e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(1); 21-27

Original Research Article

Cytopathological Spectrum of Salivary Gland Lesions at Tertiary Care Hospital

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Received: 25-10-2023 / Revised: 23-11-2023 / Accepted: 26-12-2023

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Conflict of interest: Nil

Abstract:

Background: Fine needle aspiration cytology (FNAC) is a cytodiagnostic method based on morphologic findings of group of cells aspirated using a fine needle. FNAC of salivary gland lesions has complexity and sometimes overlapping features that pose a diagnostic challenge for cytopathologists. The Milan System for Reporting Salivary Gland Cytopathology (MSRSGC) has been introduced for uniformity in the reporting of salivary gland FNAC and improves in better patient management.

Material and Method: I study 50 patients attending the surgery and ENT OPD with the chief complain about salivary gland swelling at the tertiary care hospital, Surendranagar from June 2022 to October 2023. I did FNA procedure and stain the smear and reported according to MSRSGC.

Results: In this study total 50 cases over a period of around one and half year was studied. Most common age group is 41-50 year with male to female ratio is 1.2:1 is found. As per laterality right side was more involved than left side in lesion, predominantly in parotid gland followed by submandibular gland and minor salivary glands. Most of cases are of chronic inflammatory lesions in non-neoplastic and in neoplastic lesion benign lesions mainly (Pleomorphic Adenoma and Warthin Tumor) are more common.

Conclusion: In the present study, the distribution of cases according to MSRSGC was comparable with the previous studies. Since its implementation, the MSRSGC has gained international acceptance as a tool to improve reporting standards and consistency in the complex diagnostic area and utilized for subsequent therapeutic case management.

Keywords: Salivary gland, MILAN, FNAC.

Introduction

Salivary glands are exocrine glands that include major and minor salivary glands. A nodule or diffuse enlargement of salivary glands may be caused by infection, inflammation, cystic lesion, degenerative process, obstruction and benign/malignant neoplasm. [1]

Salivary gland neoplasms account for <3% of all head and neck tumor. [2] Fine-needle aspiration is a well-established procedure for the diagnosis and management of salivary gland lesions, despite challenges imposed by salivary gland tumor diversity, complexity and cytomorphologic overlap. [3,4]

In 2015, an international group of pathologists initiated the development of evidence based tiered classification system- the Milan System for Reporting Salivary Gland Cytopathology (MSRSGC). FNAC of salivary gland provides a minimally invasive, safe, cost-effective, and accurate technique that is extremely useful in identifying a substantial subset of salivary gland lesions. [5,6]

Material and Method

The Retrospective study on the 50 patients who were attending the Surgery and ENT OPD during the June 2022 to October 2023 for the complaining about salivary swellings and came to our

department for the FNA procedure. We did FNA with 22 Gauge needle by aspiration method depending on the size and complexity of the lesion. The collected material were spread on the slides and some of them were air- dried smears, were stained using May- Grunwald Giemsa stain and few were fixed with methanol and then done hematoxylin and eosin, PAP stain. Stained smears were reported as per MILAN system into six categories. Following table shows MILAN category (MSRSGC- MILAN reporting system for reporting salivary gland cytopathology) with its prevalence, malignancy risk category wise and its management.

