)
WALDEYER'S RING

- It is a lymphoid tissue ring located in the pharynx.

- Function as a barrier to infection especially in the first few years of life.

- Consists:
  - Adenoids (pharyngeal tonsils)
  - Tubal tonsil
  - Palatine tonsil
  - Lingual tonsil

** Tonsillary hypertrophy
PHARYNX MUSCLES

- Superior, Middle & Inferior.
- Extend around the pharynx and are inserted posteriorly into a fibrous raphe that extends from the pharyngeal tubercle on the occipital bone to the esophagus.
- Propel the bolus of food down into the esophagus
PHARYNX
INFERIOR CONSTRUCTOR MUSCLE

- **Origin**: lamina of thyroid cartilage, cricoid cartilage
- **Insertion**: pharyngeal raphe

- **Cricopharyngeus** (lower fibers of the inferior constrictor)
  - act as a Upper esophageal sphincter.
  - preventing the entry of air into the esophagus between the acts of swallowing.

** CP spasm , dysphagia in elderly .
PHARYNX
INFERIOR CONSTRUCTOR MUSCLE

- Area of weakness:

**Killian’s Triangle**: Zenker’s Diverticulum

- dysphagia & aspiration in elderly
HYPOPHARYNX

- Extends from upper border of epiglottis to lower border of cricoid cartilage (C6).

- Narrowed to become esophagus.

- Nerve supply
  - Internal laryngeal branch (SLN) of the vagus nerve (CNX)
HYPOPHARYNX
BOUNDRIES

• **Anterior**:
  - Opening of the larynx (upper part)
  - Mucosa covering the posterior surface of larynx (lower part)

• **Posterior**:
  - supported by bodies of C3, 4, 5, 6 vertebrae
HYPOPHARYNX
BOUNDARIES

• Lateral wall:

  ➢ Thyroid cartilage and thyrohoid membrane.

  ➢ The piriform fossae
HYPOPHARYNX SUBSITES

- **Pyriform Sinus:**
- **Posterior Pharyngeal Wall**
- **Postcricoid Region**
• Most common site for hypopharyngeal cancer.
• Most common site of FB impaction (hypopharynx).
• Hypopharyngeal Lesion
  ➢ Vocal cord paralysis (CA joint involvement)
  ➢ Pooling of secretion proximally.
  ➢ Referred otolagia (CNX involvement).
SWALLOWING
PHARYNGEAL PHASES

- Reflexive phase
  - (posterior pharyngeal wall receptors, CN IX and CN X)
- Transient time < 1 sec in normal subjects
SWALLOWING
NASOPHARYPEAL PHASE

- Levator veli palatini
  - Lifts the soft palate

- Palatopharyngeous
  - Tightens and raises the pharynx and narrows the oropharyngeal inlet.

- Superior pharyngeal muscle contraction
SWALLOWING
OROPHARYNGEAL PHASE

• Base of Tongue Propels Bolus Past Vallecula
  ➢ squeezes against posterior pharynx
**Glossectomy patients have difficulty with bolus propulsion**
DEEP NECK SPACES

- Potential space containing fat, lymph nodes, neurovascular structure:
  - Peritonsillar area
  - Retropharyngeal area
  - Parapharyngeal area
PERITONSILLAR AREA

- **Boundaries**:
  - Medial: palatine tonsil
  - Lateral: superior constrictor muscle

- **Content**:
  - Loose connective tissue
  - Tonsillar branches of the lingual, facial, ascending pharyngeal vessels
RETROPHARYNGEAL SPACE

- **Boundaries:**
  - Superior: base of skull
  - Inferior: superior mediastinum
  - Anterior: pharynx, esophagus
  - Posterior: alar fascia
  - Medial: midline raphe of superior constrictor
  - Lateral: carotid sheath

- **Content:**
  - Lymph nodes
  - Connective tissue
PARAPHARYNGEAL SPACE

- **Boundaries:**
- Superior: base of middle fossa
- Inferior: hyoid bone
- Anterior: pterygomandibular raphe
- Posterior: prevertebral fascia
- Medial: superior constrictor
- Lateral: deep lobe parotid, medial pterygoid
PARAPHARYNGEAL SPACE

- Content:
- Fat
- Lymph nodes
- Int. max. artery
- Auriculotemporal, Lingual & inferior alveolar nerve
- Pterygoid muscles
- Deep lobe parotid
- Carotid
- Internal jugular
- Superior sympathetic
- CN IX, X, X, XII
Disease & management
NASOPHARYNX

• **Adenoid hypertrophy:**
  - Child
  - Snoring & Mouth breathing
  - Nasal Tone of speech
  - Bilateral Otitis media with effusion
  - Bilateral nasal obstruction & discharge
  - Adenoid face: Overbite • Long face • Crowded incisors
ADENOID HYPERTROPHY
DIAGNOSIS

- Adenoid face
- Lateral neck X ray
- Nasal endoscopy
ADENOID HYPERTROPHY MANAGEMENT

• Treat underlying allergies
• Nasal steroid spray
  • Mild symptoms
  • Adenoid obstructing less than 50% of posterior nasal choana
• Adenoidectomy
ADENOIDECTOMY
INDICATIONS

• Obstruction, sleep apnea
• Serous otitis media
• Chronic sinusitis in children
Oropharynx

Tonsil

- Tonsillitis
- Tonsillar hypertrophy
OROPHARYNX
TONSILLITIS

• Viral (most common)
• Bacterial
• Infectious mononucleosis
• Malignancy: lymphoma, leukemia, carcinoma
• Diptheria
• Vincent angina
• Scarlet fever
• Agranulocytosis

*** Prescribe Antibiotics (culture proven bacterial infection)
**TONSILITIS BACTERIAL**

- **Clinical Manifestations**: Dysphagia, Headache, Painful cervical lymphadenitis, Fever, Exudate, Absence of cough, and hoarseness.

