



FINE NEEDLE ASPIRATION CYTOLOGY OF SALIVARY GLAND LESIONS: REPORTING BY THE MILAN SYSTEM

Pathology

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ABSTRACT

Background: In the salivary gland lesions most common presentation is of a swelling or palpable mass of varying duration. In infective lesions, pain is another presenting feature. The most accurate method of diagnosing salivary gland lesions is histopathology, yet the role of fine needle aspiration cytology (FNAC) for the diagnosis of salivary gland masses is well documented and is significantly accurate. The present study comprise analysis of FNAC of all salivary gland lesions using Milan system of classification. **Material and Methods:** The present retrospective study involves 234 cases of salivary gland swellings, referred for FNAC to the Department of Pathology, Government Medical College, Jammu for a period of five years w.e.f November, 2016 to 31 October, 2021. This study includes cytomorphological features of various salivary gland lesions on FNAC and their classification by the Milan system of reporting. **Results:** It was observed that peak incidence of salivary gland tumours was seen in the age group of 31-45 yrs. The majority of benign lesions were seen in the age group 16-30 yrs and the malignant lesions were seen in the age group 46-61 yrs. There was female predominance over the male with F:M ratio is 1.46:1. The most frequently involved site was parotid gland (48.7%) followed by submandibular gland (40.6%). 109 cases were diagnosed as non-neoplastic, 98 as benign and 16 cases as malignant. **Conclusion:** FNAC is an important diagnostic tool to clinch the correct diagnosis of salivary gland tumours Fine needle aspiration cytology was able to distinguish between non-neoplastic and neoplastic lesions and benign and malignant tumours.

KEYWORDS

Salivary Glands, FNAC, Neoplastic, Non-Neoplastic

INTRODUCTION

The salivary gland lesions are the common presentation of a swelled or palpable mass of varying duration. Sudden increase in size, involvement of facial nerve, adherence with skin/underlying structures are indicative of malignancy.

Salivary gland tumors comprise about 6% of head and neck neoplasms and about 0.5% of all malignancies in humans. The rate of mortality depends on the stage and type of the lesion. The most common location of salivary gland tumours is the parotid gland (up to 80%), followed by the submandibular tumours (10-15%) and the sublingual gland with minor salivary glands.¹

FNAC of salivary gland lesions is used globally for the diagnosis and management of salivary gland tumours. It provides a minimally invasive, safe, cost-effective, and accurate technique that is extremely useful in identifying a substantial subset of salivary gland nodules as benign and thus reduces unnecessary invasive surgical procedure in patients with benign diseases as well as it guides the further management strategy. FNAC guided by ultrasound imaging (USG) is a widely used diagnostic tool to evaluate both neoplastic and inflammatory lesions of the salivary glands.²

FNAC is being routinely carried out in Pathology Department of GMC, Jammu. The present study analyzed the FNAC of all salivary gland lesions using Milan system of classification. The objective of the present study is to classify salivary gland lesions into non neoplastic and neoplastic according to Milan system.

AIMS AND OBJECTIVES:

- To study the cytomorphological features of various salivary gland lesions on FNAC.
- To classify lesions by the Milan system of reporting.

MATERIAL AND METHODS:

The present retrospective study involves 234 cases of salivary gland swellings, referred for FNAC to the Department of Pathology, Government Medical College, Jammu for a period of five years w.e.f November, 2016 to 31 October, 2021. This study includes cytomorphological features of various salivary gland lesions on FNAC and their classification by the Milan system of reporting. Patients of all ages, both genders were included in the study. All data related to cytological examination, history, clinical examination and relevant investigation was done. The following inclusion and exclusion criteria was followed:

Inclusion Criteria:

It includes major (parotid, submandibular and sublingual glands) and

minor salivary gland lesions including intraoral lesions in all age groups and both sexes.

Exclusion Criteria:

It includes:

- Swellings of lymph nodes
- Soft tissue swellings
- Non-cooperative patients
- Cases with lost or damaged cytological materials
- Hematological or metastatic lesions.