Diagnostic Category and Definitions	Explanatory Notes	Average Prevalence[10]	Average Risk of Malignancy[10]	Usual Management
Nondiagnostic Insufficient cellular material for a cytologic diagnosis	This diagnostic category should only be used after all the material has been processed and examined. Exceptions include matrix material, mucinous cyst contents, cases with abundant inflammatory cells, and any case with significant cytologic atypia	<10%	25%	Clinical and radiologic correlation/repeat FNA
Nonneoplastic Benign entities such as chronic sialadenitis, reactive lymph node, granulomas, and infection	Specimens lacking cytomorphologic evidence of a neoplastic process. Specimens with inflammatory, metaplastic, and reactive changes. Specimens showing evidence of reactive lymphoid tissue (flow cytometry is recommended based on clinical and morphologic suspicion)	13%	10%	Clinical follow-up and radiologic correlation
AUS Reserved for FNA samples containing limited atypia; indefinite for a neoplasm	Samples are indefinite for a neoplasm; a neoplastic process cannot be excluded after examination of all the material. A majority of these FNAs represent poorly sampled neoplasms or reactive atypia	<10%	~20%	Repeat FNA or surgery
Neoplasm				
(A) Benign Reserved for benign neoplasms diagnosed based on established cytologic criteria	This category includes classic cases of pleomorphic adenoma, Warthin tumor, lipoma, etc	60%	<5%	Conservative surgery or clinical follow-up
(B) SUMP Reserved for FNA samples that are diagnostic of a neoplasm; however, diagnosis of a specific entity cannot be made	This diagnosis should be used for cases where a malignant neoplasm cannot be excluded. A majority of these cases include cellular benign neoplasms, neoplasms with atypical features, and low-grade carcinomas	<10%	35%	Conservative surgery*
Suspicious for malignancy This category is for FNA samples showing features that are highly suggestive of, but not unequivocal for malignancy	The FNA report should state which type of malignant tumor is suspected or provide a differential diagnosis. A majority of specimens in this category are high-grade carcinoma on histopathologic follow-up (an attempt should be made on histopathologic examination to subclassify the neoplasm following complete surgical excision into specific types and grades of carcinoma for cytologic-histologic correlation)	<10%	60%	Surgery*
Malignant This category is for FNA specimens that are diagnostic of malignancy	An attempt should be made to subclassify the neoplasm into specific types and grades of carcinoma: eg, low-grade (low-grade mucoepidermoid carcinoma) vs high-grade (salivary duct carcinoma). Other malignancies such as lymphomas, metastases, and sarcomas are also included in this category and should be specifically designated	22%	90%	Surgery* (extent dependent on type and grade of malignancy)

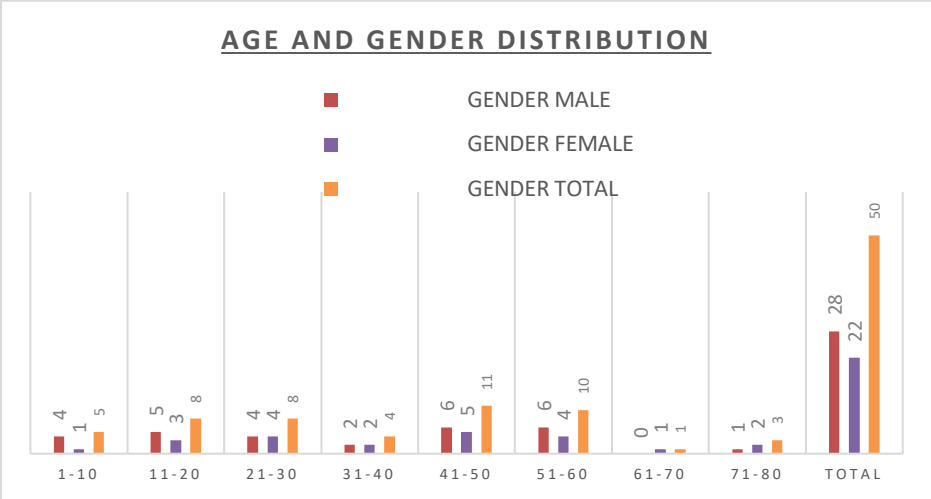
*Intraoperative examination (frozen section) may be helpful to guide the extent of surgery.

Result

A total of 50 salivary gland lesions were examined in the cytology section during the study period out of which 28(56%) were male and 22(44%) were female. Our study population mean age was 45 ± 5. The most frequent site of involvement was parotid gland (56%) followed by submandibular gland (36%) and least common minor salivary gland was affected only in 8%. Out of our 50 cases non-neoplastic lesions were 26 (52%) and neoplastic lesions were 24 (48%).

