Treatment of Parotid Salivary Gland Tumors

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The diagnosis of a salivary gland neoplasm must be strongly considered in any patient who presents with a swelling in the area of the parotid even if the swelling has been present for years. When the swelling is intermittent, associated with discomfort, and a purulent discharge from Stenson's Duct a much rarer inflammatory process is most likely. In adults, 80% of parotid tumors are benign. In children with a parotid swelling not due to mumps, hemangiomas and embryonal rhabdomyosarcomas are more common than salivary gland neoplasms. In children only 50% of parotid tumors are benign and the most common malignant tumor is mucoepidermoid carcinoma.

In the painting by Robert Hinckley of Dr. Morton giving ether anaesthesia at Massachusetts General Hospital, Dr. John Collins Warren is depicted removing a tumor from the left parotid area. This was reported in a letter to the Boston Medical and Surgical Journal in December of 1846. The operation took 30 minutes and although Dr. Warren called the lesion a tumor of the neck it may well have been a parotid salivary gland tumor.

The etiology of parotid tumors is usually unknown. However, a radiation history is occasionally found. In a well known article in Lancet in February 1974 11,000 children had immigrated to Israel from North Africa and other countries of the Mideast. All received irradiation to the scalp because of a high incidence of ringworm. The children were followed for 12 to 23 years and a marked increase incidence of brain, thyroid and parotid tumors was found. The incidence of salivary gland tumors was markedly increased in survivors of Hiroshima and Nagasaki 12 to 25 years later as reported by the Atomic Bomb Casuality Commission in Cancer of Feb. 1975. In the same journal in October 1963 a report of parotid tumors in Eskimos noted a 30 time increase in incidence as compared with that of the neighboring

white population. These tumors were often poorly differentiated. Repeated dental x-rays in children and young adults have been suspect but I am unaware of any study that documents a relationship to development of salivary gland tumors.

The parotid salivary gland is the site of salivary neoplasms in 70% of cases with the submandibular, sublingual, minor salivary glands and lachrymal glands being the primary site in the remaining cases.

The pathologic classification of salivary gland tumors is unique and in no other organ system does the pathologic type so influence prognosis and treatment. The most frequent types are listed below.

Histologic Classification of Salivary Gland Neoplasms

Benign
- Pleomorphic Adenoma (Benign Mixed Tumor)
- Warthin's Tumor - Papillary Cystadenoma Lymphmatosium
- Oncocytoma
- Benign Lympheopithelial Lesion
- Monomorphic Adenoma
  - Sebaceous Gland or Basal Cell Adenomas

Malignant
- Malignant Mixed Tumor
- Muceopidermoid Carcinomas
- Adenoid Cystic Carcinoma
- Acinic Cell Carcinoma
- Squamous Cell Carcinoma
- Adenocarcinoma

Pleomorphic adenomas account for about 90% of the benign tumors. These lesions have a pseudocapsule and should not be enucleated as growth occurs by pseudopods extending into the false capsule. If enucleated, recurrence rates of 40% or more can be expected. A recurrence rate of less than 4% occurs when the tumors are removed with normal parotid tissue on all sides of the lesion.

Almost all Warthin's Tumors occur in the Parotid Gland. The typical presentation is an asymptomatic mass in the region of the tail of the parotid in an elderly male. 15% of these lesions are multicentric and 10 to 15% may be bilateral. All other salivary gland tumors are unicentric and never bilateral.

Benign Lymphoepithial lesions are seen in Sicca Syndrome, rheumatoid arthritis

and AIDS patients.

Monomorphic Adenomas have recently been recognized and they have not been followed long enough to know what implications their histiology has. It is thought that they will act the same as pleomorphic adenomas.

The malignant mixed tumor is the malignant variant of the pleomorphic adenoma. It's clinical presentation is often that of a benign tumor and it usually is not high grade or high stage.

Mucoepidermoid carcinomas comprise about 20% of parotid tumors and may be a low,intermediate or high grade tumor. The grade correlates well with clinical behavior. Low grade tumors are almost 100% curable while high grade tumors have a 5 year cure rate of only 10 to 15% and are usually high stage as well.

Adenoid Cystic Carcinoma accounts for about 12% of malignant parotid tumors. It was first described by Theodore Billroth in 1859 and called a cylindroma. It is an insidious tumor in that it is histologically benign appearing, but rarely curable when followed for 10 to 20 years. There is frequent nerve invasion and perineural spread well beyond its gross margins. Vascular permeation may be seen and hematogenous metastases are eventually common. The tumor rarely metastasizes to lymph nodes.

Acinic Cell Carcinoma occurs almost exclusively in the parotid gland where it accounts for 10-15% of malignant tumors. A clear cell variant could be mistaken for a metastatic renal cell carcinoma. Prognosis is usually good but there is a rare papillocystic variety that is very virulent with a 5 year survival of only 20% and a 10 year survival of 0%.

Squamous Cell Carcinomas are very rare and usually present with a high stage and have a poor prognosis.

Adenocarcinoma comprises about 10% of malignant salivary gland tumors that cannot be classified in a more defineable way. They are often of high stage when first diagnosed.

The following is a breakdown of the distribution of 1968 consecutive parotid tumors seen at Memorial Sloan-Kettering.

