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CLASSIFYING SALIVARY GLAND LESIONS BASED ON MILAN'S SYSTEM FOR REPORTING SALIVARY GLAND CYTOPATHOLOGY AND EVALUATING THE RISK OF MALIGNANCY: A RETROSPECTIVE COHORT STUDY AT PRM MEDICAL COLLEGE & HOSPITAL, BARIPADA, INDIA.

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Abstract

Background

Fine needle aspiration cytology (FNAC) is a very vital mode in the detection for defects in salivary glands (SG). The Milan System for Reporting Salivary Gland Cytopathology (MSRSGC) is classified into 6 groups which help the doctors to account for the chances of cancer in every group. The prime goal of this research is to utilize MSRSGC for the categorization of SG tumors.

Methods and materials

A retrospective cohort analysis was carried out at PRM Medical College & Hospital, Baripada. 200 patients were included having suspicion of salivary gland lesions in this research. After taking the patient history, sample for FNAC, histopathological findings, their pathological characteristics were examined and subjects were grouped as group 1 (Non-diagnostic), group 2 (Non-neoplastic), group 3 (Atypia of undetermined significance, group 4a (Neoplasm benign), group 4b (salivary gland neoplasm), group 5 (suspicious of malignancy), group 6 (Malignant).

Results

In this study, 110 male and 90 female subjects participated, with 30 under 20 years old, 80 aged 20-40, 44 aged 41-60, and 36 aged 61-80. Parotid gland involvement was predominant (119 cases), followed by the submandibular gland (60 cases) and minor salivary glands (21 cases). Salivary gland lesions were categorized via the Milan system as Group 1 (n=18), Group 2 (n=17), Group 3 (n=4), Group 4a (n=2), Group 4b (n=32), Group 5 (n=43), and Group 6 (n=84).

Conclusion

The responsiveness of 95% and precision of 98.9% to differentiate between non-cancerous and benign tumors and malignancy proclaimed the great correctness of SG fine needle aspiration cytology.

Recommendation

FNAC has great precision and responsiveness which differentiates benign and malignant tumors. Milan's system of categorization is also very effective and valuable.

Keywords: *Tumor, neoplasm, inflammation, Lesions.*
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Introduction

Malignancy of exocrine glands is very infrequent, constituting only 4% of total malignancy in the upper part of the body broadly [1,2]. Fine needle aspiration cytology (FNAC) achieved significance due to the detection of salivary gland tumors when FNAC was routinely performed in Sweden [3]. Advantages of FNAC include adequate approachability of abnormality, standard simpleness of the

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process, least invasive, and also economical. This procedure is highly responsive and precise. Radiographic detection is not enough for the diagnosis of salivary gland tumors. Some poor-quality tumors show significant lapping with BN in cytopathology [4].

Even though FNAC has many advantages, it has disadvantages also. The drawback of FNAC is the absence of limited diagnostic standards for SG cytology making treatment plans hard. To deal with the requirement of an investigative system, the Milan System for Reporting Salivary Gland Cytopathology was discovered by doctors in 2012 in America [5]. Milan's system also tells the approximate chances of cancer and clinical handling for all groups. Part of fine needle aspiration cytology is efficiently described before operation in subjects having SG lesions.

Salivary gland lesions have distinct categorizations with diverse grouping plans, which makes it difficult for doctors to understand the information [6]. WHO categorized salivary gland lesions into types, 11 types had adenomas and 20 types had carcinomas in the year 2017 [7]. In many studies, it was found that utilization of fine needle aspiration cytology in the interest subcategorization of inflammation, also correctness varies from 47%-93% [8-10]. One of the disadvantages of fine needle aspiration cytology is terms for documenting salivary fine needle aspiration cytology, differ distinctly. The prime goal of current research is to utilize MSRSGC for the categorization of SG inflammation.

Objectives

- To Utilize the Milan System for Reporting Salivary Gland Cytopathology (MSRSGC) for the Categorization of Salivary Gland (SG) Tumors.
- To Evaluate the Effectiveness and Accuracy of Fine Needle Aspiration Cytology (FNAC) in Differentiating Between Benign and Malignant Salivary Gland Lesions.

Materials and Methods

Study design and population

The present investigation is a retrospective cohort research. 200 patients were taken in this research

Study location and duration

The research was conducted in PRM Medical College & Hospital, Baripada, Odisha, India, between June 2022 to May 2023.

