

SALIVARY GLAND TUMORS

Dr. Louis Jordaan

Moderator : Dr. S. Clifford

INTRODUCTION:

The salivary glands are divided into the major salivary glands :

- parotid
- submandibular
- sublingual

and the minor salivary glands :

- several thousand glands distributed through the upper aerodigestive tract :
 - Mouth
 - Lips
 - Cheeks
 - Hard and soft palate
 - Uvula
 - Floor of mouth
 - Tongue
 - Peritonsillar region
 - Nasopharynx
 - Paranasal sinuses
 - Larynx
 - Trachea
 - Bronchi
 - Lacrimal glands

PATHOLOGY :

A variety of site-specific systemic diseases affect the salivary glands :

Disease Category :

Inflammatory disease

Disease Entity :

Actinomycosis
Acute Bacterial sialoadenitis
Cat scratch disease
Mumps
Tuberculosis
Kusskaul's disease
Sialolithiasis
Sjogren's disease
Stricture

Obstructive salivary disease

Neoplasia

Benign tumors

Mixed tumor (Pleomorphic adenoma)
Monomorphic adenomas
Oncocytoma

Malignant tumors

Whartins's tumor
Acinic cell carcinoma
Adenocarcinoma

Adenoidcystic carcinoma
Malignant mixed tumor
Mucoepidermoid carcinoma
Squamous cell carcinoma
Undifferentiated carcinoma

According to Way :

- Tumors of the salivary glands constitute about 5% of head and neck tumors
- Affect major salivary gland 5X more often than minor glands
- Incidence of malignancy vary inversely with the size of the gland :
 - Parotid – 15%
 - Submandibular – 50%
 - Minor salivary – 90%
- Since 70% of tumors arise in the parotid gland and 85% of these are benign, the majority of salivary gland tumors are benign

According to Greenfield :

- 80% of salivary gland tumors arise in the parotid gland
- 10-15% in submandibular gland
- The remaining in the sublingual and in minor salivary glands
- 80% of parotid tumors are benign
- 50% of sublingual tumors are benign
- Less than 40% of minor salivary gland tumors are benign

Malignancies are often asymptomatic but signs and symptoms of malignancy include rapid enlargement, pain, trismus and facial or other cranial nerve paralyses.

DIFFERENTIAL DIAGNOSIS OF PAROTID SWELLING :

- Parotitis
- Primary parotid tumor
- Tumor of the tail of the submandibular gland
- Upper jugular chain lymph node
- Branchial cleft cyst
- Epithelial inclusion cyst
- Mesenchymal tumor

BENIGN MIXED TUMOR OR PLEOMORPHIC ADENOMA

- Accounts for 70% of parotid and 50% of salivary gland tumors
- Women > Men
- Peak incidence 5th decade of life
- Slow growing, lobular, smooth, well defined capsule
- Histologically have incomplete encapsulation with pseudopod extension beyond the apparent borders of the mass
- High recurrence rate if removed by enucleation alone.
- Appropriate surgery involves removal of tumor with surrounding margin of normal gland.

- Malignant transformation rare (Malignant mixed tumor)

WARTIN'S TUMOR OR PAPILLARY CYSTADENOMA LYMPHOMATOSUM

- Accounts for about 5% of parotid tumors
- Cystic in appearance
- Occurs in men
- Fourth to seventh decades of life
- Almost exclusively in parotid
- Bilateral in 10%
- Histology : papillary-cystic pattern with marked lymphoid component
- Treatment include superficial parotidectomy, similar to pleomorphic adenoma

ONCOCYTOMAS

- Large oxyphilic cells called oncocytes
- Cytoplasm packed with mitochondria

MONOMORPHIC TUMORS

- Rare
- Usually epithelial but occasionally mioepithelial
- Mostly seen in minor salivary glands of the lip

MUCOEPIDERMOID CARCINOMA

- Most common parotid Ca
- Histology : epidermoid and mucus cells
- Classified as : high grade, intermediate grade or low grade cancers
- High grade –
 - highly aggressive, local recurrence rate of 60%
 - Regional metastases in 50%
 - Distant metastases in 30%
 - Treatment : total parotidectomy, neck dissection and postoperative radiotherapy
 - 5-year survival : 50%

