

Parotid Tumors and Cosmetic Reconstruction of post-removal defects

Ruthann Lipman, DO
ENT Specialists of NW PA

Objectives

- Recognize the presentation and management of common parotid disorders/neoplasms
- Review the surgical complications of parotid surgery
- Cosmetic reconstruction of parotid post-removal defects

Anatomy of Parotid

- Paired glands located in pre-auricular region that secrete mainly serous saliva
- Stensen's duct runs 1.5 cm below the zygoma and opens into the mouth opposite the second upper molar
- Divided into a superficial and deep lobe by the facial nerve

5 Major Functions of Saliva

1. Lubrication of food
2. Buffering capacity
3. Maintain tooth integrity
4. Antibacterial
5. Aid in taste/digestion

Saliva

- Triggers of saliva production are mastication and gustatory stimuli
- Humans secrete about 1 liter of saliva/day
- Consistency and protein content vary depending upon the gland that produces it.
- Antimicrobial proteins include secretory IgA
- Excretory functions include viruses (HIV) and inorganic elements (lead)
- Cystic fibrosis patients have thicker saliva and decreased flow rates

Viral Illnesses

- Mumps - viral, peak incidence age 4-6. Incubation period of 2-3 weeks. Headache, fever, malaise and myalgia may precede parotid swelling.
- Testing: urine (isolate the virus 6 days prior to swelling and for 13 days after parotid swelling begins). Antibodies to mumps S, V and hemagglutination antigen.
- Complications: sudden deafness, pancreatitis, meningitis, orchitis. Post-mumps diabetes is due to Islet Cell antibodies.

Viral Illnesses

- Other viral diseases: CMV, coxsackie virus, influenza A, lymphocytic choriomeningitis virus

Acute Suppurative Sialadenitis

- 30-40% in post-operative patients. Most commonly on 3-7th post-op day in patients between age 60-70. Secondary to salivary stasis, dehydration, poor oral hygiene. Predisposing factors are strictures or stones.
- Classic presentation: sudden, diffuse gland swelling with induration and tenderness. Pus may be seen at duct opening.
- Treatment: hydration, gland massage, improved oral hygiene, IV antibiotics (penicillinase-resistant anti-staph coverage), consider surgical I&D if not improved after 48 hours. Mortality rate of 20%

Chronic Sialadenitis

- Etiology is thought to be a lowered secretion rate with salivary stasis. May be a continuation of recurrent parotitis of childhood. Permanent damage may be done to the gland by an acute infection.
- Exam shows enlargement of the gland with scant saliva.
- Treatment: sialogogues, massage, antibiotics for acute flares

Recurrent Parotitis of Childhood

- Infancy to age 12; more common in boys
- Presentation: sudden, unilateral or bilateral parotid swelling with no obvious cause
- Generally not ill, mild pain

Benign Lymphoepithelial Lesions

- May occur as a result of chronic sialadenitis
- Presentation: asymptomatic enlargement of the gland with no infection.
- May be associated with HIV infection
- May transform over time into lymphoproliferative disease, carcinoma, lymphoma, pseudolymphoma

Primary Tuberculosis of Salivary Gland

- Uncommon
- Thought to be secondary to focus of infection in the tonsils or teeth
- Acute inflammatory lesion or chronic lesion
- PPD may be negative (*Mycobacterium*)
- Treated medically or with surgical excision

Sarcoidosis

- Unknown etiology, diagnosis of exclusion. Salivary gland is involved in 1/3 of cases. Noncaseating granulomas on lip biopsy. Angiotensin converting enzyme (ACE) levels can help monitor the disease.
- Uveoparotid fever (Heerfordt syndrome) - uveitis, parotid swelling and facial paralysis. Prodrome of fever, malaise, weakness for days-weeks. Parotitis may last months-years. Treat symptomatically, steroids acutely for facial paralysis

Sjogren Syndrome

- Lymphocyte-mediated destruction of exocrine glands leading to xerostomia and keratoconjunctivitis sicca. Second most common autoimmune disorder. 90% of patients are adult women (average 50). Biopsy of minor salivary gland shows heavy lymphocytic infiltration in 70-95% of cases.
- Symptoms of burning oral discomfort, sandy sensation in the eye, +/- salivary gland swelling (in 80% of primary Sjogrens, 30% of secondary). Treat xerostomia (gums, mouthwashes, sprays)
- Primary (exocrine glands alone) or secondary (exocrine glands + another autoimmune disease - usually Rheumatoid arthritis)
- Increased incidence of non-Hodgkin's lymphoma (44X)

