

FNAC Spectrum of Salivary Gland Lesions in a Referral Pathology Lab - An Institutional Experience

C. Bhavani¹, P. Sravani², M. Neeraja³, Shyam Prasad B.R.⁴

^{1, 2, 3} Department of Pathology, Government Medical College, Anantapur, Andhra Pradesh, India.

⁴Department of Biochemistry, Government Medical College, Anantapur, Andhra Pradesh, India.

ABSTRACT

BACKGROUND

Salivary gland swellings are one of the common presenting symptoms in the outpatient department. These swellings are referred to the pathology department for determining the exact nature of the lesion to reach a diagnosis. Fine needle aspiration (FNA) of the salivary gland and diagnosis of the disease represents one of the most challenging areas in cytopathology. FNAC is widely used for pre-operative diagnosis of many swellings and masses, including salivary gland lesions. It is a cost-effective, safe and straightforward procedure that provides valuable information for planning appropriate management. The present study aims to evaluate the efficacy and cytological spectrum of FNA of salivary gland lesions done over a fixed period in Government Medical College / Government General Hospital, Anantapuramu.

METHODS

This cross-sectional study was conducted in the Department of Pathology of Government Medical College / Government General Hospital, Anantapuramu, during the period January 2017 to December 2019. Patients with suspected salivary gland enlargements, who were referred for FNAC, were included in this study. FNAs of 80 patients were studied in the present study. FNAC was performed by using a 10 mL syringe with a 23 g needle. Smears were stained by using the H & E stain (Haematoxylin and Eosin). The data collected was entered into an Excel sheet and analysed. Chi-square and p-value were calculated using Open Epi software.

RESULTS

Cytology slides prepared were studied, interpreted, and the diagnosis made was analysed. Out of the 80 FNAC salivary gland lesions, 44 were non-neoplastic lesions, and 36 were neoplastic lesions. Of the non-neoplastic lesions, chronic sialadenitis was predominant (30), and among the neoplastic lesions, pleomorphic adenoma cases were dominant, accounting for 30 cases. In our study, the most common major salivary gland involved was the parotid gland.

CONCLUSIONS

FNAC of the salivary gland lesion is a simple, safe, rapid, cost-effective, convenient, harmless, well-tolerated procedure by patients, and it remains an accurate method for the diagnosis of salivary gland lesion for pathologists and physicians. Our study reflected a varied spectrum of lesions in patients referred for FNAC for the diagnosis of swellings of salivary glands.

KEYWORDS

FNAC, Cytology, Salivary Gland, Parotid, Pleomorphic Adenoma

Corresponding Author:

*Dr. Shyam Prasad B.R.,
301, Hanuman Classic,
2nd Cross, Aravinda Nagar,
Ananthapur, Andhra Pradesh, India.
E-mail: shyamcapt@yahoo.com*

DOI: 10.18410/jebmh/2020/499

How to Cite This Article:

*Bhavani C, Sravani P, Neeraja M, et al.
FNAC spectrum of salivary gland lesions
in a referral pathology lab - an
institutional experience. J Evid Based
Med Healthc 2020; 7(42), 2409-2413.
DOI: 10.18410/jebmh/2020/499*

*Submission 18-08-2020,
Peer Review 24-08-2020,
Acceptance 18-09-2020,
Published 19-10-2020.*

*Copyright © 2020 C. Bhavani et al. This
is an open access article distributed
under Creative Commons Attribution
License [Attribution 4.0 International
(CC BY 4.0)]*

BACKGROUND

Salivary glands are exocrine organs which produce and secrete saliva and include parotid, sub-mandibular, sub-lingual and the minor glands that are numerous which are distributed throughout the mouth and oropharynx.¹

These glands often are subjected to a diverse range of neoplastic and non-neoplastic disease processes. Currently, the swellings are suspected clinically, and the differential diagnosis is ruled out either by imaging or pathological studies like FNAC, biopsy or serological studies to rule out the presence of specific biomarkers related to infection, inflammation or malignancy. Clinical acumen allied to modern ranging techniques contribute to the assessment of suspected salivary gland disease but cannot be affirmative in the final diagnosis. Sialomegaly may be clinically misdiagnosed, and equivocal findings on imaging may be found with intrinsic salivary gland lesions and extrinsic lesions with lymph nodal, skin, adnexal and metastatic origins.