Table 1: Age and Gender Wise Distribution of Lesions

Age	Gender		
	Male	Female	Total
1-10	4	1	05
11-20	5	3	08
21-30	4	4	08
31-40	2	2	04
41-50	6	5	11
51-60	6	4	10
61-70	0	1	01
71-80	1	2	03
Total	28	22	50



Graph 1: AGE AND GENDER DISTRIBUTION

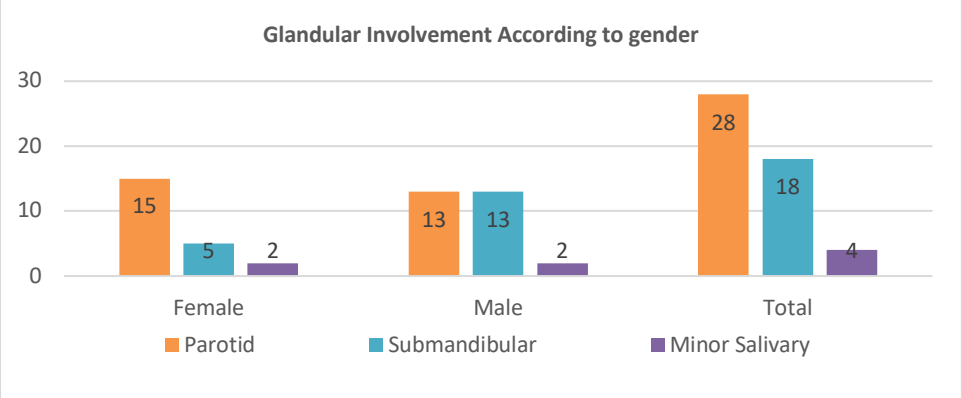
Table 2: FNAC Diagnosis according to age distribution

FNAC Diagnosis	Age Group								
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	**Total**
Acute Sialadenitis	0	0	0	0	1	1	0	0	2
Chronic Sialadenitis	0	0	0	0	0	1	0	0	1
Benign Cystic Lesion	1	1	1	0	0	0	0	0	3
Inflammation	3	4	3	2	3	4	1	0	20
Pleomorphic Adenoma	0	2	2	2	1	0	0	0	7
Warthin's Tumor	0	0	0	0	2	4	0	1	7
Mucoepidermoid Carcinoma	0	0	0	0	2	0	0	0	2
Oncocytoma	0	0	1	0	0	0	0	0	1
Adenoid Cystic Carcinoma	0	0	1	0	0	0	0	0	1
Hemangioma	1	0	0	0	0	0	0	0	1
Round cell Lesion	0	1	0	0	1	0	0	0	2
Basal Cell Adenoma	0	0	0	0	0	0	0	1	1
Lymphoid Neoplasm	0	0	0	0	0	0	0	1	1
CaexPA	0	0	0	0	1	0	0	0	1
Total	5	8	8	4	11	10	1	3	50

Abbreviations: CaexPA, carcinoma ex pleomorphic adenoma. Out of 26 non-neoplastic cases, most of cases were of inflammatory lesions (20). Out of 24 neoplastic cases, 7 cases were of pleomorphic adenoma and 7 cases were of warthin tumor.