Sialolithiasis

- 75% are single calculi. Most common in middle age males. Gout may predispose.
- 90% in parotid are radiolucent, 90% in submandibular are radiopaque.
- Transoral removal is possible if close to orifice or in some areas of duct. If in hilum, may require gland removal
- Sialoendoscopy (up to 2.7 mm diameter scopes with working channels, baskets, balloons). Scope is introduced into the natural opening of the duct that has been dilated.
- Lithotripsy - stone is located by ultrasound. 3+ sessions may be required. Residual pieces of stone can be removed by sialoendoscopy

Cystic Lesions

- 2-5% of parotid lesions. May be acquired or congenital (dermoid cyst, branchial cleft cyst).
- Acquired - associated with benign lymphoepithelial lesions, trauma, parotitis, calculi, duct obstruction, mucus cyst, HIV, neoplasms

Endocrine and Metabolic Conditions with Gland Enlargement

- Obesity, Malnutrition, Alcoholic cirrhosis, Celiac disease, Pregnancy, Lactation, Hypothyroidism etc...

Medications that can cause gland enlargement

- Isoproterenol, Ethambutol, Phenbutazone, Iodine compounds, Heavy metals

Neoplasms

Etiologic factors for salivary neoplasms

- Tobacco - Warthin tumor
- Epstein-Barr virus - undifferentiated CA
- Low-dose radiation - pleomorphic adenoma, mucoepidermoid carcinoma
- Wood/silica dust exposure

History

- Usually present with asymptomatic mass
- Benign tumors commonly present in the parotid tail
- Pain is unusual for benign tumors but can be secondary to infection, hemorrhage or cyst enlargement. Malignant tumors - pain indicates neural involvement.

History

- Dysphagia or changes in speech may indicate involvement of the parapharyngeal space. May be first noted on routine exam.
- Signs of malignancy include facial palsy, pain, lymphadenopathy, rapid growth, fixation to surrounding tissue, trismus and skin involvement.

Exam

- Size, location, mobility of the mass.
- Tenderness
- Facial nerve function (paralysis raises suspicion for malignancy)

Fine Needle Aspiration Biopsy

- Simple and accurate. Helps obtain a definitive diagnosis to help with preoperative planning.
- Some argue that it will not change management, may delay the treatment, may not be diagnostic...

Radiology

- CT and MRI cannot differentiate between benign and malignant lesions. Both provide similar information for surgical planning.
- Useful for recurrent or malignant tumors, large neoplasms, suspected parapharyngeal involvement (periparotid fat pad separates the deep lobe of parotid from parapharyngeal space), suspected carotid artery involvement.
- Ultrasound gives less information about the deep lobe. Commonly used in Europe and Japan

Diagnostic surgery

- Avoid surgical biopsy. Excision or enucleation of parotid masses is associated with high rates of recurrence.
- Proper approach is complete surgical resection with identification and preservation of the facial nerve.
- Open biopsy is rare. Reserved for patients who are not surgical candidates and have an obvious malignancy - helps direct palliative treatment

Differential Diagnosis

- Normal anatomic structures can be confused for salivary gland tumors (masseter muscle, transverse process of C1, process of mandible)
- Inflammatory disease, nutritional deficiencies, infections, cysts
- Metastatic cutaneous malignancies (squamous cell CA, melanoma)
- Infraclavicular tumor metastasis (lung, kidney, breast, colorectal CA)

Staging

- T1 - <2cm; not extraparenchymal
- T2 - >2cm but <4cm; not extraparenchymal
- T3 - >4cm and/or extraparenchymal
- T4a - invades skin, mandible, ear canal, facial nerve
- T4b - invades skull base, pterygoid plates, encases carotid artery

Regional Nodes

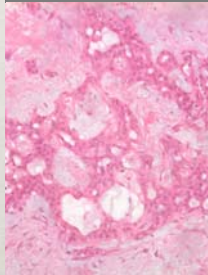
- N1 - single, ipsilateral node 3 cm or less
- N2a - single, ipsilateral node 3-6 cm
- N2b - multiple ipsilateral nodes <6cm
- N2c - bilateral or contralateral nodes <6cm
- N3 - node >6cm

