***Salivary gland tumors***

First, the doctor made a revision about salivary glands and their basic anatomy (it was a quick one so I advise you to study these information from the previous lecture).

-We have two types of salivary glands: major and minor.

-The major salivary glands come in pairs and they are:parotid, submandibular and sublingual.

-*Parotid gland*

It’s located in the retromandibular area bounded superiorly by TMJ. Posteriorly by base of skull, stylomastoid process, stylomastoid foramen, posterior belly of digastric. Medially there are vascular (external carotid artery, branches of internal maxillary artery and network of veins) and muscular structures.

Since its function is secretomotor so it’s innervated by parasympathetic nerve supply that comes from auriculotemporal nerve from otic ganglion at the base of skull.

Its secretion is mainly serous.

-*Submandibular gland*

It’s located in the submandibular space bounded superficially by skin, platysma, deep cervical fascia. From the inside we have mylohyoid muscle and inner surface of body of the mandible.

Parasympathetic nerve supply from chorda tympani, a branch of facial nerve.

*-Sublingual gland*

It’s the only one that it’s not capsulated and it’s located underneath the mucous membrane in the floor of the mouth bilaterally and it has multiple ducts.

It has mixed secretion just like the submandibular gland.

*-Minor salivary glands*

Roughly from 600-1000 and located in many areas in the oropharyngeal and respiratory airway.

*-Embryology*

Parotid gland: pouching of the ectoderm into mesenchymal tissues forming ducts, acini, myoepithelial cells. Usually have some lymphatic structures around it come from mesenchyme.

Sublingual mainly from endoderm and wherever you have connective tissue it comes from mesenchyme.

***Why*** do we get tumors in salivary glands??

It’s not really understood why, but we have some theories that relate them to tobacco (e.g. Warthin tumor) other theories relate them to genetic mutation (mainly P53).

-Roughly speaking , to remember, most tumors ( around 75-80%) affect major salivary gland and 75% of these tumors affect parotid gland and 75% of parotid tumors are pleomorphic adenoma(benign).

-another rule easy to remember is the smaller the gland the more the chance that it will be malignant so if the patient has minor salivary gland (MSG) tumor , most probably its bad news while if he has a parotid gland tumor then he is lucky.

The percentage of malignancy:

Parotid gland around 15%

Submandibular gland has a higher percentage

Sublingual and MSG around 50%

Now we will start with benign salivary gland tumors

***a) pleomorphic adenoma***

-it’s called “pleomorphic “because histologically it has different cells(mixed cell origin).

-usually it’s a slowly growing tumor that mainly affects the parotid.

-an important characteristic is that it has *incomplete capsule* and this is important for two reasons:

1) It makes the surgical procedure more difficult because we can leave tumor tissue behindresulting in recurrences.So we cannot just remove the tumor itself, insteadwe go for superficial parotidectomy (removal of the whole superficial lobe which includes the tumor inside).

2) Having incomplete capsule prevents us from taking open biopsies as that could rupture the capsule with seeding of tumor cells to other places like skin.

-Note: incomplete capsule means it’s not a thick tough capsule easy to identify surgically which increases the possibility of recurrence.

-malignant transformation is possible but rare.

-The doctor then showed a picture and described it as follows: a clinical photograph showing the maxilla for a full dentate patient and we can see swelling on right side of the maxilla extending from premolar area to the junction of hard and soft palate,almost reach the midline and covered by mucosa of a normal color.

What do you think the differential diagnosis??

1) Inflammatory lesion: unlikely but possible (problem in one of the teeth that causes abscess in the palate).

2) Could be cystic lesion (dentigerous, keratocyst)

3) Bony exostosis

4) Tumors like pleomorphic adenoma

***Warthin tumor***

-It’s the 2nd most common tumor happens almost exclusively in the parotid.

-Bilateral, related to smoking.

- Patient with autoimmune disease, decreased immunity, or previous radiotherapy has increased risk of having salivary gland tumor.

***Management of salivary gland tumor***

a) Full history and examination

We should know the characteristic of the lesion: rate of enlarging, does it have symptoms or not and is pain related to eating or drinking (which usually indicates functional problem in parotid like sialolithiasis).

If the lesion is isolated,painless, its size doesn’t change and it’s not related to drinking or eating usually it’s neoplastic.

b) Presentation

-in the parotid gland the tumor mainly affect the tail of the gland while in submandibular gland usually its diffuse swelling in the gland itself. In sublingual gland usually there is elevation in the floor of the mouth and the tongue becomes elevated.

-MSG: isolated discrete swelling. If it affects the nasal cavity the patient will complain of obstructed nasal passage. And if it affects the parapharyngeal wall the airway will be affected and the complain will be non-efficient respiration.

-if the tumor is malignant how the presentation will differ?

a) Possibility of neural symptoms (like if the patient complains of facial nerve palsy you should suspect malignancy).

b) Painand deep fixation in malignancy. The pain isn’t necessarily from the tumor itself but because of invasion to adjacent structure that may cause hemorrhage or suppuration causing pain.

c)The overlying skin/ mucosa are usually ulcerated/ abnormal while in the case of a benign tumor they are normal.

d) Time frame of malignant tumors is narrow “faster growth”.

Malignant tumor in parotid gland: there will be a lump that extends externally with redness of skin (it could be penetrated in some cases) and it might go medially and invade structures like parapharyngeal wall in addition to enlarging intraorally. It might go up to TMJ.

c) Investigation

MSG: excisional biopsy.

Major salivary gland:

-proper imaging (CT, MRI) which gives a good idea about size and location of tumor.

-FNA (fine needle aspiration) core biopsy: we take certain cells from the tumor and it helps us to know the type of tumor without the need for open biopsy (which is contraindicated as we said earlier).

