

FINE NEEDLE ASPIRATION CYTOLOGY OF SALIVARY GLAND LESIONS: CORRELATION WITH HISTOPATHOLOGICAL FINDINGS AND DIAGNOSTIC ACCURACY

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Received : 20/01/2024
Received in revised form : 28/03/2024
Accepted : 13/04/2024

Keywords:

Salivary gland, Fine needle aspiration cytology (FNAC), Histopathology, Diagnostic accuracy.

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DOI: 10.47009/jamp.2024.6.2.218

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2024; 6 (2); 1082-1086



Abstract

Background: Fine needle aspiration cytology (FNAC) of salivary gland lesions provides a minimal invasive way to obtain cellular material for analysis, aiding in preoperative planning and reducing the need for more invasive procedures. Although histopathology confirmation provides a more comprehensive understanding of the nature and characteristics of tumor, FNAC offers valuable preliminary information for early diagnosis. **Aim and Objectives:** The objective of the research was to study cytomorphological diagnosis of various salivary gland lesions and its correlation with histopathological findings in order to access its diagnostic accuracy at tertiary care center. **Materials and Methods:** Total 37 cases of various salivary gland lesions were studied over a period of 18 months. 5 ml syringe and 22 gauge needle were used for FNAC and Haematoxylin & Eosin (H&E) and Giemsa stain were used for staining of cytosmears. H&E stained paraffin sections were examined for histopathological assessment. Cytological findings were correlated with histopathological findings in order to calculate diagnostic accuracy of FNAC in salivary gland lesions. **Result:** Total 37 cases were reported, among them 14 (37.83%) were non neoplastic lesions ranges from inflammation, sialadenitis, lymphoepithelial cyst and abscess. 5(40.54%) benign and 08(21.62%) were malignant lesions showing overall male preponderance(67.57%). Most common benign lesion was pleomorphic adenoma (86.66%) and malignant lesion was mucoepidermoid carcinoma(50.0%). Parotid gland(48.64%) was most commonly involved salivary gland, Overall diagnostic accuracy of FNAC was 90.45% in various salivary gland lesions. **Conclusion:** From this study it was concluded that FNAC is a very useful preoperative diagnostic tool for superficial palpable tumors as of salivary gland having high accuracy and results comparable to that of frozen sections. FNAC in correlation with histopathology helps in distinguishing between benign and malignant tumors, guiding further management and treatment decisions.

INTRODUCTION

Fine needle aspiration cytology (FNAC) is a valuable diagnostic tool in the evaluation of salivary gland neoplasms, offering multiple advantages including minimally invasive sampling, rapid results, cost effectiveness and accurate diagnosis which contribute to improved patient care and outcomes.^[1,2] Aspiration cytology has proved impressive results in almost every organ systems among which FNA of salivary glands is very easier to perform as the site is very superficial.^[3] Biopsies or frozen sections have

complications like inflammation, facial nerve injury and risk of bleeding are very negligible in FNAC.^[4,5] Salivary glands diseases lesions range from reactive inflammatory to neoplastic, which may be benign or malignant and it accounts for about 6% of tumours in the head and neck region.^[6] Diagnostic methods like sialography, ultrasonography, and Computed Tomography scan provide some diagnosis but often cannot differentiate the nature and type of salivary gland lesion. In such cases, FNAC can diagnose the lesions with high accuracy.^[7] Though histopathological diagnosis is gold standard for confirmation of Fine needle aspiration cytology

findings, FNAC is an excellent first-line tool in providing an early diagnosis and there by avoids the need of unnecessary surgical intervention.^[8] In this study, most of the lesions were diagnosed by FNAC and categorized into non-neoplastic and neoplastic lesions. Histopathology (HPE) was done wherever possible, and a correlation of cytological and histopathological findings was made to assess the diagnostic accuracy and efficacy of FNAC.^[9]

