



E-ISSN: 2616-3470  
P-ISSN: 2616-3462  
© Surgery Science  
www.surgeryscience.com  
2020; 4(1): 94-97  
Received: 24-11-2019  
Accepted: 28-12-2019

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## Management of salivary gland tumours at a tertiary care hospital

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**DOI:** <https://doi.org/10.33545/surgery.2020.v4.i1b.319>

### Abstract

Endogenous hormones have been reported in normal and neoplastic salivary glands, but some of the results have been conflicting. Estrogen receptors were found in nearly 80% of normal glands in males and females and four out of eight salivary tumours in women had estrogen receptor levels similar to those of “hormonally dependent” breast carcinomas. However, more recent studies have not confirmed this finding and questioned the methodology. Estrogen receptors have been reported in a minority of cases of acinic cell carcinoma, mucoepidermoid carcinoma and salivary duct carcinoma, but were not detected in adenoid cystic carcinoma. Estrogen or estrogen receptors have been reported in pleomorphic adenomas in some studies, but in others, estrogen receptors were absent. Progesterone receptors have been reported in normal salivary gland. After evaluation of the tumor by clinical examination and specific investigations, a surgical plan was formulated. The final decision was taken per operatively by the surgeon. The specimen was sent for HPE. Overall pleomorphic adenoma, constitute 80% of all salivary gland tumours. In parotid it constitutes 77.77% of all tumours occurring in parotid gland. Among malignant tumours squamous cell carcinoma constitute 5% and myoepithelial tumour constitutes 5% of all tumours occurring in salivary glands. One HPR was normal accounting for 5% and one was haemangioma.

**Keywords:** Management, salivary gland tumours, HPE

### Introduction

A number of viruses have been implicated in the pathogenesis of salivary gland tumours. There is a strong association between Epstein Barr virus (EBV) and lymphoepithelial carcinomas but this appears to be largely restricted to Asian patients. EBV has not been convincingly shown in other salivary gland carcinomas or neighbouring normal gland. A recent study did not support an etiological role for EBV or cytomegalovirus in benign parotid tumours. SV40 sequences have been demonstrated in human pleomorphic adenomas but there is no convincing association between human salivary gland tumours and other viruses, including polyoma virus and papilloma virus [1].

There is compelling evidence implicating exposure to ionizing radiation and the development of salivary gland tumours. Long term follow-up studies of the survivors of the atomic bomb explosions in Hiroshima and Nagasaki show an increased relative risk of 3.5 for benign, and 11 for malignant salivary neoplasms. The risk was directly related to the level of exposure to ionizing radiation. There was a high frequency of both mucoepidermoid carcinomas and Warthin tumours in these patients. Therapeutic radiation, particularly of the head and neck region, has been linked with a significantly increased risk of developing salivary gland cancers.

There appears to be a risk from iodine 131 used in the treatment of thyroid disease, as the isotope is also concentrated in the salivary glands. There is evidence that exposure to routine dental radiographs is associated with an increased risk of salivary gland carcinoma. Exposure to ultraviolet radiation has also been implicated. There appears to be no excess risk in those exposed to radon, or the microwaves of cellular telephones [2].

It has been shown that workers in a variety of industries have an increased incidence of salivary gland carcinomas. These include rubber manufacturing, exposure to metal in the plumbing industry and nickel compounds, woodworking in the automobile industry and employment in hairdressing and beauty shops. An increased risk of salivary gland cancers was reported in people living in certain Quebec counties where asbestos was mined, and the risk was inversely proportional to the distance from the mines [3].

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No association was found between tobacco use and alcohol consumption and salivary gland cancers in a case/control study, confirming previous findings. One study showed an elevated risk in men but not women. However, there is a strong association between smoking and Warthin tumour (Section on Warthin tumour). Exposure to silica dust and kerosene as a cooking fluid increased the risk of developing salivary malignancy in a Chinese population, and a higher level of risk of parotid carcinomas was associated with exposure to nickel, chromium, asbestos and cement dust in a European study. An increased level of risk has been postulated in those with a high cholesterol intake [4].