It is in these aspects FNAC provides a cutting edge as a diagnostic tool with minimal inconvenience and pain to the patient. It is also an effective, accurate, affordable, and easily repeatable and can be discussed and opined by many. Even to the surgeon, FNAC aids in providing pre-operative and definitive diagnosis. Thereby, allowing him to plan the surgical approach and any other managements like radiotherapy or chemotherapy and advice and explain the patients and relatives more accurately about the prognosis and management modalities. There also exists a heterogeneous nature of cytological pitfalls in salivary glands FNAC. Salivary gland swelling can be classified into a wide range of non-neoplastic to neoplastic lesions. Fine needle aspiration cytology (FNAC) acts as an excellent pre-operative procedure providing valuable information on the salivary gland lesions. FNAC got an edge over incisional biopsy previously used for diagnosis of salivary gland lesions.²

FNAC was introduced in the 1920's, and soon, it gained wide acceptance among clinicians as it was easy to perform and the rapidity of diagnosis. Nowadays, FNAC has become a cornerstone diagnostic tool in head and neck swelling.³

The diagnostic spectrum of the disease range of FNAC range from infections, inflammations, obstruction, functional, impairment and neoplasms. Salivary gland neoplasms account for 2 - 6.5 % of all the neoplasms of the head and neck.⁴

The present study aimed to evaluate the varied cytological spectrum of salivary gland lesions investigated by FNAC in our institute.

METHODS

An institution-based cross-sectional study was carried out for a period of 36 months from Jan. 2017 to Dec. 2019 in the Department of Pathology, Government Medical College and Government General Hospital, Anantapuramu. Among all FNAC requests received, 80 were of patients who were referred with salivary gland swelling for FNAC. The study

design and methodology were started after obtaining the Institutional Ethics Committee approval and permission from the superintendent of Government General Hospital. Demographic information was recorded from the requisitions sent along with the patients. All patients who were willing and cooperative for undergoing FNAC procedure were included in the study. Unwilling and un-cooperative patients were excluded from the study.

The patients were explained about the procedure, complications and benefits of FNAC. After obtaining the consent from the individuals, demographic and relevant clinical details were collected from the patients. A local examination of the salivary gland swelling was performed in all patients before the procedure.

In a sterile environment and under aseptic precautions, using a 10 mL syringe with 23 G needle, aspiration was done as per the standard methods described in books. The characters of aspirates were noted, and immediately aspirated fluid / tissue fragments was transferred on to the slides, prepared the smears and stained with H & E (Haematoxylin and Eosin) as per standard protocols. Smears were studied under a microscope and interpreted. The cytological interpretation was made as it has been described in standard textbooks of cytology. All the details were entered in a Microsoft Excel sheet, and a descriptive type of statistics was used to analyse the data. The results were expressed in percentages.

Statistical Analysis

The cytological and histological analysis was reported in terms of frequencies and percentages. By using open Epi software, found the p-value after calculating chi-square and degree of freedom. A p-value < 0.05 is considered as statistically significant.

RESULTS

A total of eighty cases was studied. Most of the salivary gland lesions showed male predominance. FNAC was done in '49' (61.25 %) male patients and '31' (38.75 %) female patients.

