

A Cytohistopathological Study to Evaluate the Diagnostic Role of Fine-Needle Aspiration Cytology (FNAC) in Salivary Gland Lesions

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Abstract:

Background: Swelling of the salivary glands, in particular the parotid and submandibular glands, is a common issue that causes patients a lot of trouble since it is so obvious. Additionally, parotid/submandibular swellings continue to be difficult to diagnose for clinicians. In order to diagnose salivary gland abnormalities, this study assessed the sensitivity and specificity of fine needle aspiration cytology (FNAC).

Methods: This 12-month prospective observational study was conducted at SKMCH in Muzaffarpur, Bihar, from July 2022 to June 2023. Total 42 cases of salivary gland lesions received for FNAC in the pathology department for the present study.

Results: We included 42 cases of salivary gland lesions in the current investigation. Twelve (28.5%) of the 42 cases were neoplastic, while thirty (71.5%) were not. Out of 12 neoplastic cases, 8 (67%) were determined to be benign, and 4 (33%), to be malignant. The majority of malignant lesions (50%) are mucoepidermoid carcinoma, Carcinoma-ex pleomorphic adenoma, and Adenoid cystic carcinoma.

Conclusion: The FNAC may be an effective pre-operative diagnostic method for SGs lesions given its excellent sensitivity, specificity, and diagnostic accuracy. In order to help with the planning of further care, this study emphasizes the diagnostic significance of FNAC in identifying benign from malignant tumors.

Keywords: Diagnostic accuracy, FNAC, Salivary gland lesions, Sensitivity.

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Introduction

The complex exocrine glands known as salivary glands (SGs) primarily consist of a ductal and an acinar part. They are divided into major and minor SGs, and they are dispersed throughout the oral cavity's submucosa. [1] SGs lesions ranging from benign or malignant neoplastic lesions to non-neoplastic lesions such inflammation, cysts, and so forth. Less than 2% of all human tumors are SG neoplasms, which are relatively uncommon. [2] Because SGs tumors exhibit wide variability in biological and clinical behavior and present a diagnostic challenge due to their complex histological features, they are of significant interest to both pathologists and surgeons. [3,4]

For a variety of palpable swellings of the body, such as breast lumps and lymph nodes, FNAC is a minimally invasive, affordable, and widely accepted standard diagnostic method. FNAC is currently a straightforward, trustworthy, and practical diagnostic method for the assessment of SGs lesions [5,6]. It is a quick and safe process that results in an early diagnosis. [7] It offers superior cellular detail retention and prevents the artifacts

that the microtome's cutting tool can produce in paraffin block sections. [8] The FNAC had a diagnostic sensitivity range of 81-100%, a specificity range of 94-100%, and a diagnostic accuracy range of 61-80%. [9]

The SGs' FNAC can discriminate between primary tumors and metastatic tumors as well as inflammatory lesions from neoplastic diseases. As a result, it provides surgeons with useful information for the design of appropriate therapeutic management, whether conservative management is given for non-neoplastic lesions, local excision or radical surgery is performed for neoplastic lesions, and chemotherapy or radiotherapy is given for metastatic problem. [10]

The aim of the current study is to examine the sensitivity, specificity, and diagnostic accuracy of FNAC by assessing the preoperative cytological findings of salivary gland lesions and correlating these findings with the postoperative histopathological findings.

Material and Methods

This 12-month prospective observational study was carried out at Sri Krishna Medical College in Muzaffarpur, Bihar, from July 2022 to June 2023. Total 42 cases with salivary gland lesions received for FNAC in the pathology department for the current investigation. Prior to the procedure, written consent was obtained. The normal protocol for FNAC was followed, and a disposable 10 ml syringe with a 23/24 gauge needle was utilized. Giemsa and H & E stains were used to make smears and stain slides. Along with a thorough clinical history and physical examination, clinical data on the patients' age, sex, and anatomical site were collected. A final diagnosis was made after a

microscopic investigation. Statistics were used to collect and analyze the data.

Results

This study included 42 patients of salivary gland lesions, of which 12 cases were neoplastic, while 30 cases were not. Age distribution was done under five groups. Most common was found to be 51-60 years, where 11 out of 16 cases were inflammatory, 3 were benign and 2 malignant. Second common was 41-50 years, with 6 inflammatory cases out of 10, and 4 benign. 31-40 years age group had 7 inflammatory and 1 malignant case out of 8 total cases. (Table 1).

Table 1: Age wise distribution of lesions

Age in years	Inflammatory	Benign	Malignant	Total
21-30	2	1	0	3
31-40	7	0	1	8
41-50	6	4	0	10
51-60	11	3	2	16
61-70	4	0	1	5
Total	30	8	4	42

Females made up 19 cases (45.24%), males slightly outnumbered them 23 cases (54.76%). Male to female ratio was therefore 1.2:1 (Table 2).

Table 2: Gender wise distribution of lesions

Gender	No. of cases	Percentage
Male	23	54.76%
Female	19	45.24%
Total	42	100.0

Out of 12 neoplastic cases, 8 (67%) were determined to be benign, and 4 (33%), to be malignant. (Table 3)

Table 3: Types lesions in 12 neoplastic cases

Lesions	No. of cases	Percentage
Benign	8	67%
Malignant	4	33%
Total	12	

Table 4 shows that the parotid gland was affected in 54.7% of cases, followed by the submandibular and minor salivary glands.

Table 4: Distribution of type of gland involved

Type of gland involved	No. of cases	Percentage
Parotid	23	54.7%
Submandibular	14	33.3%
Minor	5	12.0%

According to Table 5, the most common non-neoplastic lesions of the salivary glands were chronic sialadenitis, which accounted for 60% of all cases, followed by cystic lesions, acute on chronic sialadenitis, and chronic granulomatous inflammation.

