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Original Research Article

Milan scoring system in the diagnosis of salivary gland lesions for assessment of risk of malignancy

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ABSTRACT

Introduction: Salivary gland lesions are one of the most common encounters in clinical practice for the evaluation of which Fine needle aspiration cytology is a well-established technique nowadays. Owing to the heterogenecity and morphological overlap between the various categories of these salivary gland lesions, there was a need for a standardised procedure. The Milan System for Reporting Salivary Gland Cytopathology (MSRSGC) provides a standardised evidence based reporting system to assess the risk of malignancy and thus helpful for the management of these lesions. We have undertaken this study for evaluation of salivary gland lesions by this newly introduced grading system for predicting the malignant potential of these lesions.

Materials and Methods: We have done a prospective study of all the salivary gland lesions received in our department for a period of 3 years from 2016 to 2019. The clinical history, aspiration cytology and histopathological examination was done for all the cases.

Results: We have received 225 salivary gland lesions for aspiration, but histological follow up was done in only 105 lesions, which were thus included in our study. Case distribution into different categories was done in the following way:ND (5.71%), NN (38.01%), AUS (2.57%), NB (33.34%), SUMP (1.9%), SM (2.85%), and M (15%). Overall, ROM reported were 25%, 5%, 20%, 4.4%, 33.3%, 85.7%, and 97.5%, respectively for each category. Overall, sensitivity was 83.34%, specificity was 98.01%, positive predictive value was 94.87%, and negative predictive value was 91.89%.

Conclusion: MSRSGC is a six category scheme that was recently proposed that separates the salivary gland FNAC into distinct categories, thus increasing the specificity by limiting the number of false negative and false positive cases.

1. Introduction

Fine needle aspiration cytology is a minimally invasive procedure that has been widely accepted in the evaluation of lesions in thyroid, lymph nodes and salivary gland, to name a few. [1,2] Salivary gland aspiration cytology provides a cost-effective means for their evaluation as it is a very simple and effective. This procedure has avoided unnecessary surgical interventions by differentiating benign from malignant lesions. The sensitivity and specificity of aspiration cytology ranges from 90-100%. [3,4]

Salivary gland lesions are known for their diversity and the heterogenecity of the morphological features and thereby many challenges are thrown to the pathologist in the process of final diagnosis. The important aspect is the differentiation of benign from malignant one. [5,6]

FNAC has many diagnostic challenge because of the presence of histological features like basaloid pattern of the cells, cystic change, oncocytic and squamous metaplasia. [7] Subclassification of the lesion into benign, suspicious of

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malignancy or definitive malignancy was done in various studies thus stratifying the risk of malignancy.[3] The risk varies from study to study ranging from 6 to 100% and lacks a consensus approach.[8]

Salivary gland reporting system lacks terminology and various systems have been in use from two tiered to six tiered system. The "Milan System for Reporting Salivary Gland Cytopathology" (MSRSGC), a tiered international classification scheme was proposed by the American Society of Cytopathology and International Academy of Cytology recently. This system (Table 1) provides a guide for clinical management depending on the risk of malignancy (ROM).[9,10]

The current study was done to diagnose and classify the salivary gland lesions by the recent Milan system for assessment of the risk of malignancy.

2. Materials and Methods

All the cases referred to the department of Pathology from the Department of Surgery, ENT and Dental Surgery for evaluation of salivary gland lesions were included in the study. Clinical data and radiological assessment was done in all these cases. Fine needle aspiration was done. The slides were stained with H and E, PAP stain was used in cases where required. All the cases were reported by a single pathologist to avoid reporting bias and stratified into various categories according to MSRSGC.

Category 1: Non-diagnostic (ND)

Category 2: Non-neoplastic (NN)

Category 3: Atypia of undetermined significance (AUS)

Category 4a: Neoplasm: Benign (NB)

Category 4b: Neoplasm: Salivary gland neoplasm of uncertain malignant potential (SUMP)

Category 5: Suspicious of malignancy (SM)

Category 6: Malignant (M).