The patients were explained about the procedure and written consent was taken. The aspiration was performed with a fine needle of 22 gauge attached to 20 ml disposable syringe and fitted to handle. All stained smears were examined and the cytological diagnosis was made based on characteristic cytological features and clinico-cytological correlation. Cytohistological correlation was done wherever available.

OBSERVATIONS & RESULTS

Table 1: Age distribution

Age group	No. of cases	Percentage (%)
≤15 years	19	8.1%
16-30 years	59	25.2%
31-45 years	67	28.6%
46-60 years	61	26.1%
61-75 years	22	9.4%
≥76 years	6	2.6%
Total	234	100.0%

In present study, more than 75% of cases were seen (Table 3) in the age group of 16-60 years with mean age of 40.26 years. The youngest patient was of 1 year and the oldest was of 95 years.

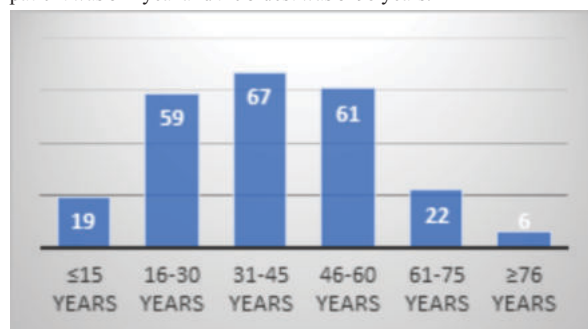
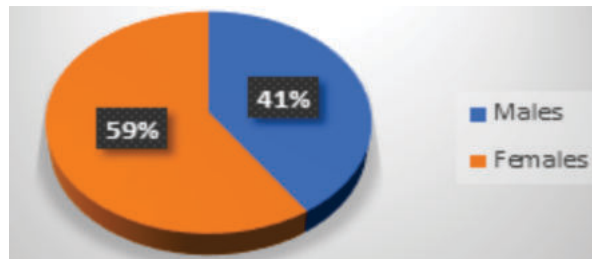


Figure 1: Age Distribution

Table 2: Sex distribution of study subjects.

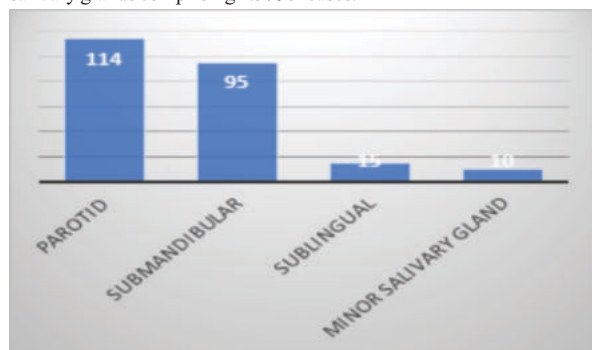
Sex	No. of cases	Percentages (%)
Males	95	40.6%
Females	139	59.4%
Total	234	100.0%

In our study, 139(59.4%) (Table 4) were females while 95(40.6%) were males and F:M ratio is 1.4:1.

**Figure 2: Sex Distribution****Table 3: Site wise distribution of lesions.**

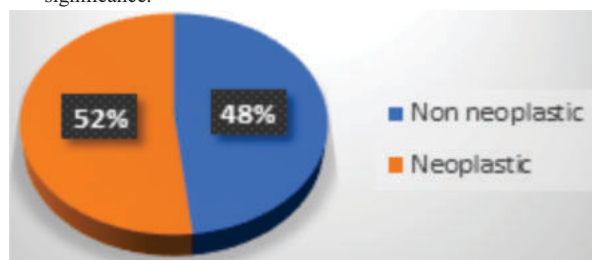
Site	No. of cases	Percentage (%)
Parotid	114	48.7%
Submandibular	95	40.6%
Sublingual	15	6.4%
Minor salivary gland	10	4.3%
Total	234	100.0%

In the present study, Parotid gland was the most frequently involved salivary gland (Table 5) comprising of 48.7%, submandibular gland comprising 40.6%, sublingual gland comprising 6.4% and minor salivary glands comprising 4.3% of cases.

