Original Research Article

Assessment of Milan System for reporting salivary gland cytopathology and risk of malignancy

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Received: 10-02-2021 / Revised: 23-03-2021 / Accepted: 28-04-2021

Abstract

Background: Salivary gland cancers are uncommon, representing 6.1% of head and neck cancers, and about 0.2% of all malignancies. The present study was conducted to assess Milan System for reporting salivary gland cytopathology and risk of malignancy. **Materials & Methods:** 180 FNAC specimen from salivary gland lesions were involved. The cytological features were evaluated, and then cases were reclassified according to MSRSGC as follows: 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) and category 6: Malignant (M).**Results:** Age group < 20 years had 40 males and 35 females, 21-40 years had 30 males and 20 females, 41-60 years had 24 males and 13 females and >60 years had 6 males and 12 females. Parotid gland was involved in 95, submandibular in 50 and minor salivary gland in 35 cases. Cat 1, Cat 2, Cat 3, Cat 4a, Cat 4b, Cat 5 and Cat 6 had 10, 70, 4, 64, 3, 2 and 27 cases respectively and histological follow-upwas 6,60, 3, 60, 1, 2 and 25 respectively. Benign non- neoplastic lesions were 3, 46, 1, 6, 0, 0 and 1, benign neoplastic lesions were 2, 10, 2, 52, 0, 1 and 4, malignant lesions were 1, 4, 1, 2, 1, 1 and 20 and risk of malignancy as seen in 1 (16.6%), 4 (6.6%), 1 (33.3%), 2 (3.33%), 1 (100%), 1 (50%) and 20 (80%) in Cat 1, Cat 2, Cat 3, Cat 4a, Cat 4b, Cat 5 and Cat 6 respectively. **Conclusion:** Milan system was effective in categorizing salivary gland pathologies and limits the chances of false positive and negative.

Keywords: Salivary, glands, malignancy.

Introduction

Salivary gland cancers are uncommon, representing 6.1% of head and neck cancers, and about 0.2% of all malignancies[1]. Fine-needle aspiration (FNA) biopsy is a safe and cost-effective technique for preoperative evaluation of salivary gland lesions and is widely accepted for the management of salivary gland masses. It is useful for differentiating between neoplastic and non-neoplastic lesions and for providing specific diagnoses for common benign and malignant neoplasms[2].Fine-needle aspiration cytology (FNAC) of salivary gland is used world-wide for the diagnosis and management of salivary gland tumors. 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. In addition, it guides the further management strategy[3].Many studies have reported excellent sensitivity and specificity of FNAC to differentiate neoplastic vs. non-neoplastic lesions as well as benign and malignant neoplasms; among different studies, the sensitivity of FNAC ranges from 86% to 100%, and specificity ranges between 90%–100%.Apart from this, FNAC is an useful tool to differentiate between primary vs. metastatic lesions specially head and neck malignancies and thus helping in deciding the treatment plan[4].The Milan System for Reporting Salivary Gland Cytopathology (MSRSGC) is a recently introduced evidence-based classification scheme that provides the risk of malignancy (ROM)for each of 6 diagnostic categories, along with recommend-dations for clinical management[5]. The 6 diagnostic categories are non-diagnostic (ND) (category 1), non-neoplastic (NN) (category 2), atypia of undetermined significance (AUS) (category 3), neoplasm, benign (NB) (category 4a), salivary gland neoplasm of uncertain malignant potential (SUMP) (category 4b), suspicious for malignancy (SFM) (category 5), and malignant (M) (category 6) [6]. The present study was conducted to assess Milan System for reporting salivary gland cytopathology and risk of malignancy.