Age Group	Male		Female		Total
	Number	%	Number	%	
0 - 10	0	0	0	0	0 (0 %)
11 - 20	4	8.2	2	6.5	6 (7.5 %)
21 - 30	7	14.2	5	16.1	12 (15 %)
31 - 40	9	18.4	9	29.1	18 (22.5 %)
41 - 50	9	18.4	5	16.1	14 (17.5 %)
51 - 60	10	20.4	3	9.7	13 (16.25 %)
61 - 70	7	14.2	7	22.5	14 (17.5 %)
71 - 80	3	6.2	0	0	3 (3.75 %)
Total	49	61.25	31	38.75	80

Table 1. Age and Gender-Wise Distribution of Cases

Age and sex distribution of lesions: Among 80 patients, the age of the patients ranged from 11 years to 80 years. With no referred cases in the age group of 0 - 10 years. The

maximum number of total cases were seen in the age group of 31 - 40 years, followed by 41 - 50 years and peak incidence for non-neoplastic lesions were observed in the age group of 41 - 50, and 61 - 70 (20.5 %) years, whereas neoplastic lesions were found in the age group of 31 - 40 years. Males were affected more than females in this study. The average age of all the cases is 44.95 yr. The age and gender wise distribution are tabulated in Table No 1.

The distribution of the cases reported on the type of glands reported is tabulated in Table No. 2. The parotid gland was the commonly involved of all salivary glands with 60 cases (75 %) followed by the submandibular gland, 18 cases (22.5 %) and minor salivary glands, 02 cases (2.5 %).

Type of Salivary Gland	Number of Cases	(%)
Parotid Gland	60	75
Sub-Mandibular Gland	18	22.5
Minor Salivary Gland	02	2.5
Total	80	100

Table 2. Distribution of Salivary Gland Involvement

The type of lesion diagnosed is listed in Table No. 3. Out of the total 80 cases reported, 44 (55 %) were non-neoplastic lesions, with the majority being chronic sialoadenitis - 30 cases (37.5 %); followed by benign cystic lesions, 07 cases (8.75 %), acute sialoadenitis, 04 cases (5 %) and abscess 03 cases (3.75 %).

Among neoplastic lesions, 31 (38.75 %) were benign, and 05 (6.25 %) were malignant. In benign lesions, 30 (37.5 %) were of pleomorphic adenoma and 01 (1.25 %) case of basal cell adenoma; in 05 malignant cases diagnosed, mucoepidermoid carcinoma were 03 cases (3.75 %) and 02 (2.5 %) cases.

The cytological spectrum of the cases referred and investigated by FNAC are tabulated in Table No. 3 below.

Lesions	Number	(%)
I. Non-Neoplastic		
Acute sialadenitis	04	05
Chronic Sialadenitis	30	37.5
Granulomatous Inflammation	00	00
Benign Cystic Lesions	07	8.75
Abscess	03	3.75
Total	44	55
II. Neoplastic		
a. Benign		
Pleomorphic Adenoma	30	37.5
Basal Cell Adenoma	01	1.25
Total	31	38.75
b. Malignant		
Mucoepidermoid Carcinoma	03	3.75
Pleomorphic Adenoma Ex Carcinoma	02	2.5
Total	05	6.25

Table 3. Cytological Spectrum of Salivary Gland Lesions

Type of Lesion	Age Group	Gender		Total	p-value
		Male	Female		
Non Neoplastic Lesions	< 50 yrs.	17	09	26	$\chi^2 = 1.728$ P = 0.0945
	> 50 yrs.	15	03	18	
	Total	32	12	44	
Neoplastic Lesions	< 50 yrs.	12	12	24	$\chi^2 = 0.2229$ P = 0.3184
	> 50 yrs.	05	07	12	
	Total	17	19	36	

Table 4. Association between Age and Gender among Neoplastic and Non-Neoplastic Lesions

It is observed that non-neoplastic lesions were seen more among males (32 out of 44 cases). In contrast,

neoplastic lesions were seen more among females (19 out of 36 patients), which is not statistically significant. The same is detailed in Table No. 4.