MATERIALS AND METHODS

In present study total 37 cases were studied over the period of 18 months at tertiary care center of North Gujarat. Informed consent was taken from all patients. The study includes all non neoplastic and neoplastic lesions of major and minor salivary glands at various sites. Clinical history taken along with relevant laboratory investigations and radiological examinations like ultrasonography were also done. Computer Tomography was done in selected cases. FNAC was done under aseptic precautions using a 5 mL disposable syringe and 22G needle. The nature of aspirates were noted, routine smears were prepared and stained with hematoxylin and eosin, May-Grunwald Giemsa and Papanicolaou's stains. Smears are examined and cytological diagnosis were established which are confirmed by histopathological analysis. Out of 37 cases, 19 specimens were obtained for histopathological examination, for that specimens were received in 10% neutral buffered formalin and after processing of the tissue, hematoxylin and eosin staining were done. Special stains and Immunohistochemistry were used wherever necessary and final results were analysed. The diagnostic accuracy, sensitivity and specificity of FNAC were determined after confirmation of diagnosis by histopathological examination.

RESULTS

Among all cases, most commonly affected age groups ranges from 31-60 years.(n=23). Non-neoplastic lesions include Acute Sialadenitis, Chronic Sialadenitis, Retention Cyst, Lymphoepithelial Cyst, Oncocytic Metaplasia and Abscess.

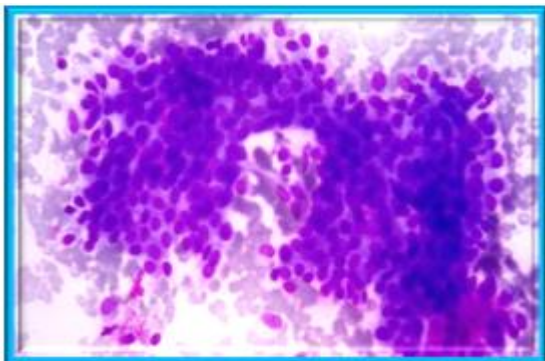


Figure 1: Pleomorphic Adenoma showing epithelial and myoepithelial cells including stromal spindle cells (MGG, HP).

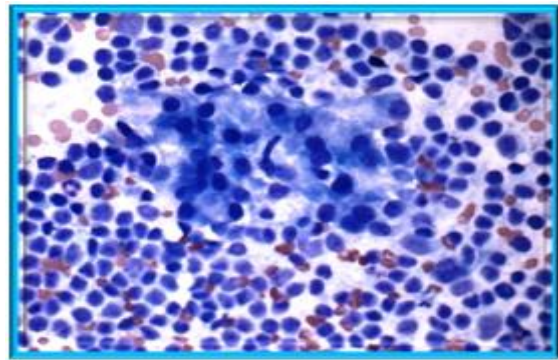


Figure 2: Warthin's Tumor Uniform oncocytic epithelial cells with small bland nuclei and lymphocytes (MGG,HP)

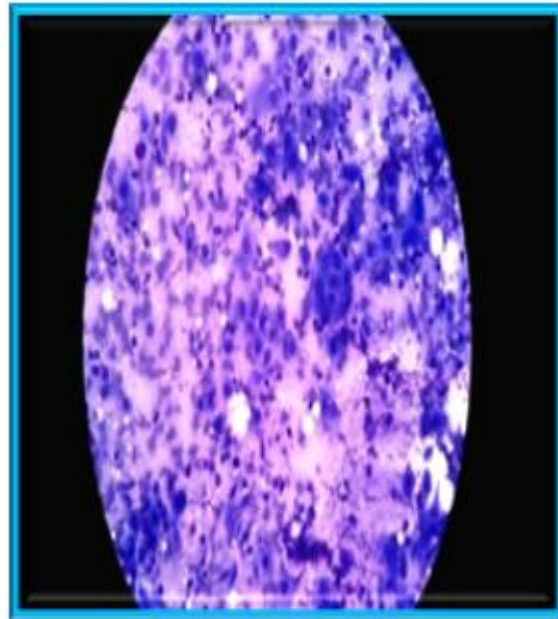


Figure 3: Mucoepidermoid Carcinoma show Cell Clusters probably of intermediate cells in dirty appearing mucus,debris, inflammatory cells and macrophages (MGG,LP)

