Pathology of Head and Neck

- Pathology of Oral cavity
- Pathology of Nose, and Nasopharynx
- Pathology of Larynx
- Pathology of Neck
- Pathology of Salivary gland
Pathology of Oral cavity

- Inflammations and infections
- Reactive lesions
- Oral manifestations of systemic disease
- Tumors and precancerous lesions

Inflammations and infections

- Herpes simplex virus infections
- Aphthous ulcer (Canker sores)
- Oral candidiasis (Thrush)
- Glossitis
- Xerostomia
Herpes simplex virus infections

• Etiology ; HSV1

• Clinical feature ;
  – Acute herpetic gingivostomatitis in young children, severe diffuse involvement of the oral and pharyngeal mucosa, tongue and gingiva, and spontaneously clear in 3-4 weeks
Recurrent herpetic stomatitis in young adult, milder form involving lip, nasal orifices and buccal mucosa and spontaneously clear in 1-2 weeks

Morphology
- Gross; Small vesicles to bullae painless, red-rimmed, shallow ulceration
- Histo; Acantholysis and presence of intranuclear inclusion with multinucleated giant cells
Aphthous ulcer (Canker sores)

- Common superficial ulceration of oral mucosa
- Most in first decade of life
- Clinical feature: painful and recurrent ulceration and clear within a week

Morphology:
- Gross: single or multiple, shallow, hyperemic ulceration with red-rimmed and thin exudate covering
- Histo: mainly mononuclear cell infiltration and neutrophilic infiltration when has secondary bacterial infection
Aphthous ulcer

Oral candidiasis (Thrush)

- The most common fungal infection in the oral cavity
- Predisposing condition:
  - Diabetic patients
  - Neutropenic patients
  - Immunocompromised hosts
  - Immunocompetent with xerostomia, debilitated, and using prolong and broad spectrum antibiotic drugs
• **Pseudomembranous candidiasis;** a superficial, curdy, gray to white membrane composed of matted organisms enmeshed in a fibrinosuppurative exudate that can be readily scraped off to reveal an underlying erythematous inflammatory base

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**Glossitis**

• **Inflammation of tongue**

• **Etiology ;**
  – Deficiencies of vitamin B12, riboflavin, niacin or pyridoxin, and iron
  – Jagged carious teeth, ill-fitting dentures, syphilis, inhalation burn and ingestion of corrosive chemicals
• Morphology;
  – Gross; beefy-red tongue with / without ulceration
  – Histo; atrophy of the papillae of tongue and thinning of mucosa, exposing vasculature and shallow ulceration

Xerostomia

• Dry mouth - lack of salivary secretion

• Etiology;
  – Sjogren syndrome
  – Drug (anticholinergic agents)
  – A complication of radiation therapy
Morphology:
- dry mucosa or atrophy of papillae of tongue with fissuring and ulceration

Reactive lesions:
- Fibroma
- Pyogenic granuloma
- Peripheral giant cell granuloma
Fibroma

- Occurring in bite line of buccal mucosa and gingivodental margin
- Etiology; irritation
- Morphology:
  - Nodular mass of fibrous tissue with scant inflammatory cell infiltration and covered by squamous mucosa
Pyogenic granuloma

- Pregnancy tumor
- Highly vascular, pedunculated tumor
- Occurring in gingiva of children, young adult and commonly pregnant woman
Peripheral giant cell granuloma

- Inflammatory lesion sized > 1.5 cm. and protruding from gingiva at some site of chronic inflammation
- Morphology:
  - aggregation of multinucleate, foreign body-type giant cells in fibroangiomatous stroma
Oral manifestations of systemic disease

• Infection ;
  – Scarlet fever - stawberry or rasberry tongue
  – Measle - Koplik spots
  – Infectious mononucleosis - acute pharyngitis
    and tonsilitis

• Dermatologic condition ;
  – Lichen planus : reticulate, lacelike, white
    keratotic lesion
  – Pemphigus and bullous pemphigoid : vesicle or
    bullae
  – Erythema multiforme : maculopapula and
    vesiculoubulous eruption - Stevens-Johnson
    syndrome
• Hematologic disorder ;
  – Monocytic leukemia : leukemic infiltration causing enlargement of gingiva
• Miscellaneous ;
  – Melanotic pigmentation : in Addison disease, Albright syndrome, Peutz-jegher syndrome .
  – Dilantin : fibrous enlargement of the gingiva