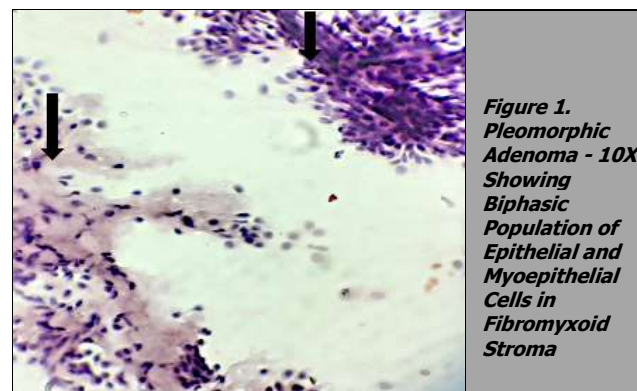


Figure 1. Pleomorphic Adenoma - 10X Showing Biphasic Population of Epithelial and Myoepithelial Cells in Fibromyxoid Stroma

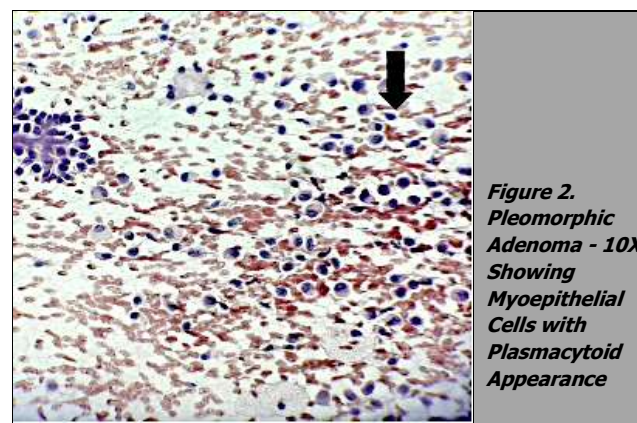


Figure 2. Pleomorphic Adenoma - 10X Showing Myoepithelial Cells with Plasmacytoid Appearance

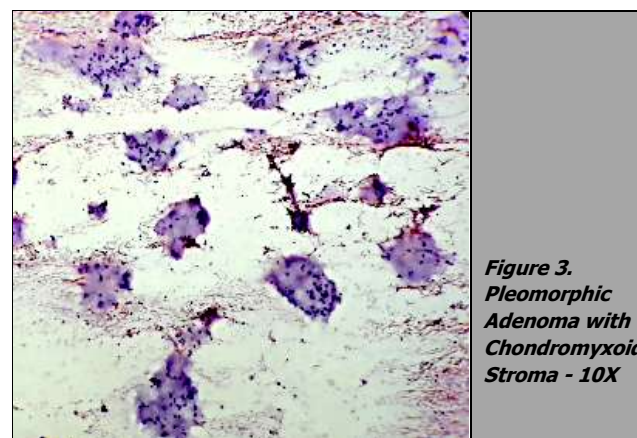


Figure 3. Pleomorphic Adenoma with Chondromyxoid Stroma - 10X

DISCUSSION

The salivary gland lesion constitutes only a small proportion of head and neck cytology. FNAC is a minimally invasive pre-operative diagnostic tool which serves to determine the nature of the lesion that provides guidelines for the clinician to manage the patient appropriately. FNAC helps to distinguish salivary gland lesions into the following category – inflammatory, benign and malignant.

Literature search had revealed that almost about 80 % of lesions occur in major salivary glands. Parotid constitutes the significant bulk of about 70 % lesions, followed by 7 – 11 % in submandibular and less than 1 % lesions in the

sublingual gland. Approximately 9 – 23 % of lesions occur in minor salivary glands.

In this present study, the male to female ratio is 1.5 : 1. In the present study, there was a male preponderance. Among the 80 patients, 49 patients were male, and 31 were female. In the study of Shetty SM et al., Omhare et al. and Saldanha et al. in their respective studies found M: F ratio of 1.1 : 1, 1.17 : 1 and 1.2 : 1.^{2,1,5}

The lesions of salivary glands can occur at any age depending upon the type and aetiology of the lesion. In the present study, the youngest patient was '11' years old, and the oldest was '75' years. The maximum incidence was seen in the 4th decade. Similar findings were observed by P. Divya et al. (2019), Kakoty et al. (2017) and Omhare et al. (2014).^{6,7,1} Most common lesions were seen in the age group of 31 - 40 years. The least lesions were seen in the age groups of 11 - 20 and 71 - 80 years.