- **Microbiology**:
  - **Streptococcus pyogenes (Group A beta-hemolytic)**
  - GABHS • H. influenza • S. aureus • Streptococcus pneumoniae
BACTERIAL TONSILITIS

- Complication

**Systemic complications:**
- Rheumatic heart disease (RHD)
- Glomerulonephritis (GN)
- Sepsis

**Local complications:**
- Airway obstruction
- Aspiration
- Deep neck space infection (retropharyngeal abscess, peritonsillar abscess, parapharyngeal abscess)
TONSILLITIS
LOCAL COMPLICATIONS

- Persistent Fever, sore throat, dysphagia despite medical treatment.
- Drooling of saliva & dysphagia
- Dyspnea
- Stridor
- Neck mass
- Trismus
- Torticollis
TONSILLITIS
LOCAL COMPLICATION

Peritonsillar abscess

Retropharyngeal abscess

Para pharyngeal abscess
BACTERIAL TONILITIS MANAGEMENT

- Throat swab is mandatory in each case
- CBC
- Blood culture, if sepsis is concerned
- CT Neck with contrast (if local complications is suspected)
- Infectious disease referral
TONSILLITIS MANAGEMENT

- Oral penicillin V is the agent of choice for treatment of GAS pharyngitis given its proven efficacy, safety, narrow spectrum, and low cost.
- The appropriate duration is 10 days of therapy;
- This approach is extrapolated from studies performed in the 1950s demonstrating that treatment of streptococcal pharyngitis with intramuscular penicillin prevents acute rheumatic fever.

- Amoxicillin is often used in place of oral penicillin in children, since the taste of the amoxicillin suspension is more palatable than that of penicillin. Some data suggest that oral amoxicillin may be marginally superior to penicillin.
TONSILITIS MANAGEMENT COMPLICATION

- Abscess Incision & drainage
  - Transoral (peritonsillar/retropharyngeal abscess)
  - Transcervical (parapharyngeal abscess)

- Intravenous antibiotics (broad spectrum coverage)

- Cardiology consultation

- Nephrology consultation systemic complication
TONSILLECTOMY

INDICATION

• Obstruction --- sleep apnea
• Malignancy
• Recurrent bacterial infections
• Recurrent peritonsillar abscess
• Prophylaxis (rheumatic fever)
INFECTIOUS MONONUCLEOSIS

- Fever
- Fatigue
- Cervical LN
- Jaundice
- **Microbiology**: Epstein-Barr virus
- **CBC**: Atypical lymphocytes
- **Dx**: “Monospot”
- **Treatment**: supportive
VINCENT ANGINA

- Acute oropharyngeal ulcerative
- Poor oral hygiene (fetid breath)
- Malnutrition
- Fatigue
- Cervical lymphadenopathy
- Pseudomembranous ulceration
- Microbiology: G-ve anaerobic
- Dx: Throat swab C/S
- Treatment: Penicillin and metronidazole
SCALRET FEVER

- Sore throat
- Fever
- Strawberry appearance tongue
- Forchheimer spots (fleeting small, red spots on the soft palate)
- Microbiology: *Streptococcus* exotoxins
- Dx: clinical history, exam & elevation of antisteptolysin O titer
- Treatment: penicillin, macrolide
DIPHTHERIA

• upper respiratory tract illness with sore throat
• Low-grade fever
• Airway obstruction
• An adherent, dense, grey pseudomembrane covering the posterior aspect of the pharynx
• Microbiology: Corynebacterium diphtheriae
• Dx: throat swab
• Treatment:
  • Secure airway
  • Penicillin G
  • Quinvaxem
ZENKER DIVERTICULUM

- Outpouching of:
  - Mucosa, sub mucosa (false)
  - Mucosa, sub mucosa & muscle (true)

- Etiology:
  - Intrinsic factors: luminal pressure
  - Extrinsic factors: adhesion outside esophagus
ZENKER DIVERTICULUM

- Location: pharyngeoesophageal junction
- Site: left, posterior
- Etiology: increase intraluminal pressure (pulsion)
**ZENKER DIVERTICULUM**

- **Diagnosis:**
  - Elderly (F>M)
  - Dysphagia to solid
  - Weight loss
  - Vomiting of undigested food
  - Aspiration pneumonia
  - Asymptomatic (detected on CT neck)

- **Radiology:**
  - Barium swallow:
ZENKER DIVERTICULUM

• Observation
  • Asymptomatic
  • Unfit for surgery (NG feeding or gastrostomy)
  • Diet modification

• Surgical intervention (cricopharyngeal myotomy +/- diverticulectomy)
  • Endoscopic
  • External approach
CONCLUSION

• The pharynx has complicated anatomy to optimize physiology & function.
• Each site & subsites has its own function.
• Missing site or subsites will compromise the function leading to aspiration, dysphagia, speech impairment.
• Understanding surgical anatomy will lead to delectated surgical dissection.
Thank you