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ORIGINAL RESEARCH

FNAC based Cytomorphological Spectrum of Salivary Gland Lesions: A Prospective Study in a Tertiary Care Centre in Chhattisgarh

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ABSTRACT

Background: Salivary Gland swellings may be due to inflammation, cyst or neoplasm. Annual incidence rate of Salivary gland tumors varies between 0.4-13.5 cases/100,000 individuals with the majority of them being benign. Fine Needle Aspiration is a simple, cost-effective, reliable and minimally invasive procedure and is widely used for preoperative diagnosis of salivary gland lesions. It provides valuable information for planning appropriate management. The present study aims to evaluate the Cytomorphological spectrum of Salivary gland lesions using FNAC as a diagnostic tool. **Materials and methods:** This Prospective Observational study was carried out in the Cytology section of Pathology Department at ShriShankaracharya Institute of Medical Sciences, Bhilai for a period of two years using FNAC technique as per standard protocol. The cases were segregated into Non neoplastic, Benign and Malignant categories on the basis of their cytological features. Histopathological correlation was made where available. **Results:** A total of 75 cases of salivary gland lesions were aspirated for a period of two year. The age of patients ranged from to 7-78 years with mean age of 45.5yrs .Overall male:female ratio was 1.34:1. Parotid Gland was most common(61.3%) salivary gland involved. There were 46.6% cases of non-neoplastic lesions and 53.4% cases of neoplastic lesions. Chronic Sialadenitis, Pleomorphic Adenoma and Mucoepidermoid Carcinoma were most common non-neoplastic, benign and malignant lesion respectively in the study. Cyto-Histopathological cases showed 91.6 % concordance. **Conclusion:** FNA cytology is safe, time saving and relatively accurate technique to evaluate salivary gland lesions and provides useful information on the management of salivary gland lesions and identification of malignancy. It helps in deciding the type and extent of surgery, also preventing unnecessary surgery in cases of nonneoplastic lesions.

Keywords: Fine-needle aspiration cytology, salivary gland lesions, neoplastic, non-neoplastic, Sialadenitis.

INTRODUCTION

Salivary glands are exocrine glands that function to produce, modify and secrete saliva into the oral cavity.These are divided into major salivary glands that include Parotid gland, Submandibular gland and Submental gland as well as minor salivary glands which are numerous in number and are found lining the mucosa of the mouth and upper aerodigestive tract [1]Salivary gland neoplasms comprise of nearly 6.5% of all head and neck lesions amongst which almost 21-46% are malignant[2]. Fine Needle Aspiration Cytology is being employed for preoperative diagnosis of salivary glands due to easy accessibility and superficial nature of the glands. FNAC is considered to be a simple, minimally invasive , accurate and quick technique used in the evaluation of salivary gland lesions preoperatively, hence playing a crucial role in their management.[3]

MATERIAL AND METHODS

The study was conducted in the Cytology section of Department Of Pathology,atShriShankaracharya Institute Of Medical Sciences, Bhilai, Chhattisgarh for a period of two years from April 2022 to April 2024. Prospective Observational Study was performed usingSimple Sampling Method. Patients of any age