Table 5: Distribution of cases of non-neoplastic lesions

Non-neoplastic lesions	No. of cases	Percentage
Chronic sialadenitis	18	60.0%
Cystic lesions	7	23.0%
Acute on chronic sialadenitis	3	10.0%
Chronic granulomatous inflammation	2	7.0%

Pleomorphic adenoma (Figure – 1,2 and 3) was the most prevalent benign neoplasm, according to Table 6, which details the frequency distribution of benign neoplasms.

Table 6: Distribution of cases of benign neoplasm

Cytological diagnosis of benign neoplasm	No. of cases	Percentage
Pleomorphic adenoma	6	75.0%
Warthin's tumor	2	25.0%

According to Table 7, which details the frequency distribution of malignant lesions, mucoepidermoid carcinoma had the highest percentage of cases (50%) followed by adenoid cystic carcinoma and carcinoma-ex pleomorphic adenoma.

Table 7: Distribution of cases of malignant lesions

Cytological diagnosis of malignant lesions	No. of cases	Percentage
Mucoepidermoid carcinoma	2	50.0%
Carcinoma-expleomorphic adenoma	1	25.0%
Adenoid cystic carcinoma	1	25.0%



Figure 1: Parotid gland swelling

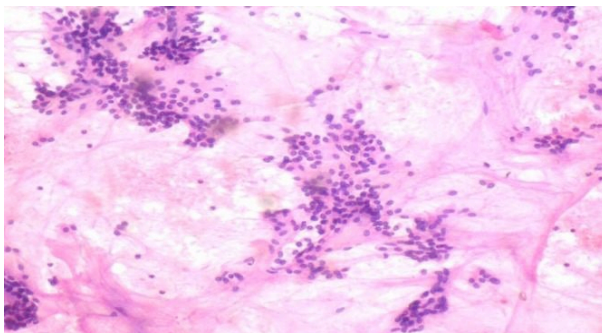


Figure 2: Benign cells trapped in fibromyxoid stroma (10X)

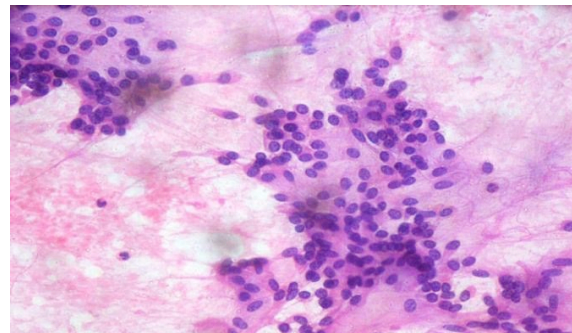


Figure 3: Benign epithelial and myoepithelial cells (40X)

The sensitivity, specificity, and diagnostic accuracy were assessed in the aforementioned cyto-histopathological correlation study using the SPSS software (version 10). For benign, malignant, and non-neoplastic neoplasms, it was displaying a sensitivity of almost 100% and a specificity of about 87% (Table 8).

Table 8: FNAC and Histopathology correlation of salivary gland lesions

FNAC diagnosis	No. of cases	Histopathologically correlated diagnosis
Chronic sialadenitis	18	16
Acute on chronic sialadenitis	3	2
Chronic granulomatous inflammation	2	2
Pleomorphic adenoma	6	5
Warthin's tumor	2	2
Mucoepidermoid carcinoma	2	2
Adenoid cystic carcinoma	1	1

Discussion

Swelling of the salivary glands, in particular the parotid and submandibular glands is a common

issue that causes patients a lot of trouble since it is so obvious. Additionally, parotid/submandibular swellings continue to be difficult for clinicians to

diagnose. FNAC has now emerged as the preferred diagnostic test to address this conundrum since it offers a practical method for obtaining a tissue-based diagnosis. This procedure's role in our setup for identifying salivary gland lesions and the range of disease pathology in our group is explained in our study. The sensitivity and specificity of FNAC for salivary gland enlargement in various demographics and settings showed significant variance, according to a literature analysis.

A sensitivity and specificity of 57% and 95%, respectively, were found in the study of 93 cases of parotid gland malignancies by Zerpa et al.[11]. Pastore, et al., on the other hand, discovered sensitivity and specificity to be 83% and 93%, respectively. They examined 357 instances of lesions of the salivary glands [12]. Salivary gland cancers were discovered in individuals in this six-month research ranging in age from 21 to 75, with a very small male predominance. While malignant neoplasms were more prevalent in the fifth and sixth decades, benign neoplasm incidence was higher in the fourth and fifth.

The current study indicated that benign tumors were more prevalent than malignant tumors. A malignant tumor was discovered in an older age group. The most frequent location for salivary gland tumors was the parotid gland, followed by the submandibular gland and smaller salivary glands. Pleomorphic adenoma was the most prevalent benign tumor, whereas mucoepidermoid carcinoma was the most prevalent malignant tumor. One of the smaller salivary glands also had a rare adenoid cystic carcinoma. A single institutional experience took place in the present.

The results of the current study analysis of age, sex, site distribution, and pathologic characteristics were comparable to those of research from India and other countries. Despite the modest number of salivary gland tumors covered in this study, the results should aid in a better understanding of the condition.

Conclusion

We concluded that there was good agreement between the FNAC and the final histology. The best use of FNAC should be made possible by physicians and cytopathologists being aware of the therapeutic implications and restrictions of the cytological interpretation.

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