Staging

- Stage 1 - T1
- Stage 2 - T2
- Stage 3 - T1-2 with N1, T3 N0 or N1
- Stage 4a - T1-4a, N2
- Stage 4b - T4b, any N3 (>6cm node)
- Stage 4c - metastasis

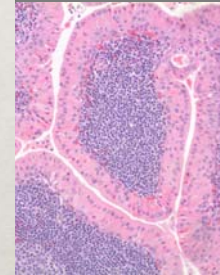
Pleomorphic Adenoma

- Benign mixed tumor
- 65% of salivary gland tumors. Excise with a cuff of normal gland surrounding tumor.
- Smooth and lobular with well-defined capsule. Epithelial and mesenchymal. May have pseudopod extensions.
- Can metastasize yet remain histologically benign (bone, lymph nodes, lung, oral cavity, pharynx, skin, sinuses, liver, kidney, CNS, calvarium, retroperitoneum)



Warthin Tumor

- Papillary cystadenoma lymphomatosum 6-10% of parotid tumors. Older men, smokers. Multicentric in 20%, bilateral in 10%.
- Smooth with well-defined capsule. Multiple cystic spaces with thick, mucinous material.
- Surgical excision, recurrence is rare



Benign Neoplasms

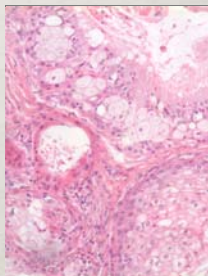
- **Oncocytoma** - <1% of parotid neoplasms. Male=female.
- Firm, rubbery, non-cystic tumors with brown, granular eosinophilic cells
- Malignant degeneration is possible (rare)
- Excision

Benign Neoplasms

- **Monomorphic adenoma** - many different types (basal cell, clear cell, glycogen rich)
- Well-circumscribed and encapsulated tumor.
- Basal cell variant can be confused with adenoid cystic carcinoma (may be the malignant counterpart)
- Excision

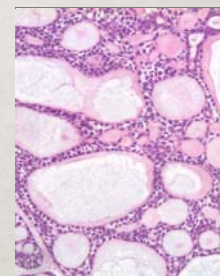
Mucoepidermoid Carcinoma

- Most common malignancy of parotid.
- Low grade and high grade tumors (high grade behave more like squamous cell CA. Aggressive, metastatic).
- Treatment depends on size and subtype - small, low grade tumors: excise...if clear margins, no XRT. High grade tumors need excision +/- elective neck dissection - high rate of occult neck nodes. XRT may improve local control and survival.



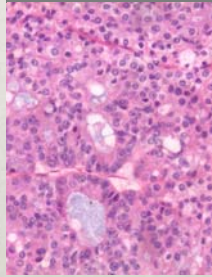
Adenoid Cystic Carcinoma

- Second most common malignancy of parotid. May present with facial paralysis and pain.
- Slow-growing, relentless tumor. Multiple local recurrences despite adequate surgery. Metastasis to lungs and bone are frequent. Perineural invasion is typical.
- Monolobular, partially encapsulated tumor with infiltration into surrounding tissue. Solid type has worse prognosis.
- Excision + XRT. Long-term follow up is necessary



Acinic Cell Carcinoma

- Females > males in 40-60's. Multicentric in 2-5%, may be bilateral.
- Well-circumscribed tumor with fibrous capsule.
- Surgical excision. Consider XRT for tumors with facial nerve involvement, metastatic neck disease and skin involvement. Elective neck dissection for high grade tumors.



Malignant Neoplasm

- **Adenocarcinoma** - more common in minor salivary glands.
 - Aggressive behavior with strong tendency to recur and metastasize.
 - Firm, hard mass attached to surrounding tissue. Graded by degree of glandular formation. Differentiated from mucoepidermoid carcinoma by lack of keratin staining

Malignant Neoplasm

- **Carcinoma ex-pleomorphic adenoma** - develops from a pre-existing or recurrent pleomorphic adenoma (epithelial component)
 - Firm tumor with minimal encapsulation. Widely infiltrative with regions of necrosis and hemorrhage. Neurovascular invasion.
 - Local and distant metastasis are common. Poor prognosis.
 - Excision and XRT

Malignant Neoplasm

- **Squamous cell carcinoma** - rarely occur in salivary glands. Need to exclude contiguous spread, metastasis or high grade mucoepidermoid CA.
 - Firm, indurated masses. More common in males in 70's.
 - High incidence of regional and distant metastasis
 - Excision + XRT

Malignant Neoplasm

- **Undifferentiated carcinoma** - closely related to Epstein-Barr virus. High incidence among Inuit Eskimos of Greenland. Rare.
 - Extremely aggressive with local invasion and early distant metastasis.
 - Excision + XRT

Malignant Neoplasm

- **Sarcoma** - Rare. More common in men. Present as an enlarging, painless mass.
 - Rhabdomyosarcoma and fibrosarcoma are most common types.
 - Need to rule out metastatic spread from another location or local soft tissue spread.
 - Prognosis correlates with tumor size, type and degree of differentiation.