Endogenous hormones have been reported in normal and neoplastic salivary glands, but some of the results have been conflicting. Estrogen receptors were found in nearly 80% of normal glands in males and females and four out of eight salivary tumours in women had estrogen receptor levels similar to those of "hormonally dependent" breast carcinomas.

However, more recent studies have not confirmed this finding and questioned the methodology. Estrogen receptors have been reported in a minority of cases of acinic cell carcinoma, mucoepidermoid carcinoma and salivary duct carcinoma, but were not detected in adenoid cystic carcinoma. Estrogen or estrogen receptors have been reported in pleomorphic adenomas in some studies, but in others, estrogen receptors were absent. Progesterone receptors have been reported in normal salivary glands [5].

They have been detected in a minority of pleomorphic adenomas but high levels of expression were reported in recurrent pleomorphic adenomas and this was thought to be a prognostic factor. However, a recent study failed to show progesterone receptors in all the benign salivary tumours examined. Progesterone receptors were seen in 2/10 acinic cell carcinomas and 3/10 mucoepidermoid carcinomas but were not detected in salivary duct carcinoma. They have been reported in adenoid cystic carcinomas in some studies but in others they were absent, or present in only a few tumours. Androgen receptors are present in over 90% of salivary duct carcinomas.

A recent study showed immunoreactivity for androgen receptors in all their cases of salivary duct carcinoma, carcinoma ex pleomorphic adenoma and basal cell adenocarcinoma. There was also staining for the receptors in a fifth of their cases of acinic cell carcinoma, mucoepidermoid carcinoma and adenoid cystic carcinoma [6].

First sialography was reported in 1904. It is possible only in parotid and submandibular gland because of the presence of a single duct of adequate size. It is used to evaluate calculi, obstructive disease, inflammatory lesions, penetrating lesions. The changes that may be seen in inflammatory process include saccular dilatation of terminal ducts and acini, segmental strictures and dilatation and pseudocyst.

Sialography is also helpful in assessing penetrating trauma. It also demonstrate occlusion of a duct, salivary cutaneous fistula or salivary oral fistula or a sialocele. Displacement of gland by hematoma also be demonstrated. Sialography can differentiate between intrinsic and extrinsic masses. Information can be obtained concerning size and location of the mass, whether benign and malignant.

In general benign neoplasm are encapsulated with displacement of stretched ducts around a circumscribed filling defect in the parenchyma of the gland. Malignant tumours are infiltrative producing an irregular defect with duct distortion and pooling of contrast media. MR and digital Substraction Sialography used

for ductal salivary gland disorder.

Imaging is definitely helpful in large tumours or with suspected malignancy, for better evaluation of the tumour's third dimension and relationship to the surrounding structures. Imaging may also detect other features suggestive of malignancy (e.g. central necrosis, infiltration of adjacent structures), as well as the presence of suspicious cervical lymphadenopathy [4].

Imaging is also important in cases of deep lobe tumours. Both computed tomography (CT) and magnetic resonance imaging (MRI) may be used. MRI affords better definition between the tumour and surrounding parotid tissue.

Proponents of fine needle aspiration cytology argue that it has a high accuracy rate (80-98 per cent). However, it should be borne in mind that reports of the accuracy of parotid aspirates may be misleading. This is because most parotid lumps are pleomorphic adenomas; hence, as long as most aspirates are reported as being consistent with this diagnosis, then the specificity and sensitivity for the diagnosis of pleomorphic adenoma is always going to be quite high [6].

On the other hand, fine needle aspiration cytology may fail to diagnose a sizeable proportion of malignancies. A review of data from the College of American Pathologists Interlaboratory Comparison Program reported 32 per cent of malignant salivary lesions to be falsely reported as benign.