**Fig.3: Site-Wise Lesion Distribution.****Table 4: Distribution of study subjects based on type of the lesion.**

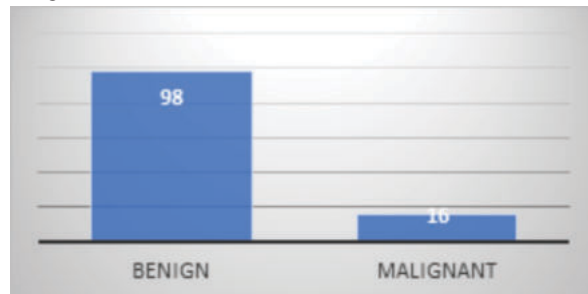
Type of lesion	No. of cases	Percentage (%)
Non neoplastic	109	48.2
Neoplastic	117	51.8
Total	226	100.0%

- In the present study, out of 226 cases, (Table 6) on FNAC, 109(48.2%) of cases were diagnosed as non-neoplastic and 117(51.8%) of cases as neoplastic.
- Six cases were non-diagnostic as they yielded on FNAC only blood, mucus and debris.
- In non-neoplastic lesions, 63 cases were diagnosed as chronic sialadenitis, 7 acute sialadenitis, 31 sialadenoses, 5 retention cyst, 2 mucocele, and 1 case of acute abscess.
- In present study, 2 cases showed atypia of undetermined significance.

**Fig 4: Type of lesion distribution****Table 5: Showing number of benign and malignant lesions.**

Type	N	(%)
Benign	98	86.0%
Malignant	16	14.0%
Total	114	100.0%

On FNAC, 98 cases were diagnosed (Table 5) as benign and 16 as malignant.

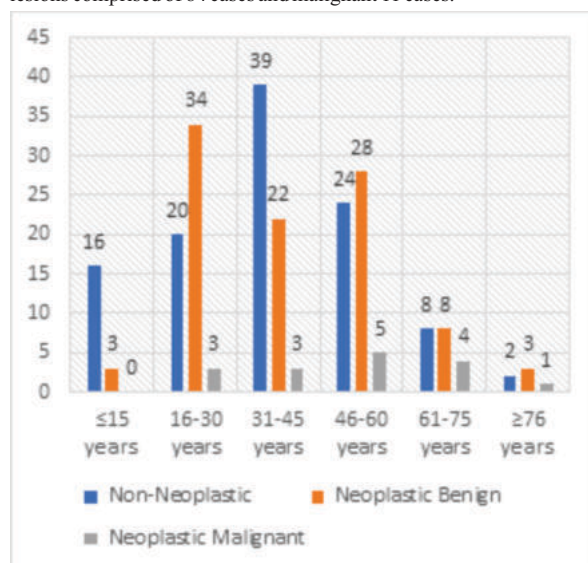
**Fig.5: Bar Chart showing number of Benign and Malignant Lesions**

- In case of benign tumours, 84 cases were diagnosed as pleomorphic adenoma, 2 Myoepithelioma, 2 Basal cell adenoma, 8 warthin's tumour, and 2 cases as oncocytoma.
- In our study, 2 cases were found as Salivary gland neoplasms and 1 as suspicious for malignancy.
- Among malignant tumours, 7 cases of mucoepidermoid carcinoma, 5 of Adenoid cystic carcinoma, 2 acinic cell carcinoma and 2 cases of Polymorphous low grade adenocarcinoma were found.

Table 6: Distribution of study subjects based on age and type of the lesion.