Among the salivary glands, the parotid gland was commonly involved, followed by submandibular and minor salivary glands. Out of '80' cases, the parotid gland was involved in 60 patients (75 %), sub-mandibular glands in '18' cases (22.5 %) and minor salivary glands in '02' cases (2.5 %). These findings were similar to P. Divya et al., Todase V et al. and Kakoty et al.^{6,8,7}

Among the non-neoplastic lesions, chronic sialadenitis was the most common lesions (37.5 %). Other condition of sialadenitis will be excluded as it contains inflammatory cells on the background. The diagnosis of sialadenitis must exclude inflammatory causes of salivary gland swelling.⁹ The cytological smears of chronic sialadenitis, comprised of clusters of ductal epithelial cells along with lymphomononuclear cells in the background. The cases diagnosed as acute sialadenitis showed numerous polymorphonuclear neutrophils and cell debris. The aspirate in cases of mucocele was watery inconsistency, and smears exhibited numerous foamy macrophages admixed with lymphomononuclear cells. The differential diagnosis for low-grade mucoepidermoid carcinoma are Warthin's tumour and chronic sialadenitis, and for high grade primary or metastatic mucoepidermoid carcinoma is Squamous Cell Carcinoma

It is comparable with the incidence reported by R. Bhuvanambe Devi et al. (20 %), Vaidhya et al. (18.9 %) and Das et al. (34.4 %).^{10,11,12} The other less common benign lesions are acute sialadenitis (05 %), abscess (3.75 %) and benign cystic lesions (8.75 %), which may be secondary to inflammatory or infective pathology.

Among the benign neoplastic lesions, pleomorphic adenoma (37.5 %) was the most common lesion with an increased incidence of occurrence in the parotid gland in the present study; similar observation was noted by R. Bhuvanambe Devi et al., Masanja et al. and Sunida et al.^{10,13,14}

Cytologically, the smears showed three main components, extracellular matrix, myoepithelial and ductal cells, which were present in various proportions and stroma. The diagnosis of a pleomorphic adenoma is usually made evident after the identification of the three components which has just been described

Mucoepidermoid carcinoma is mostly composed of a variable mixture of squamous cells, mucous secreting and

intermediate cells, occasionally focal sebaceous gland, goblet cells also are seen. They remain the most common type of primary malignant tumour of the salivary gland.¹⁵

In the present study among the malignant cases diagnosed by FNAC, mucoepidermoid carcinoma was present in '03' (3.75 %) cases, and pleomorphic adenoma ex carcinoma was present in '02' cases (2.5 %). Shivani et al. made a similar observation, Flaszavi et al. and Muhammed Isakara et al.^{16,17,18}

Fine needle aspiration cytology (FNAC) has now been accepted by head and neck surgeons as an excellent, though challenging primary method of evaluating space-occupying lesions of the salivary glands. The diagnosis rendered by FNAC often influences the management of the patient and allows for appropriate treatment planning.

The role of FNAC for the diagnosis of salivary gland masses is well documented. The traditional open biopsy is no longer justified because of the risk of tumour spillage and damage to facial nerve.¹⁹

A pre-operative malignant diagnosis allows the surgeons to plan the treatment, while a benign diagnosis relieves the patient from anxiety and surgical procedure.

CONCLUSIONS

FNAC has become a cornerstone diagnostic tool in diagnosing a head and neck swelling. The main goal of FNAC is to determine as to whether a mass is inflammatory, benign or malignant neoplasm and, if possible, to render a specific diagnosis, especially typing the neoplastic lesions.

In the present study, there was a peak incidence in the age group of 31 - 40 years. Male predominance was seen. The most frequent salivary gland involved was the parotid.

Among the inflammatory lesions included chronic sialadenitis and benign cystic lesions. Among benign neoplastic lesions, pleomorphic adenoma was the most common and malignant lesions were mucoepidermoid carcinoma followed by carcinoma ex pleomorphic adenoma.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

The institutional ethical committee approved the study.

We gratefully acknowledge all the staff members of the Department of Pathology, Government Medical College, Anantapuramu.