Table 3: Involvement of gland with Gender distribution

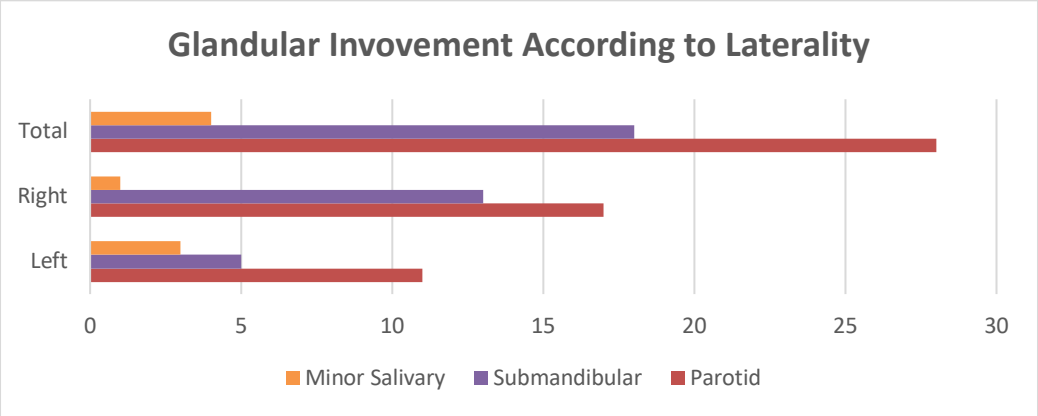
	Gland Involve			
	Parotid	**Submandi-bular**	**Minor Salivary**	**Total**
Female	15	05	02	22
Male	13	13	02	28
Total	28	18	04	50



Graph 2: Glandular Involvement According to gender

TABLE 4: Laterality involvement of individual gland

SIDE	Parotid	Submandi-bular	Minor Salivary	Total
Left	11	05	03	19
Right	17	13	01	31
Total	28	18	04	50



Graph 3: Glandular Involvement According to Laterality

In my study maximum involvement was of right side parotid and submandibular gland followed by left side.

Table 5: MSRSGC Wise Total Number of cases

MILAN Category	Number (%)	Comparison with the study1	Comparison with the study2
		Balmiki Datta et al. (12)	Garima singh et al. (14)
I (non-diagnostic)	03(6%)	05(8.8%)	23(18.7%)
II (non-neoplastic)	20(40%)	14(24.6%)	39(31.7%)
III (AUS)	03(6%)	04(7%)	1(0.81%)
IVa (Benign Neoplasm)	18(36%)	29(50.8%)	49(39.8%)
IVb (SUMP)	02(4%)	02(3.5%)	2(1.63%)
V (SM)	02(4%)	01(1.8%)	2(1.63%)
VI (Malignancy)	02(4%)	02(3.5%)	7(5.69%)
Total	50(100%)	57(100%)	123(100%)

AUS (Atypia of Undetermined Significance); SUMP (Salivary gland neoplasm of Uncertain Malignant Potential; SM (Suspicious of Malignancy). The distribution of cases into different categories were as followed, category I includes 6% of cases, category II includes maximum 40% of cases, category III, IVa, IVb, V, VI includes respectively 6%, 36%, 4%, 4%, 4%.

Table 6: Distribution of the diagnosis with the site it involve

Diagnosis	Site			
	Parotid No. (%)	Submandibular No. (%)	Minor Salivary No. (%)	TOTAL No. (%)
Acute Sialadenitis	1(3.6%)	1(5.6%)	0(0)	2(4%)
Chronic Sialadenitis	1(3.6%)	0(0)	0(0)	1(2%)
Benign Cystic Lesion	2(7.2%)	1(5.6%)	0(0)	3(6%)
Inflammation	7(25%)	13(72%)	0(0)	20(40%)
Pleomorphic Adenoma	5(17.8%)	2(11.1%)	0(0)	7(14%)
Warthin's Tumor	7 (25%)	0(0)	0(0)	7(14%)
Mucoepidermoid Carcinoma	1(3.6%)	0(0)	1(25%)	2(4%)
Oncocytoma	0(0)	1(5.6%)	0(0)	1(2%)
Adenoid Cystic Carcinoma	1(3.6%)	0(0)	0(0)	1(2%)
Hemangioma	0(0)	0(0)	1(25%)	1(2%)
Round cell Lesion	0(0)	0(0)	2(50%)	2(4%)
Basal Cell Adenoma	1(3.6%)	0(0)	0(0)	1(2%)
Lymphoid Neoplasm	1(3.6%)	0(0)	0(0)	1(2%)
Carcinoma ex Pleomorphic Adenoma	1(3.6%)	0(0)	0(0)	1(2%)
Total	28(56%)	18(36%)	4(8%)	50(100%)