Malignant Neoplasm

- **Lymphoma** - rare. To diagnose, you need to rule out extrasalivary lymphoma, have proof that the tumor involves the salivary parenchyma (not a lymph node within the gland), and have architectural and cytologic confirmation of the malignant nature of the lesion.

Parotidectomy

- Typically a pre-auricular incision, around ear lobule and into a neck crease. May use a modified facelift incision.
- Expose main trunk of facial nerve and follow peripherally into gland to safely remove tumor
- Total parotidectomy involves removing parotid tissue superficial and deep to the facial nerve.



Traditional Modified Blair Incision

Early Surgical Complications

- Facial nerve paralysis (partial or complete, permanent or temporary) - 10-30% have temporary paralysis of at least 1 branch. Permanent <3%. Use facial nerve monitoring intraoperatively.
- Bleeding
- Infection
- Skin flap necrosis
- Trismus
- Sialocele
- Seroma

Late Surgical Complications

- Frey syndrome - gustatory sweating or dermal flush with salivary stimulation in 30-60% of patients, 10% are symptomatic
- Recurrent tumor
- Poor cosmesis
- Soft tissue deficit
- Hypertrophic scar/keloid

Gustatory Sweating (Frey's Syndrome)

- Abberant reinnervation of cholinergic sympathetic sweat glands in the skin with exposed post-ganglionic fibers of the auriculotemporal (V3) nerve (stimulates secretion). With eating or stimulation of salivary flow, these patients have facial sweating.
- Treated with topical anticholinergic creams/patches, grafts under the skin, tympanic nerve section (carry preganglionic parasympathetic fibers to otic ganglion), intradermal injection of Botox

Cosmetic Reconstruction of post-parotidectomy defects

- An effort to reduce the late complications of poor cosmesis from placement of the incision, soft tissue deficit after tumor removal, and reduce the incidence of Frey Syndrome.
- Technique involves a modified facelift incision with a myofascial split thickness sternocleidomastoid muscle flap to fill in the soft tissue defect.

30 year post-op picture

Modified facelift incision with scm flap



Intraop photo

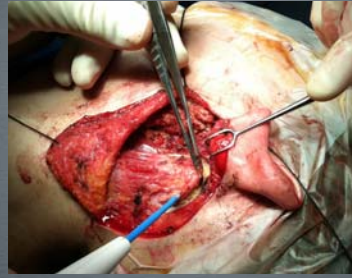
modified facelift incision



Flap Design



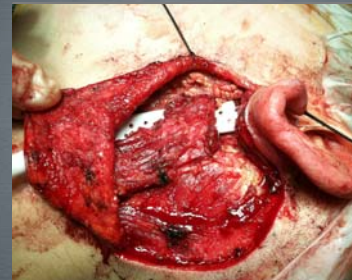
Tumor Removal



SCM Flap Construction



Flap Measurement



Flap Secured



Post-operative

References

- Bailey BJ, Johnson JT: Head and Neck Surgery - Otolaryngology 4th edition. Philadelphia, PA, Lippincott Williams & Wilkins, 2006.
- Alper CM, Myers EN, Eibling DE: Decision Making in Ear, Nose and Throat Disorders. Philadelphia, PA, WB Saunders, 2001.
- Bugis SP, Young JE, Archibald SD. Sternocleidomastoid flap following parotidectomy. Head and Neck. 1990; 12(5):430-5.
- Filho WQ, Deditis RA, Rappaport A, Guimaraes AV. Sternocleidomastoid muscle flap preventing Frey syndrome following parotidectomy. World J Surg. 2004; 28(4): 361-4.
- Liu H, Yisong L, Dai X. Modified face-lift approach combined with superficially anterior and superior-based sternocleidomastoid muscle flap in total parotidectomy. Oral Surg Oral Med Oral Pathol Oral Radiol. 2011 Aug 23. E-article.