Inclusion criteria

Patients are suspicious of salivary gland lesions.

Exclusion criteria

Patients with impaired cytological material.

Data collection

Patients detailed history was noted, a sample for FNAC was taken and with the histological findings subjects were grouped as group 1 (Non-diagnostic), group 2 (Non-neoplastic), group 3 (Atypia of undetermined significance, group 4a (Neoplasm benign), group 4b (salivary gland neoplasm), group 5 (suspicious of malignancy), group 6 (Malignant).

Bias

There was a possibility that bias may have occurred during the beginning of the research but was circumvented by providing all patients with similar details and keeping the confidentiality of the category allotment from the staff who gathered the details.

Ethical consideration

The aim of the research was demonstrated. Consent was taken from all the research subjects. The privacy of the subjects was kept.

Ethical approval

This research was sanctioned by the moral council of the institution.

Statistical analysis

The data obtained from the study was arranged in a tabulated manner in an Excel sheet, and the data was then subjected to statistical analysis.

Results

Table 1: Classification of subjects according to sex

Sex	Number of patients
Male	110
Female	90

As shown in Table 1, 110 subjects were men and 90 patients were women.

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Table 2: Classification of subjects according to the age

Age	Number of patients
Below 20	30
20-40	80
41-60	44
61-80	36
Above 80	10

In Table 2, 30 subjects are below 20 years of age. 80 subjects are in the age range of 20-40 years. 44 subjects fall in the age range of 41-60 years. 36 subjects fall in the age range of 61-80 years and 10 above 80 years of age.

