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A RETROSPECTIVE ANALYSIS OF SALIVARY GLAND LESIONS BASED ON THE MILAN SYSTEM FOR REPORTING SALIVARY GLAND CYTOPATHOLOGY

Pathology

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ABSTRACT

Introduction: In order to improve patient treatment outcomes, facilitate communication between physicians and institutions, and standardize reporting of salivary gland cytology, The Milan System for Reporting Salivary Gland Cytopathology (MSRSGC) was created. This study aimed to determine the cytopathological spectrum of salivary gland lesions using the MSRSGC at a tertiary care hospital in northeast India. **Aims And Objectives:** To classify the results of salivary gland lesions according to MSRSGC and to analyse the frequency of individual category and assess the ROM for each category. **Materials & Methods:** Clinical data and cytology smears of salivary gland lesions diagnosed between December 2023 and November 2024 were obtained. After assessment, each cytology smear was classed into one of the six MSRSGC groups. Using histopathological examination as the gold standard, the following metrics were determined: sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of fine-needle aspiration cytology (FNAC) for detecting malignant lesions. **Results:** According to MSRSGC, out of 50 cases 3 cases (6%) were category I (nondiagnostic), 10 cases (20%) category II (nonneoplastic), 4 cases (8%) category III (atypia of undetermined significance) , 21 cases (42%) category IVA (benign), 3 cases (6%) were category IVB (salivary gland neoplasm of uncertain malignant potential), 3 cases (6%) were category V (suspicious for malignancy) and 6 cases (12%) were category VI (malignant). Overall ROM reported were 0,0,33.3%,0,33.3%,66.6%,100% respectively for each category. Overall sensitivity was 75%, specificity was 96.9%, positive predictive value was 85.7% and negative predictive value was 94.1%. **Conclusion:** Based on the Milan nomenclature, our institution's cytological reporting of salivary gland lesions had an overall diagnosis accuracy of 92%. Our results show that the MSRSGC effectively aids in the identification of malignant lesions, which helps physicians make well-informed management decisions.

KEYWORDS

Fine Needle Aspiration Cytology, Salivary gland lesions, Risk of malignancy Diagnostic accuracy

INTRODUCTION

Fine-needle aspiration cytology (FNAC) serves as a vital diagnostic method in the evaluation of salivary gland lesions. It offers a safe, quick, and reliable way to distinguish between non-neoplastic, benign, and malignant conditions, assisting clinicians in preoperative planning and management decision.[1] It is widely adopted to provide management for salivary lumps mostly based on the ability in distinguishing between non-neoplastic and neoplastic entities, and low grade versus high-grade malignancies including metastatic processes.

Salivary glands, which encompass both the three major pairs (parotid, submandibular, sublingual) and numerous minor glands throughout the oral lining, are exocrine in nature. Enlargement of a salivary gland—whether presenting as a discrete nodule or a diffuse swelling—can arise from a variety of factors, including infections, inflammatory or cystic processes, degenerative changes, ductal obstructions, or benign and malignant tumors.[2]

The MSRSGC is a six tier classification providing a standardized terminology and ROM for each category and thus avoiding the ambiguity often seen in FNAC interpretation.[3]

The categories of MSRSGC are-

I-Non diagnostic
II-Non neoplastic
III-Atypia of undetermined significance
IVA-Benign neoplasm
IVB-Salivary gland neoplasm of uncertain malignant potential (SUMP)
V-Suspicious for malignancy
VI-Malignant

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.[4]

Aim:

To classify the results of salivary gland lesions according to Milan System for Reporting Salivary Gland Cytopathology (MSRSGC).

To analyze the frequency of individual category and assess the risk of malignancy (ROM) for each category.

MATERIALS AND METHODS:

A retrospective study is done for all the cases of salivary gland lesions in Cytopathology Department of AMCH during the period from December 2023 to November 2024. The cytology smears of the salivary gland lesions included FNACs of lesions involving both the major and minor salivary glands.

50 cases were included in the study and reported using the newly proposed six tiered MSRSGC guidelines.

The histological reports and clinical follow up, wherever available, were compared. The risk of malignancy (ROM) was calculated for each category.

A quick history, physical examination, and pertinent inquiry were conducted in each case. The FNAC procedure was carried out with a 20-22 gauge needle attached to a plunger or a needle attached to a 10-ml syringe. Slides were promptly coated with the aspirated substance. While some slides were immediately submerged in 95% ethanol, the majority of the slides were allowed to air dry.

The air-dried smears were routinely stained using Giemsa stain, while alcohol-fixed smears were stained using the Papanicolaou (PAP) method.

All stained smears were examined, and diagnoses were made based on cytological characteristics along with clinic cytological correlation. The collected data from the study was then analyzed.