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Materials & Methods

The present study comprised of 180 FNAC specimen from salivary gland lesions.Aspiration form major and minor salivary gland swelling were done through a direct percutaneous or intraoral route with 22 or 23 gauze needle with or without ultrasound guidance. The smears were aspirated in different areas, and smears were prepared and stained with May-Grunwald-Giemsa stain, H and E stain in all cases and occasionally with Pap stain also.The cytological features were evaluated, and then cases were reclassified according to MSRSGC as follows: 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) and category 6: Malignant (M). Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1:Age and gender wise distribution of cases

Age group	Males	Females	P value
< 20 years	40	35	0.05
21-40 years	30	20	
41-60 years	24	13	
>60 years	6	12	

Table 1,Fig 1 shows that age group < 20 years had 40 males and 35 females, 21-40 years had 30 males and 20 females, 41-60 years had 24 males and 13 females and >60 years had 6 males and 12 females. The difference was significant (P< 0.05).

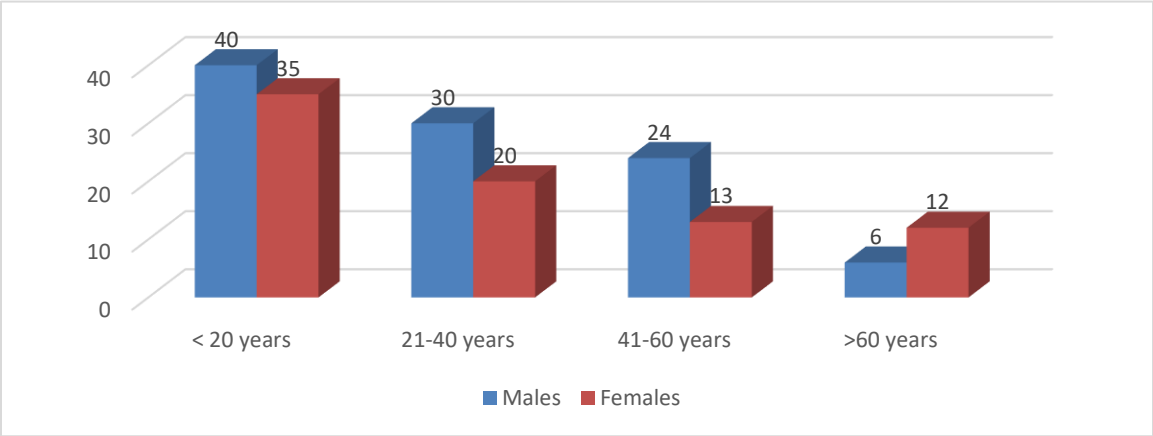

Fig 1:Age and gender wise distribution of cases

Table 2:Involvement of gland

Gland	Number	P value
Parotid	95	0.05
Submandibular	50	
Minor salivary gland	35	

Table 2 shows that parotid gland was involved in 95, submandibular in 50 and minor salivary gland in 35 cases. The difference was significant (P< 0.05).

Table 3:Histological diagnosis and Milan system

Category	Cat 1	Cat 2	Cat 3	Cat 4a	Cat 4a	Cat 5	Cat 6	P value
Number	10	70	4	64	3	2	27	0.01
Histological follow-up	6	60	3	60	1	2	25	0.04
Benign non- neoplastic	3	46	1	6	-	-	1	0.01
Benign neoplastic	2	10	2	52	0	1	4	0.03
Malignant	1	4	1	2	1	1	20	0.04
Risk of malignancy	1 (16.6%)	4 (6.6%)	1 (33.3%)	2 (3.33%)	1 (100%)	1 (50%)	20 (80%)	0.04

Table 3 shows that Cat 1, Cat 2, Cat 3, Cat 4a, Cat 4b, Cat 5 and Cat 6 had 10, 70, 4, 64, 3, 2 and 27 cases respectively and histological follow-up was 6,60, 3, 60, 1, 2 and 25 respectively. Benign non-neoplastic lesions were 3, 46, 1, 6, 0, 0 and 1, benign neoplastic lesions were 2, 10, 2, 52, 0, 1 and 4, malignant lesions were 1, 4, 1, 2, 1, 1 and 20 and risk of malignancy as seen in 1 (16.6%), 4 (6.6%), 1 (33.3%), 2 (3.33%), 1 (100%), 1 (50%) and 20 (80%) in Cat 1, Cat 2, Cat 3, Cat 4a, Cat 4b, Cat 5 and Cat 6 respectively.