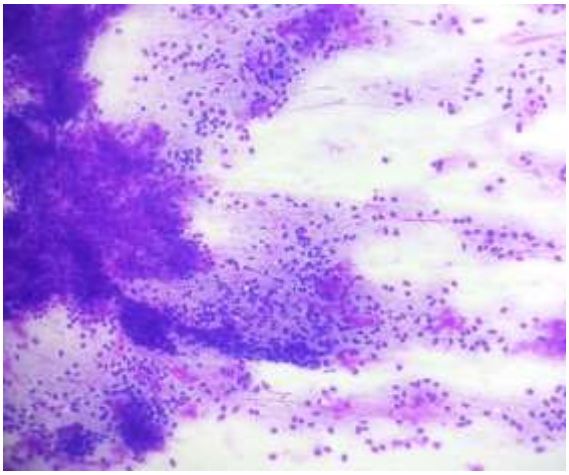

Fig 1 –Pleomorphic adenoma

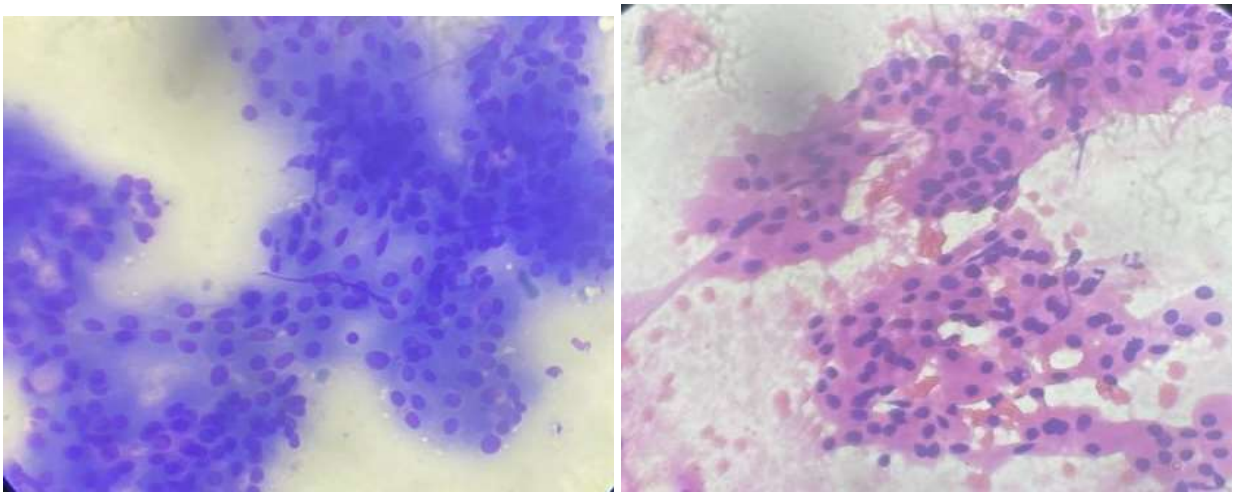

Fig 2(a,b)- Warthins Tumour

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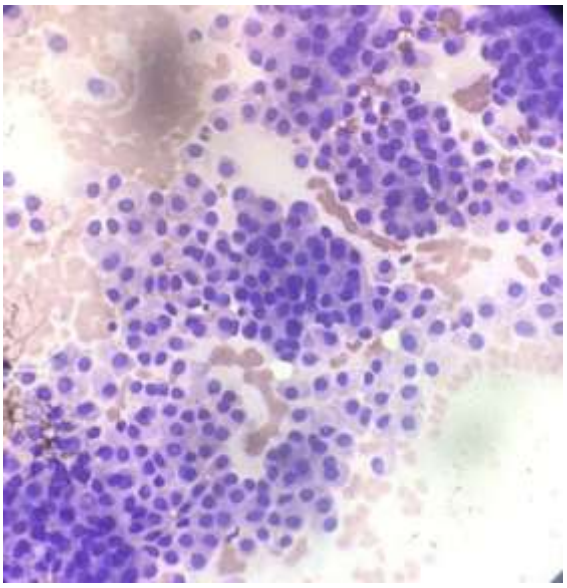
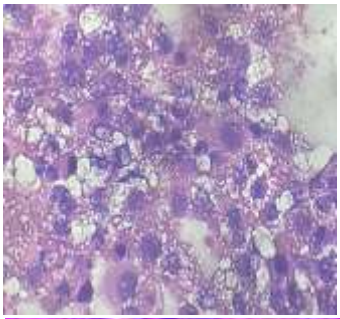
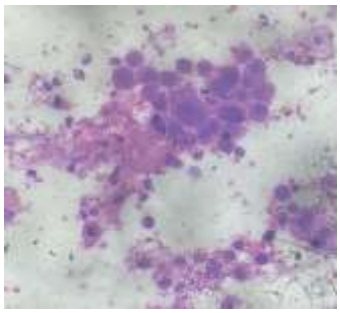


Fig 3-Oncocytoma





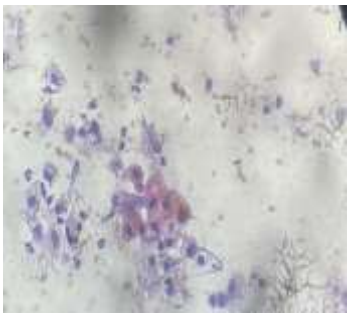
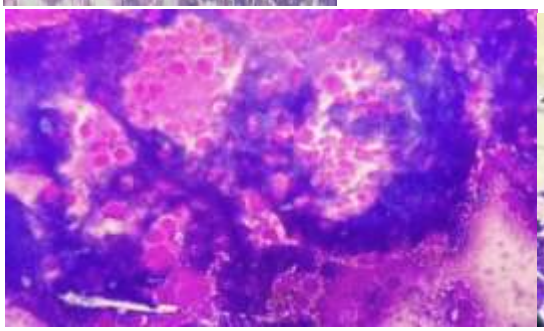


Fig 4 (a, b, c) MUCOEPIDERMOID CARCINOMA



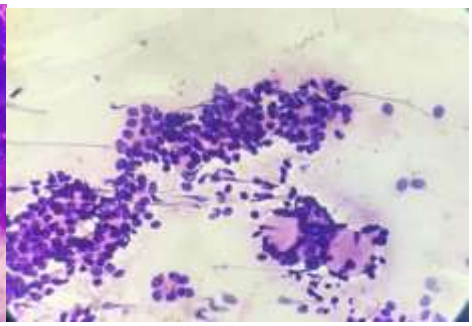


Fig -5 (a, b) – ADENOID CYSTIC CARCINOMA

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Table 3: Classification according to the association of gland

Glands associated	Number of patients
Parotid	119
Sub mandibular	60
Minor salivary glands	21

As shown in Table 3, in the majority of the patients that are 119, the parotid gland is involved. In 60 patients sub mandibular gland was involved in 21 cases minor salivary glands were involved.