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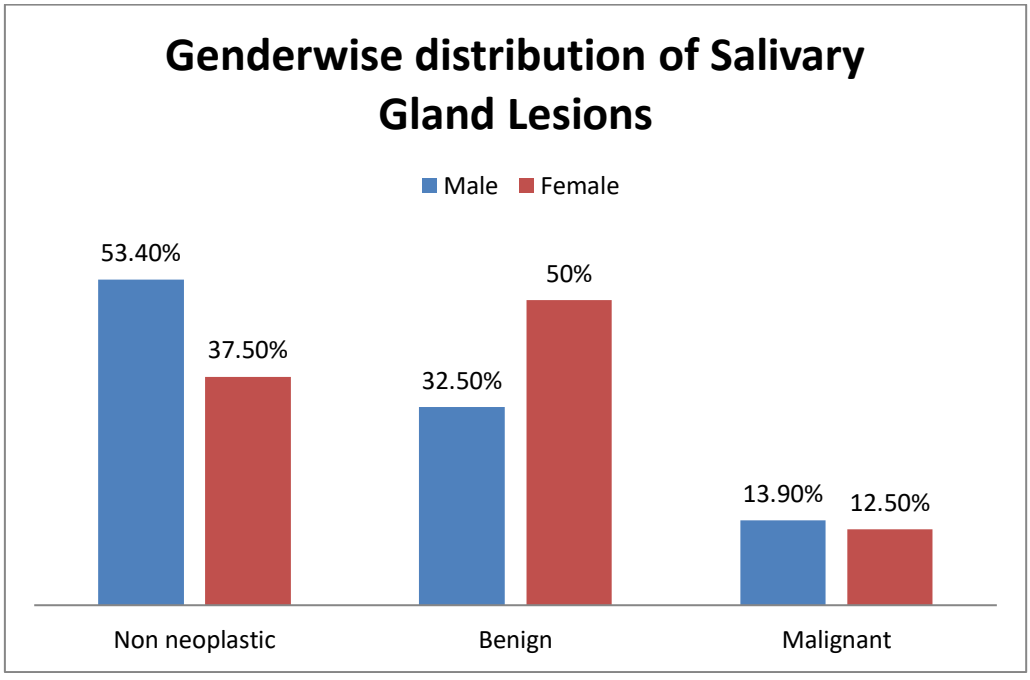
and gender with superficial, palpable and nodular lesions of salivary glands who gave consent were included.Patients with scanty or hemorrhagic aspirate after repeated attempts were excluded. Total 75 patients with suspected salivary gland lesions were explained about the FNA procedure and informed consent was obtained. The clinical data pertaining to patient's age, gender, anatomical site, radiology reports were retrieved from the records. A 22 gauge needle was used for performing FNAC. A minimum of three slides were prepared. One was air dried and stained by MayGrunwald-Giemsa stain (MGG) and other two were fixed in alcohol and stained with Papanicolaou stain (PAP) and Haematoxylin& Eosin stain (H&E). Further, wherever available the FNA slides were correlated with Histopathological Diagnosis from the paraffin embedded sections of tissue blocks, fixed in 10% formalin. The collected data was entered in Microsoft Excel spreadsheet and analysed statistically and reported in terms of percentage, frequency, tables and graphically wherever required. Approval from the Institutional Ethics and Scientific Committee was obtained.

RESULTS

- In the present study, 75 cases were studied out of which 43 patients (57.3%) were males and 32 patients (42.6%) were females, making male:female1.34:1. The maximum number of cases were in age group 41-50yrs. Age of patients ranged from 7-78yrs, with mean age 46.5years.The most common site of involvement was Parotid glandaccounting for 61.3% cases (46/75cases) followed by Submandibular gland 33.3% cases and sublingual glands and minor salivary glands with 2.7% cases each. Most common lesion was Non neoplastic type accounting for 46.6 % cases (35/75cases)of which Chronic Sialadenitis was reported as most common cause (45.7% cases), followed by Benign Cystic lesion(20% cases). Benign tumors of salivary glands comprised 40% of total cases in the study in which Pleomorphic Adenomaaccounted for maximum number of cases (56.6%) followed by Warthin's tumor and basal cell adenoma (13.3% cases) each. Malignant tumours were diagnosed in 13.4% patients (10 out of 75 cases) with male predominance (60%). Mucoepidermoid carcinomawas the most common cause (40%) followed by Poorly differentiated carcinoma(30%) . Histopathological correlation was available for 48 out of 75 cases, and 91.6% of the biopsy outcome correlated with the cytological diagnosis.