Table 7: Mean Age of Category

Category	Age		
	Mean + SD	Range	
		Minimum	Maximum
Non- Neoplastic	34.18+ 19.38	5	68
Neoplastic	41.72 + 19.45	10	75

The Mean age of the non- neoplastic lesion is 34.18 + 19.38 years with minimum age is 5years and 68 years is maximum, while in neoplastic lesion is 41.72 + 19.45 years with minimum age is 10 years and 75 years of age is of oldest one.

Discussion

Swelling of salivary glands, specifically parotid and submandibular gland presents as a common problem and being readily visible creates stigma among patients. FNAC provides a minimal invasive way to obtain a tissue for diagnosis and therefore has now become a diagnostic test of choice to diagnosis these lesions. [7]

However, in lesions showing diverse morphology and various forms of metaplasia, cytomorphological interpretation tends to become challenging. Till recently, there have been classification formats followed for salivary gland cytology such as the five-group system (Myxoid-hyaline, basaloid, oncocytoid, lymphoid, and squamoid lesions) suggested by Miller. [11]

MSRSGC is a newer system for reporting salivary gland lesions according to risk stratification with an objective to provide a better communication between clinicians and cytopathologists so as to improve overall patient management. It is evidence based six tiered system, which provides risk of malignancy (ROM) and clinical management strategies for each category.

Allows easy and reliable sharing of data from different laboratories for national and international collaborative studies and facilitates research into salivary gland lesions. [8,9,10]

AUS (Atypia of Undetermined Significance); SUMP (Salivary gland neoplasm of Uncertain Malignant Potential; SM (Suspicious of Malignancy)

In the present study, 3 cases (6%) were unsatisfactory for diagnosis (Category I) due to scant cellularity on aspirate. The most common reason for the inadequacy was fluid aspirate from a cystic lesion. Balmiki Datta at el found 5 cases (8.8%) of category I. [12]

Non-neoplastic lesions or Category II were the most common salivary gland lesions in the present study (40%). On review of literature, similar distribution of Category II cases (21.5%– 38.2%) was reported by other authors as well, though a higher proportion (55.8%) was reported by Rohilla et al. [13] Inflammatory lesions was the most common cytological diagnosis in our study.

AUS category or Category III in the MSRSGC is defined as a salivary gland lesion that lacks either qualitative or quantitative cytomorphologic features to be diagnosed with confidence as either non-neoplastic or neoplastic. In our study, 3cases (6%) was categorized into Category III. Balmiki Datta at el reported 4 cases (7%) of category III. [12]