Discussion

FNA is a widely accepted tool for the diagnosis of salivary gland lesions. MSRSGC is an evidence-based reporting system for salivary gland cytopathology to increase the overall efficacy of salivary gland FNA[7].MSRSGC should improve the performance of salivary gland FNA by promoting the distinction of neoplasms from NN lesions and providing tiered ROM for each category, guiding appropriate clinical management[8].Other major drawback is the terminology of reporting salivary FNAC, which varies markedly[9]. Various reporting formats have been used varying from two tired scheme to six or even more. Although some have tried to diagnose according to histological category, other have tried terminology such as atypical, suspicious, and malignant[10].The present study was conducted to assess Milan System for reporting salivary gland cytopathology and risk of malignancy.In present study, age group < 20 years had 40 males and 35 females, 21-40 years had 30 males and 20 females, 41-60 years had 24 males and 13 females and >60 years had 6 males and 12 females. Kala et al[11] conducted retrospective study to reclassify the salivary gland lesions from previous diagnosis and to evaluate the ROM in different categories.Clinical data, FNAC specimen, histological, and clinical follow-up of cases were retrieved, cytological features were re-evaluated, and cases were reclassified as follows: 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); and Category 6: Malignant (M).Total 293 cases were evaluated cytologically, and histological follow-up was available in 172 cases. The distribution of cases into different categories was as follows ND (6.1%), NN

(38.2%), AUS (2.7%), NB (33.4%), SUMP (2.0%), SM (2.4%), 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 83.33%, specificity was 98.31%, positive predictive value was 95.74%, and negative predictive value was 92.80%.We found that parotid gland was involved in 95, submandibular in 50 and minor salivary gland in 35 cases. Cat 1, Cat 2, Cat 3, Cat 4a, Cat 4b, Cat 5 and Cat 6 had 10, 70, 4, 64, 3, 2 and 27 cases respectively and histological follow-up was 6,60,3,60,1,2 and 25 respectively. Benign non- neoplastic lesions were 3, 46, 1, 6, 0, 0 and 1, benign neoplastic lesions were 2, 10, 2, 52, 0, 1 and 4, malignant lesions were1, 4, 1, 2, 1, 1 and 20 and risk of malignancyas seen in 1 (16.6%), 4 (6.6%), 1 (33.3%), 2 (3.33%), 1 (100%), 1 (50%) and 20 (80%) respectively. Hirata et al[12] applied MSRSGC to Japanese cases and evaluated its utility. A total of 480 FNA cases were reviewed. They recategorized each case into one of the MSRSGC categories. The risk of neoplasm (RON) and the risk of malignancy (ROM) for each diagnostic category in MSRSGC, and the sensitivity, specificity, accuracy, positive predictive value (PPV), and negative predictive value (NPV) for malignancy and for neoplasms were calculated for cases with histological follow-up. In addition, the overall ROM (O-ROM) was calculated for all FNA cases. RON, ROM, and OROM rates were as follows – non-diagnostic: 51.3, 5.1, and 1.0%; non-neoplastic: 0, 0, and 0%; atypia of undetermined significance: 83.9, 12.9, and 7.3%; neoplasm, benign: 100, 0, and 0%; salivary gland neoplasm of uncertain malignant potential: 100, 32.1, and 23.7%; suspicious for malignancy: 100, 85.7, and 60%; and malignant: 100, 100, 81.8%. The sensitivity, specificity, and accuracy with (without) indeterminate cases for malignancy were 65 (100), 99 (99), 92% (99%) and PPV and NPV were 96 and 100%, respectively, and those for neoplasms were 84 (100), 100 (100), 85% (100%), and PPV and NPV were 100 and 100%, respectively.

Conclusion

Authors found that Milan system was effective in categorizing salivary gland pathologies and limits the chances of false positive and negative.

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Conflict of Interest: Nil
Source of support:Nil