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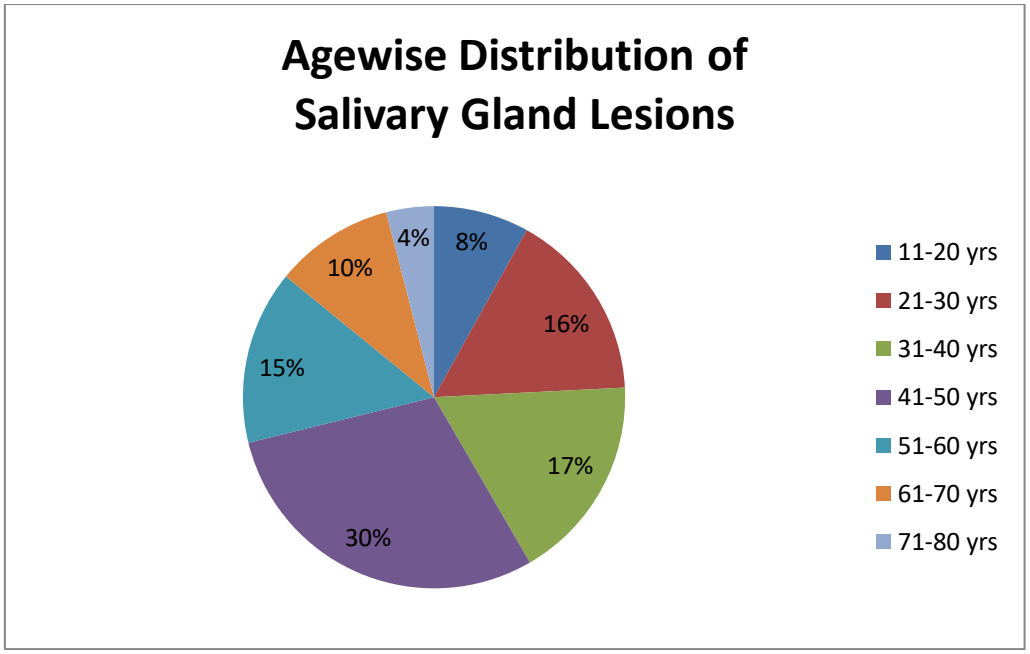

Gland wise distribution of cases under each category

Salivary Gland	NON NEOPLASTIC	BENIGN	MALIGNANT	TOTAL
Parotid	23	17	6	46
Submandibular	9	13	3	25
Sublingual	2	0	0	2
Minor	1	0	1	2
TOTAL	35	30	10	75

Distribution of Salivary Gland lesions and their Incidence along with Histopathological Correlation

S. NO	FNAC Diagnosis	Total No of Cases	Cases available for HP	No Of Concordant cases	No of Discordant Cases	HP Diagnosis
1	Chronic Sialadenitis	16	9	9	0	-
2	Acute Sialadenitis	2	0	-	-	-
3	Granulomatous Sialadenitis	4	2	2	0	-
4	Sialadenosis	2	1	0	1	Chronic Sialadenitis
5	Benign Cystic Lesion	7	6	5	1	Warthin's Tumour
6	Reactive Lymphoid Hyperplasia	4	1	1	0	-
7	Pleomorphic Adenoma	17	12	11	1	Basal cell Adenoma
8	Warthin's Tumour	4	3	3	0	-
9	Basal Cell Adenoma	4	3	2	1	Adenoid Cystic Carcinoma
10	Oncocytoma	3	2	2	0	-
11	Schwannoma	2	1	1	-	-
12	MucoepidermoidCa	4	3	3	0	-
13	Adenoid Cystic Ca	2	2	2	0	-
14	Acinic Cell Ca	1	1	1	0	-
15	Poorly Differentiated Ca	3	2	2	0	-
TOTAL			75	48 44	4	

(HP: Histopathological)