### Methodology

All patients admitted were evaluated by documenting the history, thorough clinical examination, routine laboratory investigations and specific investigations. In history, importance was given to presenting complaints, duration of lump, rapid increased in size, associated symptoms of facial nerve involvement, previous surgical treatment or any medical problem.

Regarding physical examination, particulars mentioned in the proforma was noted. Importance was given to the site, extent of the tumor, deep lobe enlargement and fixity to the surrounding structures, nerve involvement and regional lymphadenopathy. Associated medical conditions like diabetes, hypertension, and anemia were managed and controlled before surgery with physician's advice.

As a part of general work up for surgery in all patients, hemoglobin level, bleeding time, clotting time, urine, sugar albumin, microscopy, chest screening. ECG, Blood urea, Serum creatinine, RBS was estimated. Specific investigations like FNAC, were done for all patients in the study group.

After evaluation of the tumor by clinical examination and specific investigations, a surgical plan was formulated. The final decision was taken per operatively by the surgeon. The specimen was sent for HPE.

Appropriate antibiotics and analgesics are administered post operatively for all cases. Drainage tube was removed on 3rd day and sutures on 7th day. The adjuvant treatment was decided depending on the final HPE report. Different modalities of treatment adopted in this study are

1. Surgery alone
2. Surgery and postoperative radiotherapy

The follow up period of these patients ranged from 3 months to 1 year. All patients were asked for follow up after 15 days of surgery then every month for first year then every 3 month in second year, to detect morbidity and recurrence. Long term follow up is necessary to study the tumor recurrence, which was not possible in this study.

**Results**

**Table 1:** Types of surgical treatment adopted in the study

Procedure	No. of cases	Percentage
Superficial parotidectomy	17	85
Total Conservative parotidectomy	1	5
Radical parotidectomy	0	0
Total excision	2	10
Total	20	100

Superficial parotidectomy was performed in 85% of cases. Total conservative parotidectomy was performed in 5%, total excision in 10% of all cases.

**Table 2:** Complication following surgery

Complication	Benign tumors	Malignant tumors
Facial palsy	Temporary	0
	Permanent	0
Wound infection	0	0
Fistula	1	0
Frey's syndrome	1	0
Recurrence	0	0

Postoperatively 4 patients developed facial palsy. All had temporary facial palsy. One patient developed fistula. One patient developed Frey's syndrome.

**Table 3:** Frequency of cases diagnosed in FNAC

Tumor	FNAC (+) ve		FNAC (-)ve	
	No.	%	No.	%
Benign	16	94.11	2	11.76
Malignant	1	50	1	50

The exact cytohistological correlation was 94.11% for benign tumours and 50% for malignant tumours.

**Table 4:** Clinical examination in diagnosis of salivary gland

Diagnosis	Clinical examination	HPE
Benign	19	16
Malignant	1	2

Sensitivity  $\approx$ 94.44% for detecting malignancy  
 Specificity  $\approx$ 88.88% for diagnosing malignancy  
 Positive predictive value  $\approx$ 84.47% for diagnosing malignancy  
 Negative predictive value  $\approx$ 94.11% for diagnosing malignancy

**Table 5:** Distribution of various types of salivary gland tumors

Tumor	No. of Cases	% of total
Pleomorphic adenoma	16	80
Mucoepidermoid carcinoma	0	0
Warthin's tumour	0	0
Adenoid cystic carcinoma	0	0
Epithelial myoepithelial carcinoma	1	5
Squamous cell carcinoma	1	5
Normal study	1	5
Haemangioma	1	5
Total	20	100

Overall pleomorphic adenoma, constitute 80% of all salivary gland tumours. In parotid it constitute 77.77% of all tumours occurring in parotid gland.

Among malignant tumours squamous cell carcinoma constitute 5% and myoepithelial tumour constitutes 5% of all tumours occurring in salivary glands. One HPR was normal accounting for 5% and one was haemangioma.