Age group	Non-Neoplastic		Neoplastic			
			Benign		Malignant	
	n	%	n	%	n	%
≤15 years	16	14.7%	3	3.06	0	0.0%
16-30 years	20	18.34%	34	34.69	3	18.75%
31-45 years	39	35.8%	22	22.44	3	18.75%
46-60 years	24	22.0%	28	28.6%	5	31.25%
61-75 years	8	7.33%	8	8.16%	4	25.0%
≥76 years	2	1.83%	3	3.06%	1	6.25
Total	109	100%	98	100.0%	16	100.0%

Maximum no. of cases of both non-neoplastic and neoplastic lesions were seen (Table 8) in age group of 16-60 years. Non-neoplastic lesions in the age group 16-60 years comprised of 83 cases, benign lesions comprised of 84 cases and malignant 11 cases.

**Figure 6: Bar Graph Showing Age and Type of Lesion Distribution.****Table 7: Distribution of study subjects based on site and type of the lesion.**

Site	Non Neoplastic	Neo plastic		Total Count
		Benign	Malignant	
Parotid	40	65	7	112
Submandibular	64	23	4	91
Sublingual	3	6	3	12
Minor salivary gland	2	4	2	8

- In parotid gland, benign neoplasms were more commonly observed 65(58%) followed by non-neoplastic lesions 40(35.7%). Malignant tumours were found in 7 patients (6.25%) (Table 9).
- In submandibular gland, non-neoplastic lesions were more frequent 64(70.32%), followed by benign neoplasm 23 (25.27%) and malignant 4(4.4%).
- In sublingual and minor salivary glands, malignancy was observed in 25% of cases each.

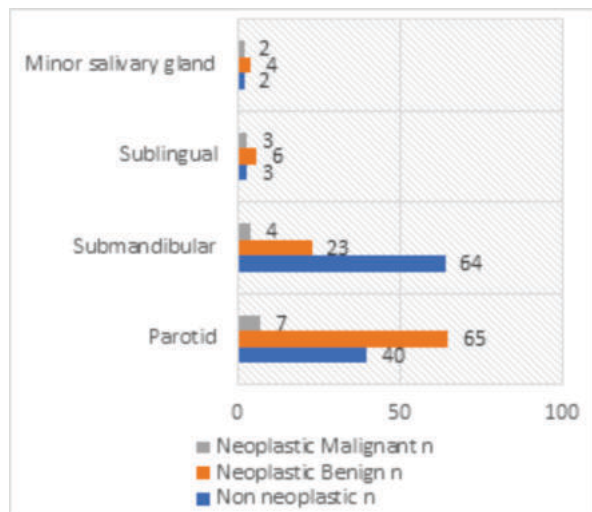


Figure 7: Bar Graph Showing Site and Type of Lesion Distribution.

Table 8. Showing distribution of lesions according to Milan system of Reporting.

MILAN Class	Category	Name of the condition	No. of cases	Percent (%)
I	Non Diagnostic (2.56%)	-	6	2.56%
II	Non-Neoplastic (46.58%)	Chronic sialadenitis	63	26.92%
		Acute sialadenitis	7	2.99%
		Sialadenosis	31	13.24%
		Acute abscess	1	0.43%
		Retention cyst	5	2.14%
		Mucocele	2	0.85%
III	AUS (0.85%)	-	2	0.85%
IV	Neoplasm (42.74%)	Benign	98	41.9%
		SUMP	2	0.85%
V	Suspicious of malignancy (0.43%)	-	1	0.43%
VI	Malignant (6.84%)	-	16	6.84%
Total	-	-	234	100%

In the present study, maximum no. of cases were seen (Table 1) in category II 109(46.58%), followed by category IV 100(42.74%), VI 16(6.84%), category I 6(2.56%), III 2(0.85%) and category V 1(0.43%).

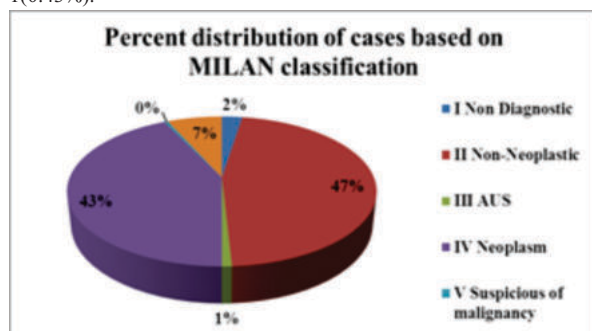


Figure 8: Milan Classification.