REFERENCES

- [1] Omhare A, Sanjeev SK, Nigam JS, et al. Cytohistopathological study of salivary gland lesions in Bundelkhand region, Uttar Pradesh, India. Pathology Research International 2014;2014:804265. <https://doi.org/10.1155/2014/804265>

- [2] Shetty SM, Kusuma KN. Diagnostic utility of Fine needle aspiration cytology in salivary gland lesion: an institutional teaching experience. *International Surgery Journal* 2019;6(11):3955-3959.
- [3] Samreen N, Atif AH, Amna K, et al. Diagnostic role of Fine needle aspiration cytology (FNAC) in the evaluation of salivary gland swelling an institutional experience. *BMC Research Notes* 2015;8(1):101.
- [4] Pukhrambam GD, Laishram RS, Marina A, et al. study of the cytomorphology of salivary gland lesions using the Milan system of reporting in a tertiary care hospital. *J Evid Based Med Healthc* 2019;6(46):2926-2930.
- [5] Saldanha C, Fernandes H, Fazalbhoy Z, et al. Diagnostic accuracy and pitfalls in Fine needle aspiration cytology of Salivary gland lesions. *Ann Pathol Lab Med* 2017;4(3):274-278.
- [6] Divya P, Manimozhi V, Dhanalakshmi M, et al. Cytological study of salivary gland lesions in a rural health care. *J Med Sci Clin Res* 2019;7(10):312-316.
- [7] Kokoty S, Baruah TD, Babu CPG. FNAC and histopathological correlation of salivary gland lesions: an observational study. *Int Surg J* 2017;4(7):2148-2152.
- [8] Todase V, Panchonia A, Kulkarni CV, et al. Cytopathological study of salivary gland lesions in patients at a tertiary care center, Indore: a one-year study. *Int J Res Med Sci* 2017;5(6):2406-2411.
- [9] Jagtap SV, Aramani SS, Mane A, et al. Sialosis: cytomorphological significance in the diagnosis of an uncommon entity. *J Cytol* 2017;34:51-52.
- [10] Bhuvanamha DR, Shivashekar G, Ganapathy H, et al. Cytological spectrum of major salivary gland lesions: an observational. *Annals of Pathology and Laboratory Medicine* 2018;5(11):872-877.
- [11] Vaidhya S, Sinha A, Narayan S, et al. A comparative study of fine-needle aspiration cytology and histopathology in salivary gland lesions. *Journal of Pathology of Nepal* 2011;1(2):108-113.
- [12] Das DK, Petkar MA, Al-Mane NM, et al. Role of fine-needle aspiration cytology in the diagnosis of swellings in the salivary gland region: a study 712 cases. *Med Princ Pract* 2004;13(2):95-106.
- [13] Masanj MI, Kalyanyama BM, Simon ENM. Salivary gland tumours in Tanzania. *East African Medical Journal* 2003;80(8):429-431.
- [14] Sunida R, Jongkolnee S, Pongsak M. Salivary gland tumours in Maharaj Nakorn Chiang Mai hospital: a retrospective study of 198 cases. *Chiang Mai Med Bull* 2006;45(2):45-53.
- [15] Orell SR. Diagnostic difficulties in the interpretation of the fine-needle aspiration of salivary gland lesions: the problem revisited. *Cytopathology* 1995;6(5):285-300.
- [16] Shivani G, Seema D, Pinki P, et al. FNAC is a Boon for salivary gland lesions: a routine diagnostic experience among the rural population. *Journal of Clinical And Diagnostic Research* 2019;13(4):EC08-EC11.
- [17] De Oliveira FA, Duarte ECB, Taveira CT, et al. Salivary gland tumour: a review of 599 cases in a Brazilian population. *Head and Neck Pathology* 2009;3(4):271-275.
- [18] Muhammed IK, Fahrettin G, Seref E, et al. Neoplasms of the salivary glands in a Turkish adult population. *Med Oral Pathol Oral Cir Bucal* 2010;15(6):e880-e885.
- [19] McGuirt WF, McCabe BF. Significance of node biopsy before definitive treatment of cervical metastatic carcinoma. *Laryngoscope* 1978;88(4):594-597.