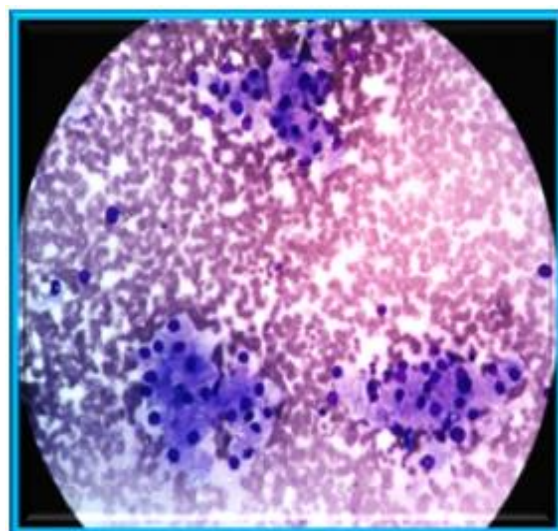


Figure 4: Acinic Cell Carcinoma show Abundant cell material in clusters and forming groupings (MGG,LP).

Table 1: Age wise distribution of salivary gland lesions

Lesions	0-10	11-20	21-30	31-40	41-50	51-60	61-70	>70	Total
Non-neoplastic	01	02	01	05	03	02	00	00	14
Pleomorphic adenoma	00	01	03	02	04	02	01	00	13
Warthin's tumor	00	00	00	01	00	00	00	00	01
Oncocytoma	00	00	00	00	00	00	01	00	01
Carcinoma Ex Pleomorphic Adenoma	00	00	00	00	00	01	01	00	02
Adenoid cystic carcinoma	00	00	00	00	00	00	01	00	01
Acinic cell carcinoma	00	00	00	00	00	01	00	00	01
Mucoepidermoid carcinoma	00	00	00	00	00	02	01	01	04
Total	01	03	04	08	07	08	05	01	37

Table 2: Sex wise distribution of salivary gland lesions

Lesion	No. of males	No. of females
Non-neoplastic	10	04
Pleomorphic adenoma	07	06
Warthin's tumor	01	00
Oncocytoma	01	00
Carcinoma Ex Pleomorphic Adenoma	01	01
Adenoid cystic carcinoma	01	00
Acinic cell carcinoma	01	00
Mucoepidermoid carcinoma	03	01
Total	25	12

Table 3: Distribution of salivary gland lesions

Lesion	No. of cases	Percentage
Non neoplastic	14	37.83%
Benign	15	40.54%
Malignant	08	21.62%
Total	37	100%

Table 4: Benign salivary gland lesions distribution

Lesion	No. of cases	Percentage
Pleomorphic Adenoma	13	86.66%
Warthin's Tumor	01	6.66%
Oncocytoma	01	6.66%
Total	15	100%

Table 5: Malignant salivary gland lesions distribution

Lesion	No. of cases	Percentage
Mucoepidermoid Carcinoma	04	50.0%
Adenoid Cystic Carcinoma	01	12.5%
Acinic Cell Carcinoma	01	12.5%
Carcinoma ex Pleomorphic Adenoma	02	25%
Total	08	100%

Table 6: Site wise distribution of salivary gland lesions

Site	No. of cases		Total no. of cases	Percentage
	Benign	Malignant		
Parotid gland	14	04	18	48.64%
Submandibular gland	13	03	16	43.24%
Minor salivary gland	01	02	03	8.10%
Total	28	09	37	100%

Table 7: Accuracy of FNAC of various salivary neoplasms

Lesion	No. of cases diagnosed on FNAC	HPE confirmed diagnosis	Accuracy
Pleomorphic Adenoma	13	12	92.30%
Mucoepidermoid Carcinoma	04	03	75%
Adenoid Cystic Carcinoma	01	01	100%
Acinic Cell Carcinoma	01	01	100%
Carcinoma ex Pleomorphic Adenoma	02	02	100%
Total	21	19	90.45%

Table 8: Male: Female ratio in various studies

Study	M:F
Das DK et al. ^[10]	1.3:1
Shafkat et al. ^[11]	1.8:1
Erik G et al. ^[12]	1.9:1

Our study	2.1:1
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Table 9: Benign: Malignant tumor ratio with other studies

Study	B:M ratio
Vaishali et al. ^[13]	5:1
Neha Sikdar et al. ^[14]	4.5:1
Koirala et al. ^[15]	1.6:1
Our study	1.9:1

