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## Fine needle aspiration cytology in management of chronic salivary gland swellings

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### Abstract

Neoplasms of salivary gland are an interesting diverse group of tumours. They form a fascinating subject for the head and neck surgeons. The relative infrequency combined with considerable histological and behavioral diversities and their regional anatomic relationship make them unusually interesting and challenging. The material of the study was obtained from 129 patients who underwent fine needle aspiration of the salivary glands during the period of two years. The smears were collected in the cytology laboratory. Medical College hospital. The clinical details were collected directly from the patients. The study confines itself to patients above the age of 12 years. The FNAC smear of the case diagnosed as carcinoma in pleomorphic adenoma showed large cell clusters having pleomorphism and vesicular nuclei with prominent nucleoli. The FNAC smear of the case diagnosed as chronic sialadenitis showed a cluster of lymphocytes and polymorphs.

**Keywords:** Fine needle aspiration cytology, Management, Chronic salivary gland swellings

### Introduction

The salivary gland possesses a number of diagnostic and therapeutic problems due to its varied presentation, biological activity. One to Three cases of salivary gland swelling are admitted in our institution per week. Histopathological analysis had been revolutionized by the introduction of Fine needle aspiration cytology.

Now FNAC has replaced open biopsy because it is more acceptable to the patient surgeon and the pathologist. It is very easy, reliable and it has low morbidity, low cost, low incidence of complications<sup>[1]</sup>.

Neoplasms of salivary gland are an interesting diverse group of tumours. They form a fascinating subject for the head and neck surgeons. The relative infrequency combined with considerable histological and behavioral diversities and their regional anatomic relationship make them unusually interesting and challenging.

Diagnostic difficulties and anatomic relations complicate the management. Surgery is the prime mode of treatment. Radiation and Chemotherapy play a significant role in the control and palliation of malignant tumours of the salivary glands. Hence a definite pre-operative diagnosis will help the surgeon to plan the management of the patient more effectively.

The credibility of FNAC depends on the technique of obtaining smears and accuracy of interpretation. The former requires special skills and the latter depends on the experience of the cytopathologist<sup>[2]</sup>.

Salivary gland tumours comprise less than 3% of all neoplasms of head and neck region and no more than 1% of all neoplasms. Approximately 80-85% of all salivary gland neoplasms occurs in the parotid gland. Although 80% of these are considered benign, earlier reports indicated a high recurrence rate after limited excision. This has led to a more aggressive approach to the treatment of these lesions in the recent years in the form of either subtotal or total conservative parotidectomy with excellent results.

The present study is an attempt to assess the diagnostic accuracy of FNAC and its role in changing the treatment of salivary gland lesions seen in patients at Medical College Hospital, Trivandrum.

The word parotid is derived from two Greek words meaning "near the ear". Probably the earliest record of a carcinoma of the parotid is represented by a stone gargoyle now in the Trocadero museum in Paris.

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At the turn of the past century, in spite of their characteristically rather pronounced variation in histological appearance, all salivary gland tumours were simplistically separated only into "infiltrating" and "encapsulated" types. Serious attempts at clinico-pathological correlation were not made until the late 1940s and early 1950s. This delay was occasioned by a combination of the relative rarity of these tumours and by a policy of expectant treatment for the tumours [3].

The situation remained essentially static till the 5th decade of this century when improvement of surgical technique, better anaesthesia, transfusion services and the advent of antibiotics revived the role of surgery for both benign and malignant tumours of the salivary gland. In the last 30 years considerable progress has been made in the management of parotid tumours with the advent of better investigation like FNAC and CT scan and proper surgical technique [4].

**Methodology**

The material of the study was obtained from 129 patients who underwent fine needle aspiration of the salivary glands during the period of two years. The smears were collected in the cytology laboratory. Medical College hospital. The clinical details were collected directly from the patients. The study confines itself to patients above the age of 12 years.