Only 105 cases came for follow up, for which histopathological examination was done. Risk of malignancy was thus calculated depending upon the histopathological features.

3. Results

In our study we had male predominance and most of the cases were seen in the age group of 21-40years.

Patients had presented with lesions in all the major and minor salivary glands-parotid, submandibular and sublingual. Majority of the cases were seen in the parotid gland.(57.7%).

Cytological evaluation was done according to the Milan system as shown in Table 6.

4. Discussion

FNAC is a safe, accurate, and cost-effective method for evaluation of salivary gland swelling and can help in management of the patient by avoiding unnecessary surgery in cases where there no malignancy as is assessed by the risk of malignany given by Milan system of scoring.[11–13]

The patient management is made easy by MSRSGC, a new system used for reporting salivary gland lesions with risk stratification. As discussed previously it is a evidence based six tiered system, providing risk of malignancy which is very useful for the treatment of the patients.[11–13] The six categories as per this system are Non diagnostic(ND), Non neoplastic(N), Atypia of undetermined malignancy(AUS), Neoplasm-Benign (NB),Neoplasm-Suspicious of malignant potential(SUMP), Suspicious of malignancy(SM), and Malignant. Risk of malignancy(ROM) as given by this system is as follows: 25%, 10%, 20%, 5%, 35%, 60%, and 90% for each category.[9] In our study after categorising the various lesions, we have assessed the risk of malignancy. ROM for the various categories is as follows: 25% for category I-Non diagnostic, 5%, for category II-Non neoplastic, 25% for category III-Atypia of undetermined significance,2.8% for category IV a – Neoplasm: Benign, 50%-IV b- Neoplasm:Salivary gland neoplasm of uncertain malignant potential, 100% for category V- Suspicious of malignancy and lastly 86.8% for category VI- Malignant. These results are comparable to those given in the Milan system.

We now discuss each category in detail with reference to the cytological and morphological features.

In the Category 1, in view of insufficient material for diagnosis, they are non-diagnostic so cannot give an informative interpretation. There were 6 cases (3.3%) in our study belonging to this category(ND). Histopathological follow-up revealed 4 cases to be chronic sialadenitis. 1 case was Pleomorphic adenoma, which in view of secondary changes, yielded an insufficient aspirate on fine needle aspiration.1 case was diagnosed as Adenocarcinoma with marked cystic change on histology that lead to insufficient aspiration on cytology.

Now we shall discuss the Category 2, non neoplastic. Only 40(44%) out of 90 cases came for follow up. Most of the cases have good cytomorphological co relation except for 1 case. This case was actually diagnosed as acute sialadenitis,but on histopathological examination, it was diagnosed as carcinoma-ex pleomorphic adenoma, the areas of necrosis seen in histopathology were actually mis interpreted as inflammatory debris and diagnosed as acute sialadenitis in cytology.

Under the next category, Atypia of undetermined significance, all the 4 cases came for follow up(100%). This category is a grey zone as malignancy cannot be ruled out. 3 cases were pleomorphic adenoma with mild atypia on histopathology. These atypicals cells were the reason for diagnosing as AUS on cytology. One case was Adenoid cystic carcinoma, the cells which seen as dispersed cells with atypia are the cells of adenoid cystic carcinoma with a

Table 1: The milan system for reporting salivary gland cytopathology (MSRSGC): Implied risk of malignancy and recommended clinical management

	Diagnostic category	Risk of malignancy (%)	Management
I	Non-diagnostic	25	Clinical and radiologic correlation/ repeat FNAC
II	Non-neoplastic	10	Clinical follow-up and radiological correlation
III	Atypia of undetermined significance (AUS)	20	Repeat FNAC or surgery
IV	Neoplasm		
	Neoplasm: Benign	<5	Surgery or clinical follow-up
	Neoplasm: Salivary gland neoplasm of uncertain malignant potential (SUMP)	35	Surgery
V	Suspicious for malignancy (SM)	60	Surgery
VI	Malignant	90	Surgery