Table 10: Comparison of diagnostic accuracy with other studies

Study	No. of cases histologically confirmed	Diagnostic accuracy
GC Fernandez, ^[17]	32	87.50%
Jayram, ^[18]	57	87.70%
O'Dwyer, ^[19]	341	90.00%
Our study	19	90.45%

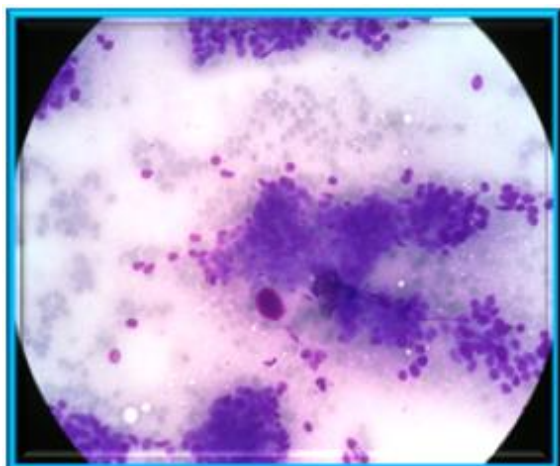


Figure 5: Adenoid Cystic Carcinoma show Cells in finger-like or beaded fragments with hyaline stromal globules (MGG, LP).

DISCUSSION

In our study, most commonly affected age group were ranges from 31-60 years. The rate of malignancy has been raised as the age increase and mean age for Pleomorphic Adenoma is 38 years and Mucoepidermoid Carcinoma is 59.62 years, which are resemble with Jefferson study.

In present study, male: female ratio in total cases was 2.1:1 suggesting of male preponderance. (67.56%). These finding are consistent with studies shown in above table.

In present study, benign to malignant tumor ratio was 1.9:1 which is compatible with Koirala et al.^[15] It show chances of malignancy are increasing day by day. Maximum cases were found to involve the parotid gland (48.64%) followed by submandibular gland (43.24%) and minor salivary glands were least affected (8.10%) among all 37 cases which is similar to Barnali Paul et al.^[16] In our study among all 37 cases, 14 cases (37.83%) were non neoplastic lesions including inflammation, retention cyst, sialadenitis and abscess formation, whereas 23 cases (62.17%) were show neoplastic etiology, Benign neoplasm were 15 cases (40.54%) and malignant neoplasm were 08 (21.62%).

In the present study, 13 cases were diagnosed cytologically as Pleomorphic Adenoma. The male-

to-female ratio was 1.2:1. Out of it, 12 cases were available for histopathologic correlation. All the cases were correctly diagnosed on HPE, thus giving the diagnostic accuracy of 100% in diagnosing Pleomorphic Adenoma on FNAC. It was an excellent finding in our study as various other studies did not show accuracy to this extent.^[7,9]

There are 08 cases (21.62%) of malignancies in our study out of total 37 cases. Most common affected age group is 50-70 years. Mucoepidermoid Carcinoma were most common malignant tumor (50.0%) in present study which was similar to Koirala et al.^[15]

Non neoplastic lesion tissue were not obtained for histopathology. 19 specimens were received for histopathological examination from 21 neoplastic lesions were reported in FNAC diagnosis show diagnostic accuracy of FNAC salivary gland was 90.45% which was compatible with studies in above [Table 10].

CONCLUSION

Many clinicians have gradually accepted the fact that FNAC is a very useful diagnostic tool for superficial palpable tumors as of salivary gland. It is the safe, simple, minimally invasive with low cost routine opd procedure especially for surgeons having accuracy and results comparable to that of frozen sections. It has an important role in the preoperative evaluation and categorisation of various salivary gland lesions. FNAC results had given us overall high accuracy rate (90.45%) with no false negative and no false positive results leads to high sensitivity (100%) and specificity (100%). In addition to standard cytological evolution, the aspirate can also be used for in situ hybridization, HPE and Immunocytochemistry procedures to detect some viral etiology in some lesions. This study highlights the utility of FNAC in distinguishing benign and malignant salivary gland tumours, which are of utmost value in planning the further management of the patient. FNAC and histopathology are complementary to each other for an accurate diagnosis of various salivary gland lesions.

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