The instruments for aspiration consisted of a 10 ml disposable syringe filled with a 22 G. or 23 G. needle. The skin at the site was wiped with an antiseptic and the suspected salivary gland swelling was held with one hand in a factorable position. No anaesthesia was used. The needle was introduced into the swelling and the plunger of the syringe withdrawn as far as possible creating a vacuum in the system. The needle was moved back and forth in a straight line to obtain sufficient material. Throughout the procedure negative pressure was maintained by retracting the plunger of the syringe. When the aspiration was complete the pressure in the syringe was allowed to equalize before the needle was withdrawn. The syringe was disconnected from the needle, filled with air and reconnected. The contents were expressed onto a glass slide and spread along the slide with the needle itself.

The smears with benign ductual and acinar cells in a background of polymorphs or lymphocytes or histocytes. The diagnosis of acute sialadenitis was consider when polymorphs were predominant and of chronic sialadenitis when monoucler cells were predominant.

**Pleomorphic Adenoma**

Smears with a biphasic population of cells-tightly cohesive flat clusters of cells with tubular and irregular configurations. The cells have eosinophilic cytoplasm and round regular uniform nuclei with inconspicuous nucleoli. Small cluster of cells with abundant cytoplasm and eccentric vesicular nuclei (plasma cytoid cells) may also be present. the background shows plumps ovoid cells or spindle cells with scanty cytoplasm and nuclei with bland appearance in fibrillary chondromyxoids ground substance.

**Warthin's Tumour**

Cellular smear showing sheets of oncocytic cells. The background shows amorphous and granular debris with sheets of lymphocytes. Oncocytic cells have plenty of organophilic cytoplasm and central regular small round nucleus.

**Monomorphic Adenoma**

Cellular smears with cells arranged in cohesive clusters. Cells are uniform with eosinophilic cytoplasm and round central nucleus. The background shows bare nuclei.

**Adenoid Cystic Carcinoma**

Smears showing abundant globules of pale grey translucent material surrounded by cells arranged in a palisade manner. Individual cells have scanty cytoplasm and round or oval nucleus with fine to granular chromatin and occasional prominent nucleoli.

**Mucoepidermoid Casrcinoma**

Cellular smear showing squamous cells, glandular cells, overlapping epithelial cells and intermediate cells. Intermediate cells have moderate nuclear; cytoplasmic ratio, without readily identifiable Keratin production.

The clusters of overlapping cells are fragments of epithelium that are multilayered and have nuclei that overlap each other.

**Acinic Cell Carcinoma**

Cellular smear showing cells in aggregates and acinar structure. Individual cells show abundant foamy or granular cytoplasm. Nuclei have moderately coarse chromatin and prominent nucleoli. Bere nuclei may be seen. Central fibro vascular core is sometimes present

**Inadequate**

A scanty cellular smear or drying artifacts making interpretation difficult or unreliable.

**Results**

**Table 1:** Age sex Distribution

AGE	Male	Female
12-20	9	3
21-30	10	13
31-40	15	14
41-50	13	08
51-60	16	09
61-70	12	04
71-80	03	0
Total	78	51

**Table 2:** FNAC of 102 patients who underwent surgery

Fnac Diagnosis.	No. of cases	% of total
Chronic sialadenitis	25	24.5
Pleomorphic adenoma	31	30.4
Warthin's tumour	12	11.8
Monomorphic adsenoma	2	1.9
Mucoepidermoid tumour	10	9.8
Acinic cell carcinoma	2	1.9
Squamous cell carcinoma	2	1.9
Inconclusive.	18	17.8
Total.	102	100

The postoperative histopathological report collected from the department of pathology revealed the following data. Surgery was done in 102 cases who have a preoperative FNAC diagnosis.

**Table 3:** FNAC of 129 patients who underwent FNAC testing

FNAC	No of cases	% of Total
Chronic sialadenitis	33	25.58
Pleomorphic adenoma	37	28.68
Worthies tumour	16	12.41
Monomorphic adenoma	2	1.55
Muco epidermal	13	10.07
Cinic cell	2	1.55
Squamous cell	2	1.55
Inconclusive	24	18.61
Total	129	100

The postoperative histopathological report collected from the department of pathology revealed the following data. Among 129 patients 102 under went surgery, 18 were treated consideration didn't came for follow up.

**Table 4:** Chronic Sialadenitis On Fnac, With Corresponding Histopathologic Reports

Histopathology	No. of cases	Percentage.
Chronic sialadenitis	22	88
Reactive lymphnode	3	12
TOTAL	25	100

All the 3 cases misdiagnosed as chronic sialadenitis on FNAC showed sheets of lymphocytes in a dirty background. The following table shows the analysis of 34 cases diagnosed histologically as Pleomorphic adenoma, with reference to the corresponding FNAC results.