Tumors and Precancerous lesions
• Leukoplakia and erythroplakia
• Squamous cell carcinoma
• Odontogenic cysts and tumors
Leukoplakia

- White plaque on the oral mucous membrane can not remove and be classified into another entities

- Morphology:
  - Histo; ranging from benign epithelial hyperplasia to dysplastic epithelium -- carcinoma in situ
Proliferation of squamous epithelium

Erythroplakia

- Dysplastic leukoplakia
- Morphology :
  - Gross : red, velvety, possible eroded area in oral cavity
  - Histo : dysplastic squamous epithelium with / without surface erosion --- carcinoma in situ or invasive carcinoma at margin
• Clinical feature:
  – Found between the age of 40-70 years
  – Male : Female = 2 : 1
  – Associated with tobacco (highly association), alcohol, ill-fitting denture, chronic exposure to irritants and HPV serotype 16
  – Malignant transformation: Erythroplakia (50%) more than leukoplakia (5-6%)

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<tr>
<th>Squamous cell carcinoma</th>
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<tr>
<td>95% of oral cancer</td>
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<td>found in the age of 50-70 years</td>
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<td>Etiology:</td>
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<tr>
<td>– Environmental factors: use of tobacco, alcohol, marijuana, betel nut and pan</td>
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<tr>
<td>– HPV infection (serotype 6, 16, and 18)</td>
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<tr>
<td>– Genetic factor; deletion chromosome 3, mutation in p53 and amplification of oncogene INT2, and BCL1</td>
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(Irritation from jagged teeth, ill-fitting denture and chronic infection associated with leukoplakia)

- Clinical feature:
  - Favored location: the floor of mouth, tongue, hard palate and base of tongue
  - Favored sites of metastasis: mediastinal lymph nodes, lungs, liver, and bone

- Prognosis -- best with lip lesion and poorest in lesion of floor of mouth and base of tongue
• Morphology :
  – Gross: protruding mass with central necrosis forming an irregular, shaggy ulcer rimmed by elevated, firm, rolled border
  – Histo: well-differentiated squamous cell carcinoma to poorly differentiated or sarcomatoid carcinoma
Pathology of Nose and Nasopharynx

- Inflammation
  - Infectious rhinitis and Allergic rhinitis
  - Sinusitis
  - Pharyngitis and Tonsilitis
- Nasal polyp and sinunasal papilloma
- Nasopharyngeal carcinoma
Infectious rhinitis (common cold)

- Major offenders are adenoviruses, echoviruses, and rhinoviruses.
- Acute stages; the nasal mucosa is thickened, edematous, and red; the nasal cavities are narrowed; and the turbinates are enlarged. These changes may extend, producing a concomitant pharyngotonsillitis.
- Secondary bacterial infection cause mucopurulent or sometimes frankly suppurative exudate.

Allergic rhinitis - hay fever

- An immunoglobulin E-mediated immune reaction with an early- and late-phase response
- The allergic reaction is characterized by marked mucosal edema, redness, and mucus secretion, accompanied by a leukocytic infiltration in which eosinophils are prominent
- The most common allergens: plant pollens, fungi, animal allergens, and dust mites.
Nasal Polyps

• Recurrent attacks of rhinitis eventually lead to focal protrusions of the mucosa, producing so-called nasal polyps, which may reach 3 to 4 cm in length.

• On histologic examination, these polyps consist of edematous mucosa having a loose stroma, often harboring hyperplastic or cystic mucous glands and infiltrated with a variety of inflammatory cells, including prominently neutrophils, eosinophils, and plasma cells with occasional clusters of lymphocytes.
Sinusitis

- Acute sinusitis is most commonly preceded by acute or chronic rhinitis, but maxillary sinusitis occasionally arises by extension of a periapical infection through the bony floor of the sinus.
- The offending agents are usually inhabitants of the oral cavity
- Impairment of drainage of the sinus by inflammatory edema of the mucosa – obstruction of outflow and accumulation of secretion or pus in sinuses