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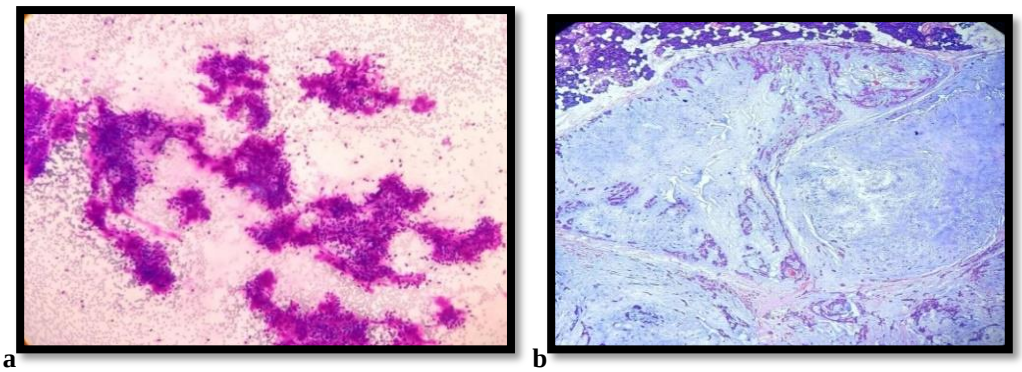
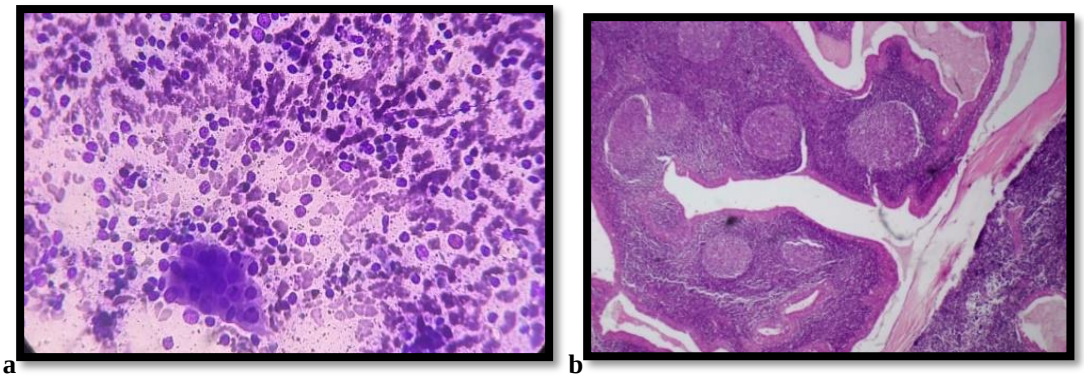
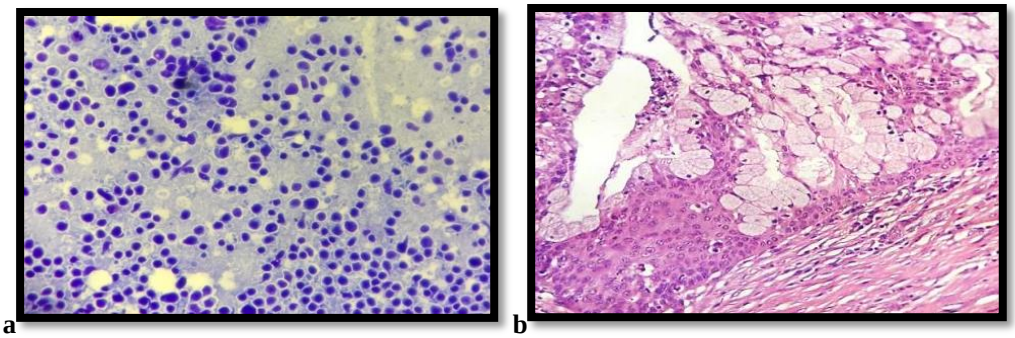


a) Aspiration Cytology showing case of **Pleomorphic Adenoma** with characteristic fibrillarychondromyxoid stromal fragments within which are embedded epithelial cells and myoepithelial cells. (MGG stain 200X)
b) H&E stained section of the same case shows a well circumscribed tumour with epithelial component arranged in the form of tubules and acini admixed with myoepithelial cells in chondromyxoidstroma. Adjacent normal salivary gland also seen. (200x) Case of **Pleomorphic Adenoma**



a) Aspiration Cytology showing case of **Warthin's Tumour** having monolayered sheets of oncocytes with abundant granular cytoplasm present against a dirty proteinacous background containing numerous lymphocytes (MGG, 200X)
b) H&E stained section of the case showing large cysts lined by oncocytes and separated by dense lymphoid infiltrate (200X). Case diagnosed as **Warthin's Tumour**



a) Aspiration Cytology showing case of **Mucoepidermoid Carcinoma** with cells having discrete squamoid morphology with nuclear enlargement and pleomorphism along with mucous secreting cells noted in mucinous background (MGG, 400X)
b) H&E stained sections of the same case showing solid areas of tumor formed by different proportions of epidermoid cells, mucus cells and intermediate cells. (400x) Case of **Mucoepidermoid Carcinoma**