**Table 5:** Pleomorphic Adenoma on Histopathologycorresponding Fnac Reports

FNAC	No. of cases	Percentage.
Pleomorphic adenoma	29	85.29
Inconclusive	5	14.7
TOTAL	34	100

The smears of all 29 cases diagnosed correctly as pleomorphic adenoma on FNAC were cellular and showed a biphasic population of tightly cohesive flat clusters of cells with tubular and irregular configurations. The cluster of cells were with eosinophilic cytoplasm and regular uniform nuclei. Plasma cystoid cells were also present. The back ground showed stellate cells or spindle cells in a chondromyxoid background with bare nuclei.

The 31 cases diagnosed as pleomorphic adenoma on FNAC are analysed against the histopathological report.

**Table 6:** Pleomoeptic Adenoma on Fnac: Their Corresponding Histopathology

Histological Type.	No. Of Cases	. Percentage
Pleomorphic adenoma	28	90.33
Chronic sialoadenitis	1	3.23
Carcinoma in pleomorphic adenoma	2	6.44
Total	31	100

The FNAC smear of the case diagnosed as carcinoma in pleomorphic adenoma showed large cell clusters having pleomorphism and vesicular nuclei with prominent nucleoli. The FNAC smear of the case diagnosed as chronic sialadenitis showed a cluster or lymphocytes and polymorphs. 10 cases were diagnosed as mucoepidermoid tumour on FNAC.

**Table 7:** Mucoepidermoid on Fnac; Corresponding Histopathology

Histopathology	No. of cases	Percentage
Mucoepidermo id	8	80
Chronic Sialadenitis	2	20
Total.	10	100

The FNAC smear of the cases of mucoepidermoid tumour showed squamous calls, glandular cells, intermediate cells and over lapping epithelial cells.

**Table 8:** Warthins Tumour On Histopathology; Corresponding Fnac Report

Fnac Report.	No. Of Cases	Percentage
Warthin"s tumour	10	83.33
Inconclusive	2	16.66
Total	12	100

**Table 9:** Inconclusive; Corresponding Fnac Report

Histologic type	No of cases
Lipoma	2
Mucoepidermal tumour	2
C/c siladilitis	13
degenerated cyst	1
Total	18

18 cases were reported as inconclusive on histopathology; they are analysed against their FNAC report as follows:-

Among the 102 histologic critical cases, the FNAC result of 18 were inconclusive of the two cases of acinic cello tumour one was diagnosed on FNAC. The smear showed cluster of cells with basophilic granular cytoplasm and central nucleus with nucleoli. In the other one, the aspiration smear was inadequate. Among the 102 histologically confirmed cases, the FNAC results of 18 were inadequate.

**Discussion**

A localized salivary gland swelling may be indicative of inflammation, cysts, a benign or malignant tumour. The history and clinical findings provide some clues to reach a diagnosis. A diagnosis is of great value in deciding up on the mode of treatment whether surgery or radiotherapy or chemotherapy. The clinical feature of the benign tumors had definite bearing on the final histopathological type and therefore a reliable guide for the preoperative diagnosis and treatment of parotid tumours. But for malignant tumours clinical has got a definite role in the preoperative diagnosis and thereby the treatment of malignant parotid tumours [5].

The sensitivity and diagnostic accuracy of FNAC varies in different centers based on the expertise of the cytopathologist and the techniques employed. In 1970 Enroth and Zajicek in their study had a sensitivity of 64%. In this study the, sensitivity for diagnosing malignancy was 62.5%. Sismarius *et al.* in their study, had a sensitivity of 85% and a diagnostic accuracy of 92%. David *et al.* 14 in 1992 did his study in a major contributions to this field is from the Stockholm group who have since 1964 published a series of papers. Their cytological accuracy has improved over the last few years.