RESULTS:

Out of 50 cases , 31 (62.0%) were males, and 19 (38.0%) were females. The most frequent site of involvement was the parotid gland (70.2%), followed by the submandibular gland (26.3%). The minor salivary gland was affected only in 3.5% of cases. All the cases were reviewed and categorized according to the MSRSGC into six categories

Table 1: Distribution of All Cases According to the MSRSGC

Category		Number
I	Non Diagnostic	3(6%)
II	Non Neoplastic	10(20%)
III	Atypia of undetermined significance	4(8%)
IV(A)	Neoplasm Benign	21(42%)
IV(B)	SUMP	3(6%)
V	Suspicious of malignancy	3(6%)
VI	Malignant	6(12%)

Table 2: Histological follow-up of Milan system diagnostic categories

Category	No. of cases	No. of cases with histological follow up	No. of benign cases	No. of malignant cases
I	3	2	2	0
II	10	8	8	0
III	4	3	2	1
IVA	21	18	18	0
IVB	3	3	2	1
V	3	3	1	2
VI	6	4	0	4

Table 3: Risk of malignancy

Category	Risk of malignancy
I	0
II	0
III	33.3%
IVA	0
IVB	33.3%
V	66.6%
VI	100%

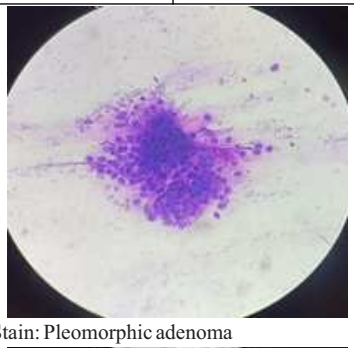

Fig 1- MGG Stain: Pleomorphic adenoma

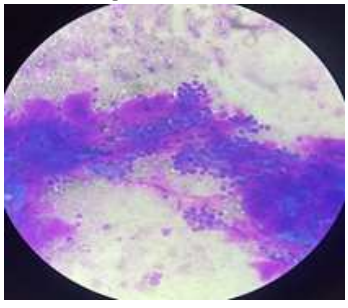

Fig 2-MGG Stain: Adenoid cystic carcinoma

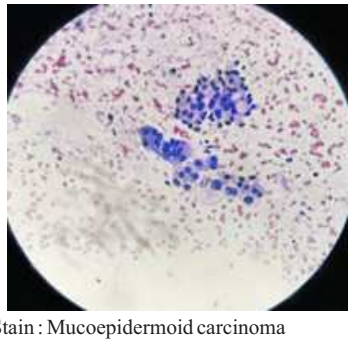

Fig 3- MGG Stain : Mucoepidermoid carcinoma

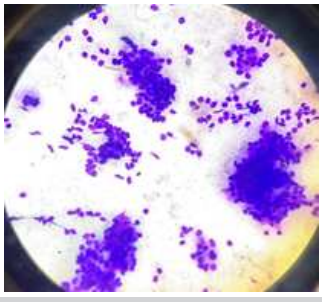

Fig 4- MGG Stain: Salivary gland neoplasm of uncertain malignant potential

DISCUSSION:

The risk of malignancy (ROM) for the present study was category I- 0, category II- 0, category III- 33.3%, category IVA- 0, category IVB- 33.3%, category V- 66.6% and category VI- 100%.

Comparison of Risk of Malignancy (ROM) of Present Study with other studies:

Authors					ROM(%)		
	I	II	III	IVA	IVB	V	VI
Faquin et al.[5]	25	10	20	<5	35	60	>90
Hollyfield d j et al.[6]	38	17	33	04	33	67	100
Chen Y et al.[7]	8.6	15.4	36.8	2.6	32.3	71.4	100
Present study	0	0	33.3	0	33.3	66.6	100

For this study, statistical analysis revealed the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy as 75%, 96.9%. 85.7%, 94.1% and 92% respectively.

Comparison of Statistical Data of Present Study with other Studies for Prediction of Malignancy by MSRSGC:

Authors	Sensitivity	Specificity	PPV	NPV	Diagnostic accuracy
Chen Y et al.[7]	70.4	99.2	90.5	96.7	80.1
Jha S et al.[8]	64.2	97.0	90.0	86.6	87.3
Karuna V et al.[9]	85.0	98.1	94.4	94.6	94.5
Present study	75	96.9	85.7	94.1	92

CONCLUSION

Fine-needle aspiration cytology (FNAC) has been a cornerstone in the initial assessment and management of salivary gland lesions for over fifty years. Its widespread adoption stems from its minimally invasive nature, rapid results, and strong ability to distinguish between benign and malignant lesions, making it an essential first-line diagnostic tool**.** The most reliable technique for verifying diagnosis and directly influencing patient treatment plans is still histopathological investigation. Clinicians can only precisely describe lesions and decide on the best**.** However, applying the Milan System to evaluate salivary gland lesions offers valuable prognostic insights. It also helps inform appropriate management strategies for patient care.

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