**Discussion**

**Table 6:** Frequency of Diagnostic accuracy of FNAC in various studies

Series	Benign (%)	Malignant (%)
Spiro RH [7]	98	93
Present study	94.11	50

Diagnostic accuracy of FNAC is comparable to Spiro RH. And Amit H Studies for benign tumours.

**Table 7:** Comparison of various types of surgery in parotid gland tumors

Surgery	Nitin M. et al. [8]	Present study
Superficial parotidectomy	19	17
Total conservative parotidectomy	3	1
Radical parotidectomy	1	0
Wide Excision	12	2

Superficial parotidectomy is the commonest surgery done.

**Table 8:** Frequency of salivary gland tumors in various studies Series

Series	A Renehan et al. [9]	A.V Jones et al. [10]	Present study
PA	64.9%	44%	80%
BCA	1.2%	5%	0
WT	13.3%	4.6%	0
MEC	3.1%	11.5%	0
AdCC	6.2%	8.4%	0
SCC	1.2%	0.1%	5%
CA Ex PA	0	3.2%	0
ACC	1.8%	2.6%	0
EMC	0.08%	0.4%	5%

In the present study PA is the most common benign tumour. These findings were similar to the previous studies.

**Table 9:** Frequency of postoperative complications in various studies

Complication	Shashinder S et al. [11]	Present study
Facial palsy (temporary/permanent)	35%/4%	21%/0%
Salivary fistula	-	5.26%
Wound infection	5%	-
Frey's syndrome	-	5.26%
Hematoma	1.31%	-

Temporary facial nerve complication was the commonest complication in the both studies Salivary gland swellings are less often encountered in surgical practice. The diagnosis of salivary neoplasm must be considered in any patient who presents with salivary gland swelling. Salivary gland swellings most commonly occurs in second and seventh decade.

Most of the salivary gland tumours occur in females. Most of the salivary gland tumours arise in parotid gland. Most of them are benign and most of the benign tumours are pleomorphic adenoma.

Swelling is the commonest symptom of salivary gland tumours. In submandibular gland most of the tumours are benign. Most of the malignant tumours presented with pain. Most of the benign tumours exhibit a slow growth pattern and malignant tumours exhibit a rapid growth pattern.

The fact that the mass has been present for several years is no guarantee that it is benign. FNAC is a good tool in diagnosing salivary gland tumours. By clinical examination only can be missed some malignancy [12].

Surgery is the mainstay of treatment of salivary gland tumours

and superficial parotidectomy is the most commonly performed surgery for benign parotid tumours. Most important complication of parotid surgery is facial palsy. In facial palsy temporary facial palsy is the one encountered most.

Long term follow-up is necessary as pleomorphic adenomas tend to recur after long time. Since the most common malignant tumours are asymptomatic and long standing benign tumours especially pleomorphic adenoma can undergo malignant change, community awareness, early detection and earliest referral from primary health care set up to tertiary centres are necessary to lessen the disease burden of mankind.

### Conclusion

- FNAC is a good tool in diagnosing salivary gland with exact cytohistological 94.11% for benign tumours and 50% for malignant tumours.
- Regarding accuracy of clinical examination in diagnosing salivary gland malignancies, the sensitivity is 94.44%, specificity is 88.88%, positive predictive value is 84.47%, negative predictive value is 94.11%.
- Pleomorphic adenoma constitute about 80% of all salivary gland tumours. In parotid it constituted 77.77% of all tumours occurring in parotid gland. Among malignant tumours squamous cell carcinoma constitutes 5% and myoepithelial carcinoma constitutes 5% of all tumours occurring in salivary glands. One HPR was normal and one was hemangioma.
- The overall prognosis was fare for all kinds of major salivary gland tumours including benign and malignant tumours. Surgery offered the curative mode of treatment in benign and malignant tumours.

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