

The gastrointestinal (GI) tract is a hollow tube extending from the oral cavity to the anus that consists of anatomically distinct segments, including the esophagus, stomach, small intestine, colon, rectum, and anus.

Oral pathology

Many pathological processes can affect the constituents of the oral cavity. The more important and frequent conditions will have covered in this lecture.

1- Aphthous ulcer

-It is a common, self-limiting condition.

-It is small (less than 5mm), painful, shallow, ulcer.

-It affects the oral mucosa, soft palate, buccal and labial mucosa, floor of the mouth.

-It is round, covered by gray- white exudate with erythematous rim.

-Etiology:

Unknown, but it is triggered by stress, fever, ingestion of certain food. etc.

Autoimmune base is suspected.

2- Herpes simplex virus infection

-Called fever blister or cold sore

-Cause: HSV type I

-The primary infection is usually asymptomatic, the virus will persist in a dormant state within the local ganglia (e.g. trigeminal) and get reactivation by:

Factors that cause reactivation of HSV:

1. Trauma
2. Fever or excessive cold
3. Exposure to ultraviolet light (sunlight)
4. Upper respiratory tract infections
5. Pregnancy
6. Menstruation
7. Immunosuppression

-This will lead to the formation of *small vesicles which rupture and leave a shallow painful ulcer located around the mouth, lips & nasal orifices.*

Microscopically:

The infected cells become ballooned and have large eosinophilic intranuclear inclusions. Adjacent cells commonly fuse to form large multinucleated cell.

3- Oral candidiasis (Thrush)

Causative agent: Candida albicans.

Gross: Adherent white curd like plaque (fibrino-suppurative exudate with matted micro-organisms) which is after scrapping will reveal an erythematous inflammatory base.

Etiological factors: It is opportunistic infection, candida is present in the oral cavity in 50% of population, so it will appear if there is any decrease in immunity e.g.

1-Diabetes mellitus

2-Immunodeficiency (congenital or acquired like AIDS)

3-Some drugs like: glucocorticoid therapy, chemotherapy and Immunosuppressive treatment after organ transplant, broad spectrum antibiotic (that eliminate or alter the normal bacterial flora of the mouth)

4-Debilitating diseases e.g. CA.

4- Oral cavity precancerous lesions:

It is a benign, morphologically altered tissue that has a greater than normal risk of malignant transformation.

- Leukoplakia
- Erythroplakia

Leukoplakia

Is a white, well defined, oral mucosal patch which can't be removed by scraping and cannot be characterized clinically or pathologically as any other disease (like thrush or lichen planus).

It is a clinical term and not a disease entity.

White color: results from thickened surface keratin layer or thickened spinous layer which masks the normal vascularity (redness) of the underlying connective tissues.

Microscopically:

Microscopical features are highly variable:

either just

*Hyperkeratosis (thick keratin layer) +/- acanthosis (thick spinous layer due to hyperplasia)
+/- variable number of chronic inflammatory cell in the underlying connective tissues.

or

* dysplasia (mild-moderate or severe) or

*5-6% carcinoma in situ.

Etiological factors:

The most important: Tobacco, HPV

Others: alcohol, irritant food, irritation from rough teeth, or rough places of ill-fitting dentures.

Approximately 3% of the world's population have leukoplakia, 5% to 25% of these lesions are premalignant and may progress to squamous cell carcinoma.

Thus, all leukoplakias must be considered **precancerous**, until proved otherwise by means of histologic evaluation.

Erythroplakia

Is a red, velvety, possibly eroded area that is flat or slightly depressed relative to the surrounding mucosa.

Microscopically:

90% shows severe dysplasia, carcinoma in situ, or minimally invasive carcinoma. Often, an intense subepithelial inflammatory reaction with **vascular dilation** is seen that likely contributes to the reddish clinical appearance.

Erythroplakia is associated with a much greater risk of malignant transformation than leukoplakia (around 50%).

- Age: typically affect persons between the ages of 40 and 70 years (it may be seen in adults at any age)
- Male: female ratio is 2: 1
- Although the etiology is multifactorial, tobacco use (cigarettes and chewing tobacco) is the most common risk factor for leukoplakia and erythroplakia

DX: biopsy from the lesion

Treatment: eliminate the cause and Surgical removal

5- Carcinoma of the oral cavity

- 95% are squamous cell carcinoma.

Predisposing factors:

*leukoplakia (the risk of transformation is 3-25%)

*Erythroplakia (the risk of transformation is 50%)

*Tobacco

*Alcohol

*Human papilloma virus 16 &18

Pathogenesis:

- Mutations frequently involve P53 or p63
- Infection with oncogenic variants of human papillomavirus (HPV), particularly HPV-16
- Oral squamous cell carcinomas are classically linked to tobacco and alcohol use, but the incidence of HPV associated lesions is rising

Grossly:

In early stages, these cancers can appear as raised, firm, pearly plaques or as irregular, roughened mucosal thickenings. Either pattern may be superimposed on a background of a leukoplakia or erythroplakia. As these lesions enlarge, they typically form ulcerated and protruding masses that have irregular and indurated or rolled borders

Microscopically:

A majority of oral cavity cancers are squamous cell carcinomas. squamous cell carcinomas with different grades (well, moderate or poorly differentiated).