ACINAR CELL CARCINOMA

- Derived from serous acinar cells
- Found almost exclusively in parotid gland

ADENOID CYSTIC CARCINOMA

- Most common malignancy of submandibular gland, second most common of parotid gland
- Accounts for 58% of malignant submandibular and minor salivary gland tumors and 12% of parotid tumors
- Great propensity for perineural spread, local recurrence and distal metastases
- Management : radical resection sacrificing nerves only if directly invaded and postoperative radiotherapy

- Despite aggressive management still develop regional and distal metastases in 40% over 10-20 year course

DIAGNOSIS

- FNA 95% sensitivity
- Most cases a local excision biopsy with a margin of normal tissue is the appropriate management
- For submandibular tumors the entire gland is removed
- For minor salivary gland tumors however an incision biopsy is recommended with more definitive treatment planned accordingly

PRIMARY TUMOR STAGING OF SALIVARY GLAND TUMORS

STAGE	DESCRIPTION
T1	Tumor \leq 2cm in greatest dimension without extraparenchymal extension
T2	Tumor more than 2cm but \leq 4cm in greatest dimension without extraparenchymal extension
T3	Tumor $>$ 4cm and/or having extraparenchymal extension
T4a	Tumor invades skin, mandible, ear canal, and/or facial nerve
T4b	Tumor invades skull base and/or pterygoid plates and/or encases carotid artery

TREATMENT PRINCIPLES

- Benign salivary gland tumors are excised
- Parotid surgery requires a preauricular incision carried onto the neck to allow adequate exposure of the gland and facial nerve
- The minimum adequate operation is superficial parotidectomy, however malignant tumors warrant total parotidectomy
- For deep parotid tumors, the superficial parotid is removed, the nerve dissected out and lifted, then the deeper part is removed
- The facial nerve is only sacrificed only for direct tumor invasion or for preexisting facial paralysis
- If the facial nerve must be divided it should be repaired if it was functioning normally preoperatively, using a graft e.g. greater auricular or sural nerves
- Patients with high grade tumors should undergo elective neck dissection in case of absence of clinical neck disease or radical neck dissection for palpable lymphadenopathy
- Postoperative radiotherapy is indicated for all high-grade tumors; close margins; recurrent disease; skin, bone, nerve, or extra parotid involvement; positive nodes or irresectable disease

PAROTID SURGERY : ANATOMY

The parotid gland lies beneath the skin in front of and below the ear, contained within the deep fascia of the neck, called locally the parotid fascia. The relationships are :

- Anterior : Masseter Muscle, ramus of mandible, internal pterygoid muscle

- Posterior : Mastoid process, sternocleidomastoid muscle
- Superior : External auditory meatus, temporomandibular joint
- Inferior : Sternocleidomastoid muscle, posterior belly of the digastric muscle
- Medial : Investing layer of deep cervical fascia, styloid process, internal jugular vein, internal carotid artery, pharyngeal wall

From the anterior edge of the gland, the parotid or “Stenson’s” duct passes lateral to masseter muscle and turns medial at the anterior margin of the muscle to pierce the buccinator muscle

STRUCTURES TRAVERSING THE GLAND :

FASCIAL NERVE :

The main trunk of the facial nerve enters the parotid gland about 1 cm from its emergence from the skull through the stylomastoid foramen about midway between the angle of the mandible and the cartilaginous ear canal. After about 1cm after entering the gland it divides into its 5 branches :

- Temporal
- Zygomatic
- Buccal
- Mandibular
- Cervical

In most individuals an initial bifurcation forms an upper temporofascial and a lower cervicofascial branch

ARTERIES

The external carotid artery enters the inferior surface of the gland and divides into the maxillary and the superficial temporal arteries which also gives off the transverse facial artery. These branches emerge separately from the superior or anterior surface of the parotid gland

VEINS

The superficial temporal vein enters the superior surface of the gland and receives the middle temporal vein to become the posterior facial vein. Within the gland it then divides and the posterior branch joins the posterior auricular vein to form the external jugular vein, while the anterior branch emerges from the gland to enter the common facial vein.

REMEMBER : The nerve is superficial, the artery is deep and the vein lies in the middle.

GREAT AURICULAR NERVE

It follows the course of the external jugular vein and is normally sacrificed during parotidectomy resulting in numbness in the preauricular region, the lower auricle and the ear lobe. This normally disappears after 4-6 months.