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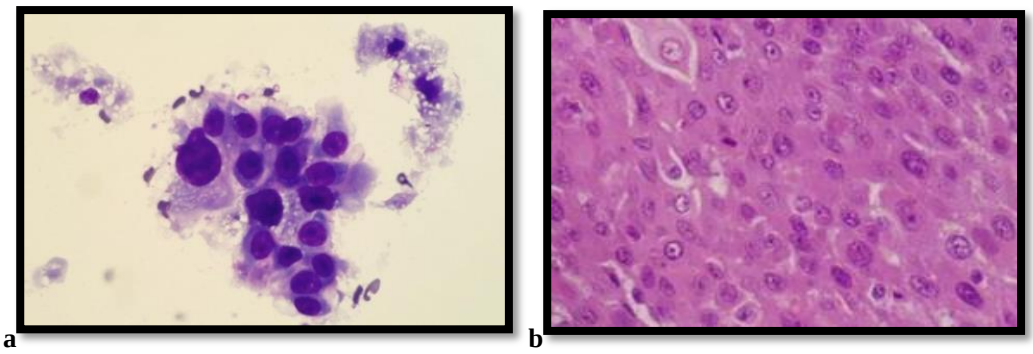
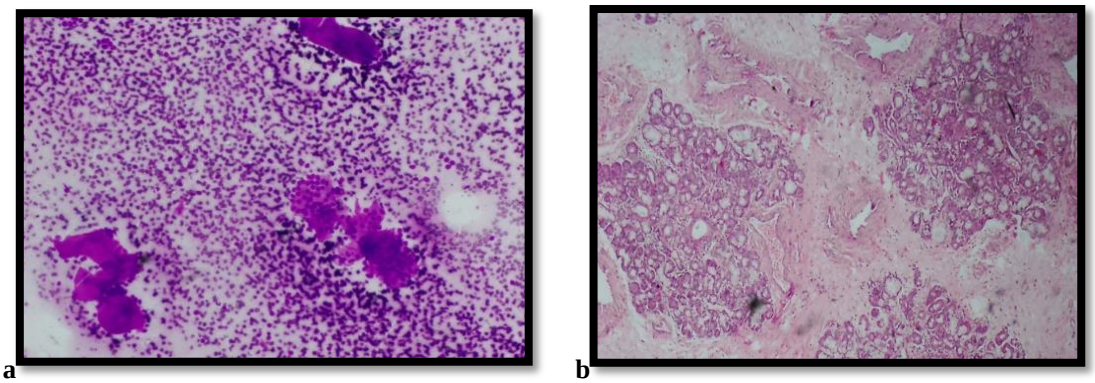


a) Aspiration Cytology showing case of **Poorly Diiferentiated Carcinoma** having clusters and singly scattered atypical pleomorphic cells with round atypical nuclei and abundant granular cytoplasm.(MGG 400x)
b) H&E stained sections of above case shows nests of large pleomorphic cells having round to oval vesicular nuclei, prominent nucleoli and abundant cytoplasm. (400X) Case of **High grade carcinoma**



Discordant Case

a) Aspiration Cytology showing occasional hyaline globules with few clusters of small monotonous cells embedded in hyaline stroma. (MGG, 200x) was diagnosed as Benign Salivary Gland Adenoma in favour of Basal cell Adenoma
b) On biopsy follow-up, H&E stained section showed basaloid cells arranged in cribriform pattern. (100x) and was diagnosed as**Adenoid cystic Carcinoma**

DISCUSSION

The present study included 75 patients who attended the OPD of Otorhinolaryngology and General surgery with salivary gland swellings referred to cytology section for FNAC. The FNAC diagnosis were made in accordance with WHO Head and Neck [4] terminology. Histopathologicaldiagnosis were available for 48 patients.