Site:

Lower lip, floor of the mouth, tongue, hard palate, base of the tongue.

Prognosis:

Best, in lips lesion

Poor, in floor of the mouth & tongue

The Salivary gland

Sialadenitis (inflammation)

Causes: Either: Viral, bacterial, or autoimmune.

1- **Viral:** the most common virus is mumps V. which affect mainly the parotid gland. In children it is self limiting disease.

In adult it may be accompanied by pancreatitis or orchitis causing sterility.

2- **Bacterial:** Which is mainly unilateral involvement, painful enlargement.

- Occur following an obstruction of major excretory duct by e.g. stone (sialolithiasis).
- Following major surgical procedure in old dehydrated patients.
- Most common causative bacteria are staph. aureus & strep. viridans

3- **Autoimmune**

- Usually bilateral
- Seen in **Sjogren syndrome:** in which there is wide spread involvement of salivary glands, mucous secreting and lacrimal glands causing:
 - a- Dry mouth (xerostomia)
 - b- Dry eye (xeroconjunctivitis sicca)
 - c- Small % may evolve to malignant lymphoma.

Tumors

About 80% of the salivary gland tumors occur in the parotid gland.

the likelihood of a salivary gland tumor being malignant is inversely proportional to the size of the gland. i.e. the **larger** the gland, the **less** likelihood to be malignant.

Parotid: 15-30% of the tumors are malignant

Submandibular gland: 40% are malignant

Sublingual: 70-90 % of the tumors are malignant

- **Benign tumors:** e.g.
- Pleomorphic adenoma (mixed tumor) and Warthin tumor
- **Malignant tumors:** e.g.
- Mucoepidermoid carcinoma and adenoid cystic carcinoma.

Benign tumors:

1. Pleomorphic adenoma (mixed tumor)

- Account for 90% of benign tumors of salivary glands
- Causes painless swelling at the angle of the jaw (in front of and below the ear (palpable discrete mass))

Grossly:

- White gray well circumscribed, encapsulated lobulated mass without hemorrhage or necrosis, although it is encapsulated but histological examination reveals capsular penetration which necessitates adequate resection margins to prevent recurrence which occur in 10%.

Microscopically:

The tumor cells are a mixture of *ductal epithelial and myoepithelial cells*, which are arranged as glands, ducts, acini, tubules, strands or sheets intermingled with loose myxoid connective tissue stroma containing cartilage & rarely bone

2. *Warthin Tumor*

- Second most common benign salivary gland neoplasm.
- It arises almost exclusively in the parotid gland
- Male > female
- 5th to 7th decades of life.
- About 10% are multifocal, and 10% bilateral.
- Smokers have eight times the risk of nonsmokers for developing these tumors.

Grossly:

It is small, well encapsulated, round to ovoid mass that on section reveal mucin containing cystic spaces within soft gray background

Microscopically:

Spaces or clefts are lined by a double layer of neoplastic epithelial cells resting on a dense lymphoid stroma sometimes with germinal centers.

The double layer of lining cells is distinctive;

the upper layer consists of palisading columnar cells with abundant, finely granular, eosinophilic cytoplasm, while **the lower layer** is comprised of cuboidal to polygonal cells.

The granular appearance of the cytoplasm of the upper layer of cells is due to the presence of numerous mitochondria, a feature referred to as "oncocytic".

Malignant tumors

1. *Mucoepidermoid Carcinoma*

As the name indicates, these neoplasms are composed of variable mixtures of mucus-secreting cells (muco), and squamous cells (epidermoid). They are *the most common primary malignant tumor of the salivary glands*. They occur mainly in the parotids. Low-grade tumors may invade locally but do not metastasize. By contrast, high-grade neoplasms metastasize to distant sites in 30% of cases.

Grossly, mucoepidermoid carcinomas are gray-white, infiltrative tumors that frequently show small, mucin-containing cysts.

Microscopically, there are cords, sheets, and cysts of squamous and mucous-secreting cells.

2. *Adenoid cystic carcinoma:*

Half of the cases are found in the minor salivary glands (in particular the palate). Although slow growing, they have a tendency to invade perineural spaces and to recur. Eventually, 50% or more disseminate widely to distant sites such as bone, liver, and brain.

Microscopically, they are composed of small cells having dark, compact nuclei and scant cytoplasm. These cells tend to be disposed in sieve-like (cribriform) patterns. The spaces between the tumor cells are often filled with a hyaline material thought to represent excess basement membrane.