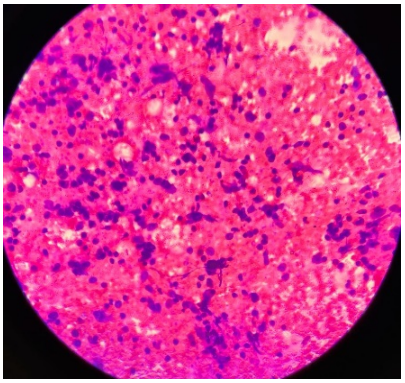


Figure 1: Sialadenitis

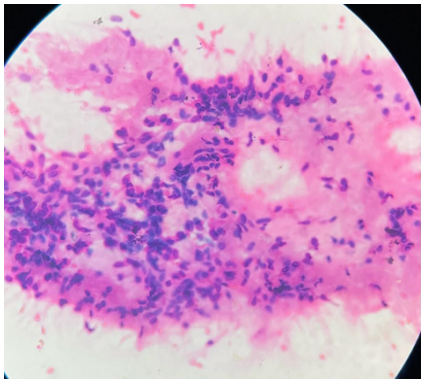


Figure 2: Pleomorphic Adenoma

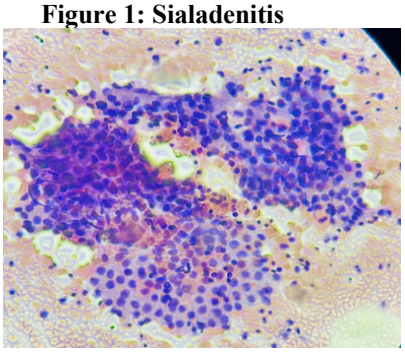


Figure 3: Warthin Tumor

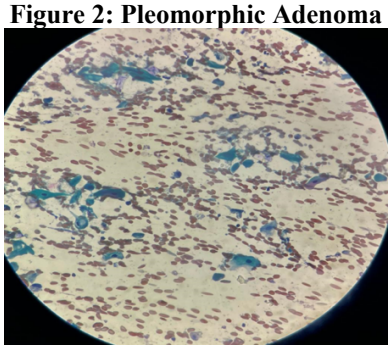


Figure 4: Low grade- MEC (Mucoepidermoid Carcinoma)

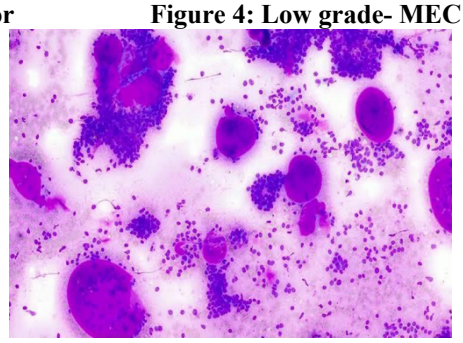


Figure 5: Adenoid Cystic Carcinoma

Figure 1; Sialadenitis; benign ductal epithelial cells, few acinar cells and lymphocytes in hemorrhagic background.

Figure 2; Pleomorphic Adenoma; cluster of benign ductal cells having monomorphic nucleus, also plasmacytoid icells and myoepithelial cells in chondromyxoid background.

Figure 3; Warthin Tumor, sheets of benign ductal and myoepithelial cells and sheets of oncocytic cells with abundant finely granular eosinophilic cytoplasm along with lymphoid aggregates in dirty eosinophilic material.

Figure 4; Mucoepidermoid Carcinoma; sheets of epidermoid cells with squamoid cytoplasm, intermediate cells, mucocytes and pleomorphic squamous cells along with extravascular mucin in necrotic background.

Figure 5; Adenocytoid cystic carcinoma; Neoplastic ductal cells were distributed in three dimensional cluster with round hyaline globule with round hyperchromatic monomorphic nuclei with scanty cytoplasm.

In the present study, a total of 24 cases (48%) were categorized as neoplastic lesions (Category IV, V, and VI). Out of these, 18 cases were benign (IVa), two cases were SUMP IVb, two cases were SFM (V), and two cases were malignant (VI). In my study Pleomorphic adenoma and warthin tumor were the most common neoplastic lesions.

In the Garima sigh at el study, a total of 60 cases (48.7%) were categorized into neoplastic lesions (Category IV, V, VI). Out of these, 49 cases were of benign (IVa), two cases were of SUMP (IVb), two cases were of SFM (V), and seven cases were of malignant (VI). Pleomorphic adenoma was the most common benign salivary gland tumor (IVa). [14]

Conclusion

Milan system of reporting salivary gland cytology provides a useful and uniform 6-tiered reporting

approach of salivary gland lesions helping in risk stratification and alerts the clinician about the subsequent management plan and conveys the ROM in various categories. In the present study, the distribution of cases according to MSRSGC was comparable with the previous studies. Since its implementation, the MSRSGC has gained international acceptance as a tool to improve reporting standards and consistency in the complex diagnostic area and utilized for subsequent therapeutic case management.

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