DISCUSSION

Fine needle aspiration cytology of the salivary gland is a commonly accepted, sensitive and specific technique in the diagnosis of both neoplastic and non-neoplastic lesions.

The overlapping morphological features and cytomorphological heterogeneity with in the same lesions makes it difficult to identify and subcategorize some particular salivary gland lesions correctly. The clinical history and presentation also play an important role for correct diagnosis of these lesions. This highlights the importance of adequate communication between clinicians and pathologists. Thus to improve overall care and uniformity in diagnosis of salivary gland lesions a category based system, Milan system, was introduced.

In Present study, Salivary gland tumours were observed in all ages but the peak incidence was seen in the age group of 31-45 yrs. This was similar to other studies by Karuna *et al.*, (2019) and Kumari M *et al.*, (2020) who found peak incidence between 31-40yrs and 21-40yrs. It was found that the youngest patient was of 1yr age and the oldest was of 95 yrs, with a mean age of 40.26. This was similar to the study by Gaikwad *et al.*, (2020). In study by Gaikwad *et al.*, (2020), patients age ranged from 7 to 85 yrs with mean age being 46 yrs.^{3,4,5}

In this study, females were affected more than males with female to male ratio of 1.46:1. The results in our study are similar to other Gaikwad *et al.*, (2020) 1.26:1, AlGhamdi *et al.*, (2021) 1.17:1.^{5,6}

The frequency of salivary gland lesions in parotid, submandibular, sublingual and minor salivary gland in present study was 48.7%, 40.6%, 6.4% and 4.3%. The results of our study were variable from other studies. Kumari M *et al.*, (2020) showed frequency of salivary gland lesions in Parotid 64.58%, submandibular 25.69%, sublingual 0.8% and minor salivary glands 9.72%. Karuna V *et al.*, (2019) showed frequency of salivary gland lesions, Parotid 62.36%, submandibular 31.19%, minor salivary glands 6.45%.^{4,3}

In the present study all 234 cases underwent FNAC of the of salivary gland swellings, 109 cases were diagnosed as non-neoplastic, 98 as benign and 16 were malignant. Among the non-neoplastic lesions, chronic sialadenitis was the most commonly noted in 63(26.92%) cases on FNAC. Out of 63(26.92%) cases, histopathology was available of only one case which showed ductal epithelial cells, few acinar cells and chronic inflammatory cells. Kumari M *et al.*, (2020) found 36 cases of chronic sialadenitis and Karuna V *et al.*, (2019) found 7 cases of sialadenitis in their studies.^{4,3}

In present study benign and malignant tumours comprised of 114 cases on FNAC. Out of 114 cases, 98(86.0%) were benign and 16(14.0%) were malignant. Our study was similar to study of Cajulis RS *et al.*, (1997) and Eneroth CM (1971).^{7,8}

The present study had also categorized salivary gland FNAC into six categories according to Milan system of reporting salivary gland cytopathology (MSRSGC). In our study, maximum no. of cases were seen in category II(non-neoplastic) followed by category IV (Benign) and VI(malignancy) which were variable from the studies Kumari M *et al.*, (2020) in which maximum no. of cases were seen in category IV (benign) followed by category II and category VI, Katta R (2019) maximum no. of cases were seen in category IV followed by category II and category VI.^{4,9}

CONCLUSION:

FNAC is an important diagnostic tool to clinch the correct diagnosis of salivary gland tumours. Though it has some limitations and pitfalls in differentiating certain lesions like pleomorphic adenoma from adenoid cystic carcinoma, basal cell adenoma and warthin's tumour from low grade mucoepidermoid carcinoma. Further, Milan system of reporting salivary gland cytopathology provides a better communication between pathologist and clinicians. This is a six-tier system to bring uniformity in categorizing salivary gland lesions.

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