Pharyngitis and tonsillitis

- Most common infectious agents; rhinoviruses, echoviruses, and adenoviruses, and, less frequently, respiratory syncytial viruses and the various strains of influenza virus.
- Superimposed bacterial infections or Primary bacterial infection - the most common offenders are the β-hemolytic streptococci
- Reddening and slight edema of the nasopharyngeal mucosa, with reactive enlargement of the related lymphoid structures in most usual cases and in more severe case, inflamed nasopharyngeal mucosa may be covered by an exudative membrane (pseudomembrane), and the nasopalatine and palatine tonsils may be enlarged and covered by exudate.
Sinonasal Papillomas

- Benign neoplasms arising from the sinonasal mucosa and are composed of squamous or columnar epithelium.
- Might related to HPV types 6 and 11
- Three forms: septal (most common), inverted (most important biologically), and cylindrical.
- Inverted papillomas are benign but locally aggressive neoplasms occurring in both the nose and the paranasal sinuses - high rate of recurrence, with the potentially serious complication of invasion of the orbit or cranial vault; rarely, frank carcinoma
Nasopharyngeal Carcinomas

- Association with EBV infection
- Three patterns:
  - keratinizing squamous cell carcinomas,
  - nonkeratinizing squamous cell carcinomas, and
  - undifferentiated carcinomas
- It is unresectable and radiotherapy is a standard treatment
- 50% to 70% 3-year survival rate.

Pathology of Larynx

- Laryngitis
- Vocal cord polyp
- Squamous papilloma
- Laryngeal carcinoma
Laryngitis

- May occur as the manifestation of allergic, viral, bacterial, or chemical insult, but it is more commonly part of a generalized upper respiratory tract infection or the result of heavy exposure to tobacco smoke.
- May cause obstruction, especially laryngoepiglottitis, caused by \textit{Haemophilus influenzae} or \( \beta \)-hemolytic streptococci in infants and young children.
- The most common form of laryngitis, encountered in heavy smokers, constitutes an important predisposition to the development of squamous epithelial changes in the larynx and sometimes overt carcinoma.

Vocal cord nodule or polyp

- Reactive nodules, also called polyps, sometimes develop on the vocal cords, most often in heavy smokers or in individuals who impose great strain on their vocal cords (singers’ nodules).
- These nodules constitute smooth, rounded, sessile or pedunculated excrescences, generally only a few millimeters in greatest dimension, located usually on the true vocal cords.
- They are typically covered by squamous epithelium that may become keratotic, hyperplastic, or even slightly dysplastic. The core of the nodule is a loose myxoid connective tissue that may be variably fibrotic or punctuated by numerous vascular channels.
Squamous papilloma

- Benign neoplasms, usually on the true vocal cords, that form soft, raspberry-like excrescences rarely more than 1 cm in diameter
- Usually single in adults but are often multiple in children
- The lesions are caused by HPV types 6 and 11
- They do not become malignant, but they frequently recur.
Laryngeal carcinoma

• Clinical symptom - persistent hoarseness
• About 95% of laryngeal carcinomas are typical squamous cell carcinoma
• Most often related to tobacco smoke; other including alcohol drink, nutritional factors, exposure to asbestos, and irradiation. HPV sequences are present in about 5% of cases
• The usual cause of death is infection of the distal respiratory passages or widespread metastases and cachexia
Pathology of Neck

- Branchial cyst (Lymphoepithelial lesion)
- Thyroglossal tract cyst
- Paraganglioma (Carotid body tumor)

Branchial cyst (Lymphoepithelial lesion)

- Benign cyst in anterolateral aspect of neck
- Remnant of the branchial arches
- Morphology:
  - Gross: circumscribed cyst, 2-5 cm.
  - Histo: cystic space lined by stratified squamous and pseudostratified columnar epitheliums and presence of lymphoid tissue in fibrous wall
Cystic wall

Cystic space

sternocleidomastoid muscle

branchial cyst

tendon of sternocleidomastoid muscle
Thyroglossal tract cyst

- Remnant of thyroglossal duct (from foramen cecum)
- Morphology;
  - Gross: Cystic mass, 1-4 cm. at anterior of neck
  - Histo: Cystic space lined by stratified squamous and pseudostratified columnar epitheliums and presence of lymphoid tissue and thyroid follicles in fibrous wall
Cystic space

Thyroid tissue
Paraganglioma (Carotid body tumor)