AURICULOTEMPORAL NERVE

A branch of the mandibular nerve, it traverses the upper part of the parotid gland and emerges with the superficial temporal blood vessels from the posterior surface of the gland. Within the gland it communicates with the facial nerve.

Injury causes “Frey syndrome” where the skin anterior to the ear sweats during eating.

PAROTIDECTOMY : TECHNIQUE

STEP 1 : Skin incision :

- Inverted T : Vertical preauricular incision 3mm in front of ear with downward curved extension at the posterior angle of the mandible. Transverse curved incision 3 cm below the mandible with posterior extension close to the mastoid.
- Or
- Modified Y : Vertical pre- and postauricular incisions which unite at the angle of the mandible and extending into a “Y” again 3cm below the mandible.

STEP 2 : Formation of skin flaps. The great auricular nerve and the posterior facial vein is sacrificed during this step

STEP 3 : Facial nerve identification

- Place the distal phalanx of the left index finger on the mastoid, pointing to the patient’s eye
- Carefully incise the parotid fascia and mobilize the superficial part of the parotid
- Use a mosquito and bluntly dissect between the mastoid and the gland
- The stem of the nerve is found at a depth of about 0.5 cm. Electrical stimulation can be used to confirm identification of the nerve.
- Using a mosquito and upward traction, dissect the superficial part off the nerve
- Identify all 5 branches

STEP 4 : Resection of the superficial lobe

STEP 5 : Resection of the deep lobe, keeping the following in mind

- Pterygoid venous plexus
- External carotid artery
- Maxillary nerve
- Superficial temporal nerve
- Posterior facial vein

All these should be ligated. Bleeding from the pterygoid plexus should be stopped with pressure, DO NOT go deep. The deep lobe is removed with the piecemeal technique.

SUBMANDIBULAR GLAND : ANATOMY

Lies within the submandibular triangle formed by the inferior margin of the mandible and the two bellies of the digastric muscle. For the surgeon the anatomy is best described in four layers:

- Roof of the triangle :
Skin, superficial fascia enclosing the platysma and fat, mandibular and cervical branches of the facial nerve
- Contents of the triangle :
From superficial to deep : Anterior and posterior facial vein, that joins at the angle of the mandible to form the common facial vein; part of the facial (external maxillary) artery; superficial part of the submandibular gland; submental branch

of the facial artery; superficial layer of the submaxillary fascia; the lymph nodes; the deep layer of the submaxillary fascia; and the hypoglossal nerve.

- Floor of the mandible :
From superficial to deep : Mylohyoid muscle and its nerve, hyoglossus muscle; middle pharyngeal constrictor muscle covering the lower part of the superior constrictor muscle, and part of the styloglossus muscle

- Basement of the triangle :
Deep portion of the submandibular gland; the submandibular (Wharton's) duct; the lingual nerve; the sublingual artery; sublingual vein; the sublingual gland, the hypoglossal nerve and the sublingual ganglion. The submandibular duct lies below the lingual nerve, except where the nerve passes under it, and above the hypoglossal nerve

SUBMANDIBULAR SURGERY : TECHNIQUE

INCISION : Transverse incision 3 cm below the lower border of the mandible. Incise the superficial fascia from the anterior border of the sternocleidomastoid muscle to 2-3cm from the midline.

REMEMBER : The 2 branches of the facial nerve (mandibular and cervical) are under the platysma and the deep fascia of the gland. The marginal branch of the facial nerve is normally superficial to the facial veins. There are lymph nodes outside the capsule of the gland close to the vessels which should be preserved in benign disease.

STEP 2 : Ligate the facial vessels

STEP 3 : Separate inferiorly the gland from the digastric muscle with a mosquito.

The hypoglossal nerve is located very close to the digastric tendon and is accompanied by the lingual vein and deeper, by the external maxillary artery, both of which are ligated carefully.

The mylohyoid muscle is elevated to expose the deep part of the gland.

STEP 4 : Ligate and cut Wharton's duct, protecting the lingual nerve.

Continue blunt dissection

STEP 5 : Insert a drain and close in layers.

PROGNOSIS

- Depends on the stage, histological grade, site, patient's age and the adequacy or surgical removal
- Cancer stage is most important factor followed by histologic grade
- Low-grade cancers usually present as stage I and II and have an excellent prognosis with a 10 year survival of up to 80%
- Stage III and IV however only 30%

RESOURCES :

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