Parotid Tumors	
Benign	1342
Malignant	626
Mucoepidermoid Ca	272
Malignant Mixed Tumor	107
Acinic Cell Ca	75
Adenocarcinoma	62
Adenoid Cystic Ca	54
Squamous Cell Ca	48
Anaplastic	8

Benign tumors are often present for a long time with no appreciable change. A malignant salivary gland tumor will often have a period of rapid growth in a previously quiescent tumor. One should consider that the tumor is very likely to be malignant if there is associated pain, tenderness, and or weakness or paralysis of the facial nerve or one of its branches. Malignant tumors may be stoney hard, relatively fixed and may infiltrate the overlying skin. However, some malignant tumors present as a well circumscribed, asymptomatic, freely moveable mass that has been present with out change for many months. This is often the presentation of low grade mucoepidermoid tumors, acinic cell carcinomas, adenoid cystic carcinomas and malignant mixed tumors.

Sialography is more useful in showing duct stenosis or sialectasis in a case of chronic parotitis than it is in evaluating the benign or malignant nature of a parotid tumor. CT scans may be helpful in evaluating advanced tumors or the rare parotid tumor that arises from the deep portion of the gland and presents as a large sub-mucosal oro-pharyngeal tumor. A Warthin's Tumor will show up as a hot nodule when radioisotopes scanning with Technetium 99M is done. Fine needle aspiration biopsy is done by some but not advised as it is difficult for the pathologist to give a definitive diagnosis on the scant material. Needle biopsy material can be definitive for a Warthin's Tumor.

Benign lesions and most T1 or T2 lesions can be removed with a conventional superficial parotidectomy with facial nerve preservation. 80% or more of the tumors

are in a plane above the nerve trunk and its branches. The operation should begin with posterior exposure of the facial nerve trunk as it exits the stylomastoid foramen. The operator may in rare instances have to identify the main trunk by tracing a peripheral branch posteriorly. A superficial parotidectomy is similar to doing a thyroid lobectomy for removal of a cold nodule. An incisional biopsy is not done. The tumor with normal parotid tissue on all its aspects is submitted for frozen section. The superficial lobectomy becomes the definitive procedure for benign lesions and a near total parotidectomy with nerve preservation is usually completed when a malignant diagnosis is reported. The chances for neuropraxia can be lessened by avoiding the use of a cautery near the facial nerve trunk or its branches and minimizing stretching of the nerve as much as possible with gentle traction. If neuropraxia occurs post-operatively, functional return is assured if the nerve trunk is intact. If the main trunk or one or more of the branches of the facial nerve is found to be infiltrated by the tumor at the time of operation do not hesitate to sacrifice all or part of the nerve to obtain a safe margin of excision. Many times a nerve graft is feasible when this is done. The concept of a radical operation when indicated by histologic type or operative findings should dwell less on routine sacrifice of the facial nerve, which often can be avoided in part by preserving the branches to the eyelids for example, and more on a wide removal of the involved tissues such as the masseter muscle, a portion of the mandible, or external ear canal. A radical neck dissection is added for obvious metastases, to facilitate resection of large primaries or recurrent tumors and for high grade mucoepidermoid and squamous cell carcinomas. Post-operative x-ray therapy is given for high grade and high stage tumors and for most adenoid cystic carcinomas because of extensive perineural spread.

Adjuvant chemotherapy has not been helpful and responses of recurrent and metastatic salivary gland tumors to various chemotherapy agents has been anecdotal

at best. Complete surgical resection is essential and there is no salvage possible with x-ray therapy with inadequate resections. For all malignant salivary gland tumors stage determines prognosis. Follow-up for all tumors benign and malignant should be at least 10 years and 20 years for adenoid cystic carcinoma.

A small number of parotid tumors arise from the deep portion of the gland and extend through the gap between the ramus of the mandible and the stylomandibular ligament to enter the parapharyngeal space and present as large submucosal oro-pharyngeal tumors that displace the soft palate and tonsillar area toward the midline. These dumbell tumors should not be removed by the oral route as certain rupture will occur and injury to the facial nerve is very possible. They are readily removed with the usual parotidectomy incision and with division of the stylomandibular ligament after the facial nerve trunk and branches are identified and preserved. Fortunately most of these tumors are benign pleomorphic adenomas.

An overall 20 year survival rate of malignant parotid salivary gland tumors is listed below.

Acinic Cell Ca	78%
Mucoepidermoid Ca	68%
Adenocarcinoma	45%
Malignant Mixed Tumor	40%
Adenoid Cystic Ca	33%
Squamous Cell Ca	33%

Although these overall percentages for a 20 year follow-up are quite acceptable, lesions that were of high stage (i.e. Stage III and Stage IV) and or high grade have a uniformly poor survival whatever the histologic classification may be. The exception is Adenoid Cystic carcinoma where the Stage is important in predicting survival but where all histologic grades have the same 20 year survival.

The clinical staging of salivary gland malignant lesions is unique in that each T classification is subdivided into T1-4A or T1-4B. The (A) denotes without significant local extension and the (B) denotes significant local extension defined as clinical or macroscopic evidence of tumor involvement of skin, soft tissues, bone or the facial

nerve. Lesions with the (B) subset are in a higher stage than the same sized tumor without significant local extension. This is most important for prognosis of salivary gland tumors since Stage is the single most predictive element.

I hope that I have been able to remind you of the long tradition general surgeons have had in treating tumors of the parotid salivary gland and I hope we continue to pass this on to our residents and not allow the treatment of these lesions to become a victim of further fragmentation of general surgery.

1987 - Robert D. Harwick, M.D.
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