Note: biopsy for major salivary gland is actually a superficial parotidectomy.

* Complications of salivary gland surgery:

Complications are related to the site, we should worry the patient before starting the surgery   
**1.Facial nerve** (Motor) is very important.   
Facial nerve trunk supplies some muscles (posterior belly of digastric, stylohyoid muscles…) the it gives two divisions; upper and lower, the lower one gives: cervical, marginal mandibular and buccal. The upper one gives zygomatic and temporal.   
So any of these branches could be involved, the most important thing here is to tell the patient that he might have weakness at the angle of the mouth, second, he might have problem in eye closure, leading to eye dryness, ulcer, Keratoconjunctivitis. Buccal and cervical branches don’t result in serious complications.

Even in benign tumors, we dissect the superficial gland, we have to see the nerve, touch it, and isolate it from the gland, so the possibility in weakness in any of these branches is high.

<>Facial nerve symptoms differ according to the site of damage, if peripherally; the specific branch will be affected. If centrally; only the lower part will be affected because of decussation.  
usually in surgery, we might induce lower motor-neuron lesion<>

**2. Salivary fistula:**   
the surgeon might induce rupture in the salivary gland tissue, leading to leak of saliva. Treated by excise and close.

**3. Mucocele:** Retention of saliva and swelling formation.

**4. Frey’s syndrome:**Sweating and redness when the patient is eating instead of salivation.  
How?? O.o

Acetylcholine is the neurotransmitter in the parasympathetic system and Adrenaline is the one in the sympathetic system. Sweat gland is activated by the sympathetic system, theoretically; when the surgeon did the incision, he induce connection between the sympathetic nerve fiber of sweat gland and the salivary tissue, so when the patient eats, the parasympathetic impulse (releasing Acetycholine) is connected to the sweat gland, induce sweating because the acetylcholine is the only neurotransmitter responsible for activation of sweat gland.

Management of these patients either by anti-prespirent, douderant and one of the good treatment modality is the Botox, since it works on Acetylcholine receptors so it might suppress the function of sweat gland.

**\*\*Malignant Tumors:**

They are rare; the most common one is mucoepidermoid carcinoma.

Perinural invasion -Alarming sign:O- the malignant cells can travel through the nerve sheath reaching distant area like the brain, so the removal of the tumor itself with safety margin is not enough.  
30% of those tumors presented with nerve involvement (facial nerve), this doesn’t mean that every malignant tumor must have nerve involvement.

They are growing rapidly, have deep fixation, invading deep muscles and all structures around it,

Overlying skin may have redness and ulceration

A 70 year patient presented with very huge tumor in the palate for about 10 years, this is an indication of benign tumor.

\*\*Protocols for treatment:  
-Surgery

-Radiotherapy

-Combined; surgery and radiotherapy

-Chemotherapy

~~Case 1:

A patient presented with a large swelling in the floor of the mouth, MRI was taken: coronal section showing radiopaque mass involving the sublingual gland ( In MRI the bony structures appeared black and the soft tissue appeared white), they took a biopsy and it was a malignant tumor( we can take a biopsy here since it’s intraorally), Removal of this tumor with safety margin and neck dissection.  
**Important structures:**

@~Intraoral approach we can see **the lingual nerve,** descending from the ganglia, attached to the submandibual gland, goes outside the oral cavity from underneath and then it goes up and lateral to the tongue and supplies the floor of the mouth and the tongue.

((It runs deep to the lateral pterygoid muscle parallel to the inferior alveolar nerve, lying anterior and medial to it. It then runs between the internal and medial pterygoid muscles and passes obliquely over the superior pharyngeal constrictor and styloglossus muscles before approaching the side of the tongue.))\*\*Medscape.com \*\*

@~**Submandibularduct** it is attached to the submandibular gland, it goes inside the mouth, gives many branches connected to the sublingual gland and opens in the floor of the mouth, so here we have to isolate the duct from the sublingual tissue.

When doing neck dissection we also remove the submandibular gland, because there are mant lymph nodes attached to it.

Histological appearance: low grade tumor, no evidence of perinural invasion.

Follow of of 7 years with no recurrence.

~~Case 2:

A patient presented with isolated lump in front of the ear, near the parotid gland, redness of the skin and elevation of the ear. He visited many doctors, treated with antifungals…. And one of the doctor excise the lump extraorally!!!

MRI was taken, showing a lump inside the parotid gland, the patient needed superficial parodectomy. External incision (Y-type) around the ear, going down to the neck, elevation of the skin, removes the gland and identify the facial nerve branches.

Post-operative pictures: the patient can smile ‘’no drooping at the angle of the mouth’’ and eye closure is normal.

~~Case 3:

A patient presented with a lump in the cheek and has limitation in mouth opening, affecting the minor salivary gland. We took a biopsy and it was adenoid cystic carcinoma –Malignant tumor may have perinural invasion--, limitation in mouth opening means involving the masticatory muscles. lymph node involvement and metastatic in the neck.

The tumor involved a good thickness of the cheek and it was stage 4, so we have to remove it with safety margin 4-5cm, we have to remove all of the skin and mucosa of the cheek, posteriorly, we have to remove from the ramus and parts of the maxilla, and also we need neck dissection.

The patient refused to remove the skin of the cheek. The best approach is extraorally is weber ferguson, elevate the face, reach the tumor and remove it, leave the skin of the cheek, neck dissection. In the reconstruction we rotate the temporalis muscle with its blood supply and we suture it with the cheek, the patient lived for 7 years and he died due to recurrence.

~~Case 4:

A patient with huge lump inside the submandibular gland, we remove it before 2years and it reoccurs a year ago and we remove it totally.