FNAC is very much useful in the diagnosis of clinically unsuspected or clinically questionable salivary gland tumours. With the application of FNAC, it is possible to differentiate between tumours of lower pole of parotid gland and upper deep cervical lymphnodes or bronchiogenic cysts. Enlargement of submandibular salivary gland is possible to differentiate from

enlarged submandibular lymphnodes. It also help to differentiate between inflammatory conditions and salivary gland tumours [6]. The prime role of FNAC, is as a diagnostic tool that help in the evaluation of salivary gland masses and not as a histologic procedure on which operative decisions can be wholly based on. Other diagnostic modalities which help to differentiate between benign and malignant salivary gland tumours include sialography, CT scan and CT sialography. But these modalities are expensive.

The danger of seeding of tumour cells in the needle tract or in the puncture site remains a matter of concern. Engzell *et al.* found no recurrence involving the skin or the site of fine needle aspiration. Frable also did not find any implantation in his study series. Dissemination of tumour cells by vascular channels is a potential danger. But practically it is not seen [7].

Before 1963 the diagnostic accuracy of FNAC for malignant tumours was only 31%. The earlier workers found it difficult to diagnose adenolymphoma by FNAC. Nuclear atypia common in oncocytes was considered as evidence of malignancy. The presence of bare nuclei and foamy or granular cytoplasm characteristic of acinic cell tumours should not be confused with oncocytomas.

The cellular atypia seen in the cytological smear of pleomorphic adenoma should be observed with caution. Only when, the smear contains many tumour cells with cytological features of malignancy, a diagnosis of malignant mixed tumour is justified. The basal cell adenoma is difficult to distinguish from adenoid cystic carcinoma. The majority of adenoid cystic carcinoma have globules or cylinders of hyaline material. In poorly differentiated adenoid cystic carcinoma the nuclei are larger with prominent nucleoli and coarse chromatin pattern [8].

Well differentiated mucoepidermoid tumours produce no problems in diagnosis. But high grade or poorly differentiated tumours may be difficult to diagnose and they are misdiagnosed as poorly differentiated squamous cell carcinoma. If there is a cystic tumour, the aspiration yield only mucus material and so diagnosis become difficult.

For most of the benign tumours the recommended surgical treatment is wide local excision with an adequate margin of normal gland tissue, except when subtotal or total conservative parotidectomy is required because of the size or location of the tumour. The facial nerve should be visualized and preserved. This approach prevents recurrence and minimizes the facial nerve injury since the risk of neural injury increases with the extent of surgical procedures. Acinic cell carcinoma or low-grade mucoepidermoid carcinoma necessitates the removal of the remaining gland. Adenoid cystic carcinoma of parotid necessitates removal of the entire gland and partial resection of facial nerve. High-grade malignancy necessitates cervical block dissection. Lay Field *et al.* have recommended a limited resection of lesions which show high cellularity with mild to moderate epithelial atypia, followed by a frozen section analysis. The cystic lesions with abundant mucus material and scanty cellularity may be mucoepidermoid carcinoma, pleomorphic adenoma or adenoid cystic carcinoma, benign cysts or Warthin's tumour. Multiple aspirations are required to prevent false negative reports [9].

The decisions regarding the need for facial nerve sacrifice depend up on the clinical findings, preoperative findings and the extent of tumour. But if the cytological report gives suspicion of malignancy it may help both the surgeon and the patient, mentally prepare for the possibility of sacrificing facial nerve. The surgeon can also think of the rehabilitative measures with the nerve graft.

In cases where a malignant lesion is suspected clinically (based on pain of the swelling, rapid growth of the tumour, and on examination hard and nodular swelling with or without facial nerve involvement), an FNAC is done. If the FNAC is positive for malignancy, then a radical procedure may be done. But, if FNAC done is negative for malignancy, then the FNAC should be repeated. If the repeated FNAC also turned out to be negative, then the surgical option should be restricted to superficial parotidectomy or submandibular sialadenectomy. Even though, rare complications like small haematomas have been reported, there were no complications in the series [10].

### Conclusion

Fine needle aspiration cytology has marked diagnostic significance in management of salivary gland swellings. It improves the management of salivary gland swellings positively. The diagnostic accuracy and specificity can be improved with the experience of the cytopathologist and refinement of technique. So it is a cost effective investigative modality. It has an important role in altering the management of salivary gland swellings especially in those which re clinically benign and cytology showing malignancy and vice versa.

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