Table 2: Distribution of cases according to age, sex, and site of involvement Sex distribution of the lesions

Sex	No. of cases	%
Males	118	51.5
Females	107	48.5
Total	225	100

Table 3: Age distribution of the lesions

Age group	No. of cases	%
0-20	31	13.6
21-40	104	46.1
41-60	61	27
61-80	22	10.2
>81	7	3
Total	100	

Table 4: Site distribution of the lesions

Site	No. of cases	%
Parotid	130	57.7
Submandibular	61	27.3
Sublingual	34	15
Total	100	

Table 5: Age distribution of the lesions

Age group	No. of cases	%
0-20	3	3.61
20-40	22	26.50
40-60	39	46.98
60-80	19	22.89

different pattern(solid) mis diagnosed as atypia in cytology.

The 4th category has 4a and 4b.35 cases out of 72 have come for follow up. The most common benign lesion was Pleomorphic adenoma the maximum co relation was seen in this category. Only 1 case which was diagnosed as pleomorphic adenoma turned out to be carcinoma adenoid cystic carcinoma. The various patterns i.e. solid, trabecular and cribriform pattern were misinterpretated as epithelial and mypepithelial componnets in cytology and was underdiagnosed as Neoplasm Benign, possibility of Pleomorphic adenoma.

In cases where cytology is not able to differentiate between benign and malignancy we label it as suspicious of malignant potential.2 out 4 cases (50%) came for follow up. 1 case was non neoplastic on histology. The other was malignant, adenocarcinoma. Thus one case was over diagnosed as suspicious of nmalignacy in view of marked atypia which was actullay due to acute inflammatory process.

Table 6: Histological follow-up of Milan system diagnostic categories

Category	Cat 1	Cat 2	Cat 3	Cat 4a	Cat 4b	Cat 5	Cat 6	Total
No. of cases	15 (6.1%)	90 (38.2%)	04 (2.7%)	72 (33.4%)	04 (2.0%)	06 (2.4%)	34(15%)	225
No. of cases with histological follow-up	06 (2.3%)	40 (11.6%)	04 (2.9%)	35 (52.3%)	02 (3.5%)	03 (4.1%)	15 (23.2%)	105 (58.7%)
Benign: non-neoplastic	4 (50%)	28 (65%)	-	03 (1.1%)	01 (16.6%)	-	2	37 (9.8%)
Benign: neoplastic	01 (25%)	10 (30%)	03 (80%)	32 (94.4%)	0	0	-	46 (58.7%)
Malignant	01 (25%)	02(5%)	01 (20%)	01 (4.4%)	1 (33.3%)	3 (85.7%)	13(97.5%)	23 (31.4%)
Risk of malignancy	01/04 (25%)	02/40 (5%)	01/04 (25%)	1/35(2.8%)	01/2 (50%)	3/3 (100%)	13/5 (86.6%)	23/105 (21.9%)

Non neoplastic category was the most common(40%) followed by neoplastic, benign (32%)

The 5^{th} category, suspicious for malignancy is a entity for cases where the features are suggestive. All the 3 cases came for follow up were diagnosed as Adenoid cystic carcinoma giving rise to 100% efficacy between cytology and histopathology.

The last category included malignant. Here the features are very much diagnostic. 15 cases came for follow up. 13 cases were malignant on histopathology with ROM being 86.6%.1 case was pleomorphic adenoma which was signed out as malignant in cytology and other case was sialadenitis with severe atypia which again was diagnosed as malignant in cytology.

As we have limited studies in this field of cytology we would conclude that further research has to be done. The other limitation of our study is sample size.

5. Source of Funding

None.

6. Conflict of Interest

The authors declare no conflict of interest.

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