Out of total cases studied, 43 patients were males and 32patients were females with Male: Female ratio being 1.34:1**.** This finding was found to be concordant with that of**JaslynJie Lin Lee et al**[5] withMale:Female ratio of 1.5:1 and **Enica Richard Massawe et al.**[6]with ratio 1.3:1 , showing a male preponderance in salivary gland lesions.

In the present study, age of patients ranged from 7 yrs to 78 yrs, with maximum number of cases in the range 41-50yrs. Mean age was observed to be 46.5 yrs. Our results were concordant with **Pooja et al** [7] with mean age of 45.5 years and **Kata et al**[8] with most of the cases in the age range of 41-50 yrs

In the present study, the most common site involved was the Parotid gland with patients contributing to 61.3% of all cases, followed by submandibular comprising 33.3% cases and 2.7% patients had swelling in sublingual region and minor salivary glands each .

Most of the studies, like **Karuna et al**[9],**Pujani et al**[10] , **Nanda et al**[11]cited the same result with Parotid gland being the commonest affected gland accounting for 59% , 62.6% and 51.1% cases respectively.

In our study, majority of patients were categorised under NN category accounting for 46.6% with 22 out of 35 cases with inflammatory etiology being the most frequent cause. The cases were categorized as chronic sialadenitis (45.7%) granulomatous sialadenitis (11.4%) and acute sialadenitis (5.71%). Similarly, **Pujani et al** [10] analysed 150 cases and found Non-neoplastic as the most common category accounting for 42% (63 cases) and the most frequent diagnosis being sialadenitis .On histopathological follow up, 2 cases were found to be discordant. (Table:4)

The Benign neoplasm category had 30 out of 75 (40%) cases in our study, and histological follow-up was available in case. Pleomorphic Adenoma was the

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most common diagnosis in this category making 56.6% of benign cases. Similarly,**Savant et al**[12] reviewed 199 cases and found 118 (59.2%) under Neoplasm Benign category, where PA being the most common diagnosis with 89 cases.

Cyto-histological agreement for the benign category was achieved in 19 out of 21 cases; thus accuracy of diagnosis of benign neoplasm was 90.4%. Discordant cases were found to be 2 cases (9.6%) (Table:4) One case was given cytological diagnosis of Pleomorphic Adenoma with cystic changes but it was found to be Basal cell Adenoma on biopsy. A case of Basal cell adenoma on FNA diagnosis turned out to be Adenoid Cystic Carcinoma on Histopathologic follow-up.

The present study recorded 10 out of 75 cases , i.e13.4 **%** in malignant category, where most common malignancy was Mucoepidermoid Carcinoma (4 out of 10 cases) followed by Poorly Differentiated Carcinoma (3 out of 10 cases). Cytological Diagnosis were found to be concordant with the biopsy outcome in all the available cases

Likely, **Karuna et al** [9] showed similar results wherein malignant cases were 17 out 105 were malignant (16.20%) with most frequent malignancy being Mucoepidermoid carcinoma (9 cases out of 17) .

Sensitivity and Specificity were derived to be 88.8% and 100% respectively. Diagnostic Accuracy was calculated to be 97.9 %. The parameters were found to be similar with the earlier published literature. [13 14]

CONCLUSION

The FNAC reporting of Salivary Gland lesions when undertaken meticulously is an effective way of diagnosing the underlying pathology enabling better decision making, avoiding a surgical procedure in some cases and thereby tremendously aiding the patient care in terms of reducing financial burden and most importantly allaying psychological trauma. Considering the high Diagnostic accuracy rate of FNAC diagnosis observed in the present study, it can aptly be concluded that Fine needle aspiration (FNA) is a useful adjunct for presumptive and in many instances, definitive diagnosing Salivary gland neoplasms.

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