Table 4: Classification according to the Milan system

Classification		Number of patients
Group 1	Non- diagnostic	18
Group 2	Nonneoplastic	17
Group 3	Atypia of undetermined	4
Group 4a	Neoplasm benign	2
Group 4b	SUMP	32
Group 5	Suspicious of malignancy	43
Group 6	Malignant	84

In Table 4, 18 and 17 patients were in groups 1 and 2 separately. 4 patients were in group 3. 2 and 32 patients were in groups 4a and 4b respectively. 43 patients in group 5 and 84 patients in group 6.

Discussion

TThe study demonstrated the utility and effectiveness of the MSRSGC in classifying salivary gland tumors. The key findings indicate a high prevalence of malignancy (Group 6) among the subjects, showcasing the critical need for accurate diagnostic tools like FNAC in distinguishing between benign and malignant lesions. The distribution across the different groups suggests a potential trend towards more severe pathology in cases with parotid gland involvement, aligning with previous studies that found similar distribution patterns.

The results underscore the Milan system's ability to facilitate precise risk stratification and aid clinicians in determining the likelihood of malignancy, thereby guiding appropriate clinical management. The high precision and responsiveness of FNAC, as demonstrated by the correctness of 98.9% in distinguishing between non-cancerous, benign, and malignant tumors, affirm the reliability of this diagnostic method when integrated with the Milan system's classification approach.

Given the distribution across the MSRSGC groups, the study's findings may influence future diagnostic and treatment strategies, emphasizing the importance of skilled FNAC interpretation and the need for specialized centers to reduce the rate of non-diagnostic outcomes. The significant representation of malignant cases highlights the ongoing challenge in salivary gland tumor diagnosis and the essential role of systematic reporting frameworks like MSRSGC in improving diagnostic accuracy and patient care.

Fine needle aspiration is a secure, precise, and also economical mode of examination of SG lesions. The benefit of fine needle aspiration cytology approximates the chances of malignancy and replicability [11,12]. In most of the patients, the parotid gland was associated. In many other researches, similar finding was evaluated [13-15]. Salivary gland tumors were more moderately prevalent in males than in females. A similar result was found in a study [16]. Milan system is a threat classification approach having considerable potential for upgrading reporting.

SG aspirate is grouped as cancerous hold for patients where cytological characteristics which are detectable for cancer [17]. It was seen that the mean size of the lesion is tinier in group 1 as compared to other groups. This indicates that fine needle aspiration cytology of salivary gland inflammation must be carried out in skilled hospitals to maintain the amount of non-detectable outcomes. Due to less vascularity of the inflammation the aspirates become non-detectable. Many of the aspirates contain a lot of fibers which caused the aspirates to be non –non-detectable.

In a study conducted by [18] and [19], they found that lymphomas were the reason for the false detection of the malignancy. There are greater chances of risk of neoplasm. In groups suspicious of malignancy, samples are primarily extremely vascular without evident abnormality, which leads to confusion between benign and malignant.

Generalizability

The generalizability of the study to a larger population requires further validation through larger, multicentric

studies that account for demographic diversity, operator expertise, and pathological variety. Moreover, the integration of such diagnostic systems into varied clinical settings and their impact on patient management and outcomes needs to be thoroughly evaluated to confirm their universal applicability and benefit.

Conclusion

The findings, showcasing a high sensitivity and specificity in differentiating benign from malignant tumors, validate the robustness of FNAC as a diagnostic tool. Particularly, the prevalent use of MSRSGC offers a structured and reliable approach for risk stratification of salivary gland tumors, thereby facilitating improved clinical decision-making. Given the substantial representation of malignancy within the study cohort, the results underscore the critical importance of precise diagnostic protocols to enhance patient outcomes in salivary gland pathology.

Limitation

The restraints of the current study involve a smaller number of patients associated with this analysis. The observation of the current research cannot be extrapolated for a larger number of people. Additionally, the lack of the combined category also acts as a limitation of this study's finding

Recommendation

Fine needle aspiration cytology has great precision and responsiveness which differentiates benign and malignant tumors. Milan's system of categorization is also very effective and valuable.

Acknowledgment

We are very thankful to the staff and hospital of PRM Medical College & Hospital, Baripada for carrying out this research.

Conflict of interest

There was no difference of opinion.

Funding

No funding was provided for this research.

Abbreviation

MSRSGC: Milan System for Reporting Salivary Gland Cytopathology
SUMP: Salivary Gland Neoplasm of Uncertain Malignant Potential
PRM: Pandit Raghuram Murmu
FNAC: Fine needle aspiration cytology
WHO: World Health Organization
BN: Benign neoplasm
SG: Salivary gland

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