- Tumor of paraganglia (clusters of neuroendocrine cells)
  - Adrenal paraganglia -- Pheochromocytoma
  - Extraadrenal paraganglia:
    - Paravertebral paraganglia (sympathetic connection)
    - Paraganglia related to great vessels of head and neck (parasympathetic connection)
• Clinical feature;
  – Arise in the age of 60
  – Associated with MEN II – multiple and bilateral lesions
  – Frequency recurrent and local invasion

• Morphology;
  – Gross: Reddish - brown mass not exceed 6 cm. at bifurcation of the common carotid body (Chemodectoma)
  – Histo: nests of polygonal chief cell (uniform) with abundant granular cytoplasm and vesicular nuclei surrounded by elongated sustentacular cells and fibrous tissue
Pathology of Salivary glands

- Inflammation (Sialadenitis)
- Mucocele
- Tumors

Inflammation (Sialadenitis)

- Cause of sialadenitis: infection (virus and bacteria) or autoimmune origins eg.
  - Viral sialadenitis caused by mumps (Epidemic parotitis)
  - Sjogren syndrome
Nonspecific bacterial sialadenitis

- Involving major salivary gland
- Etiology:
  - Secondary to duct obstruction caused by sialolithiasis
  - The most common organisms: Staphylococcus aureus and streptococcus viridans
- Morphology: Acute and chronic inflammation
Mucocele

- The most common lesion of the salivary glands.
- Results from either blockage or rupture of a salivary gland duct, with consequent leakage of saliva into the surrounding connective tissue stroma.
- Most often found on the lower lip
• The cyst-like space of mucocele is lined by inflammatory granulation tissue or by fibrous connective tissue

Salivary gland tumors

• Salivary gland tumor - uncommon tumor
• Site;
  – 65 - 80 % in parotid gland
  – 10 % in submandibular glands
  – remaining arise in minor and sublingual gland
• Malignant tumor;
  – 15 - 30% of parotid gland tumor
  – 40% of submandibular gland tumor
  – 50% of minor salivary gland tumor
  – 70% of sublingual gland tumor
• Age
  – usually occur in adult

Pleomorphic adenoma

• Mixed tumor
• Most common tumor and benign tumor of salivary glands
• 60% in parotid gland
• Epithelium-derived benign tumor with both epithelial and mesenchymal differentiation
• Clinical feature;
  – Painless, slow-growing mass in parotid, submandibular glands and buccal mucosa
• Carcinoma ex pleomorphic adenoma or malignant mixed tumor - the most aggressive of all salivary gland malignant neoplasm, 30-50% mortality in 5 years

• Morphology;
  – Gross: round, well-encapsulated masses, not exceeding 6 cm.
  – Histo: epithelial elements (duct, irregular tubules, strands, sheets) and mesenchymal-like elements (myxoid, hyaline, chondroid to bony matrix)
**Warthin’s tumor**

- The second most common salivary gland neoplasm
- present in parotid gland
- found more commonly in male and fifth to seventh decades of lifes
- 10 % multifocal and bilateral

**Morphology ;**
- **Gross** : well-encapsulated masses, 2-5 cm. having gray-brown surface with cleft-like or cystic spaces
- **Histo** : spaces lined by double layers of epithelial cells (abundant granular eosinophilic cytoplasm) resting on lymphoid stroma
Mucoepidermoid carcinoma

- The most common malignant tumor of salivary gland (60-70% in parotid gland)
- Radiation-induced neoplasm
- Clinical course and prognosis -- grade of tumor
- Grade of tumor; three grades depend on amount of mucus-secreting cells

Morphology:
- Gross: nonencapsulated and circumscribed masses, > 8 cm with infiltrate margins, having gray-white cut surfaces with small mucin containing cysts
- Histo: variable mixtures of squamous cells, mucus-secreting cells and intermediated cells
Adenoid cystic carcinoma

- Malignant tumor
- The most common neoplasm in minor salivary gland
- Clinical feature;
  - the most painful salivary gland neoplasm (perineural invasion of tumor)

- Morphology;
  - Gross: poorly encapsulated gray-pink masses, with infiltrate margins.
  - Histo: tubular, solid and cribiform patterns of small cells with dark, compact nuclei and scant cytoplasm
Perineural invasion
The end