Original Research Paper

VOLUME-6 | ISSUE-3 | MARCH - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

# Role of Fine needle aspiration cytology in the diagnosis of Salivary gland lesions

Pathology

**KEYWORDS:** Salivary gland, Fine needle aspiration cytology, Histopathology

**Biradar MP** — SIMS&RH, Associate professor, Dept of Pathology, Shridevi Medical college and research institute, Tumkur.

**Biradar PB** — Consultant pathologist, Bhagwan Mahaveer Jain Hospital Bangalore

## ABSTRACT

**Background:** Fine needle aspiration cytology is a simple, accurate, minimally invasive, cost-effective procedure for the patients. The aim of the present study was to evaluate diagnostic accuracy of Fine needle aspiration cytology in salivary gland lesions with histopathological correlation.

**Methods & Materials:** This was a retrospective study done from Jan 2011 to Dec 2012 at MIMS, Mandya. The cases for which both cytological and Histopathological diagnosis were available was selected. The cytological results were compared with histopathological diagnosis.

**Results:** Among 62 cases studied, there were cytologically 56(90.3%) benign lesions and 6(9.67%) malignant lesions. Histopathological findings showed 54 (87.09%) cases benign and 8(12.9%) cases as malignant. Sensitivity was 75%, specificity was 100%. Diagnostic accuracy of the present study was 96.77%.

**Conclusion:** FNAC of salivary gland pathology is a safe diagnostic tool that has a reliable sensitivity and specificity. Although FNAC of the salivary gland tumors has a high diagnostic accuracy(96.77% in the present study), it can further be improved by a wider sampling and ultrasound guided aspirations.

**Introduction:**

Fine needle aspiration cytology(FNAC) is a simple, accurate, minimally invasive, cost-effective procedure for the patients. The procedure has been used to diagnose various lesions of salivary gland and to differentiate benign and malignant lesions. Because of its simple technique it has established a role in pre-operative diagnosis and effective therapeutic approach. However, confirmatory diagnosis rests on histopathological examination(HPE). The aim of the present study was to evaluate diagnostic accuracy of FNAC in salivary gland lesions with histopathological(HP) correlation.

**Material and methods:**

This was a retrospective study done from Jan 2011 to Dec 2012 at MIMS, Mandya. A total of 62 patients with salivary gland lesions who had undergone preoperative FNAC and had been diagnosed by subsequent HPE were included in the study. Informed consent was taken from the patient and FNA was performed using 23-guage needle attached to a 10ml disposable syringe. Aspirates were smeared on clean slides, wet fixed or air dried and stained by Papaniculoau (PAP) and May Grunwald-Giemsa (MGG) stain. The excised surgical specimens were fixed in 10% formalin, routinely processed and stained by Haematoxylin and Eosin(H&E) stain. The cytological findings were correlated with HP diagnosis. Sensitivity, Specificity, Positive predictive value (PPV), Negative predictive value(NPV) and overall diagnostic accuracy(DA) of FNA for diagnosing benign and malignant lesions were calculated. Galen and Gambino method was used to calculate sensitivity and specificity.

**Results:**

In the present study FNA was performed on 62 patients having palpable swelling with histopathological correlations in all cases. The age of the patients ranged from 10-72yrs with median age of 39yrs. Male: Female ratio was 2:1. Parotid gland was the most commonly involved gland 45(72.58%)cases, followed by submandibular gland 15(24.19%) cases and minor salivary gland 2(3.22%) cases. There were 56(90.3%) benign lesions and 6(9.67%) malignant lesions diagnosed on FNAC. The results of FNAC were broadly divided into Inflammatory lesions, benign cystic lesions, benign and malignant neoplasms (Table-1).

**Table - 1: FNAC diagnosis of Salivary gland lesions**

| | Diagnosis | Total | Percentage % |
|---|---|---|---|
| Benign | Benign cystic lesion | 06 | 10.7% |
| | Chronic Sialadenitis | 16 | 28.6% |
| | Pleomorphic adenoma | 32 | 57.1% |
| | Warthin's tumor | 02 | 3.6% |
| | **Total** | **56** | **100%** |
| Malignant | Mucoepidermoid carcinoma | 03 | 50% |
| | Acinic cell carcinoma | 02 | 33.3% |
| | Adenoid cystic carcinoma | 01 | 16.7% |
| | **Total** | **06** | **100%** |
| | **Grand Total** | **62** | |

Of 62 cases, 40(64.51%) cases were neoplastic and 22( 35.48%) cases were non-neoplastic. Histopathological examinations were done on all 62 cases. There were two false negative cases, but no false positive cases in the study (Table-2). Pleomorphic adenoma(Fig 1) was the most common salivary gland tumor followed by warthin tumor. Among malignancies, mucoepidermoid carcinoma was the most common followed by acinic cell carcinoma and adenoid cystic carcinoma. The sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy was 75%, 100%, 85.71%, 96.36%, 96.77% respectively.

**Table - 2: False Negative Cases**

| FNAC diagnosis | Histopathological diagnosis |
|---|---|
| Benign cystic lesion | Adenoid cystic lesion |
| Pleomorphic adenoma | Mucoepidermoid carcinoma |

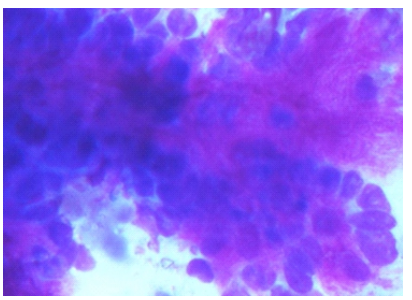

**Fig 1**: Myxoid stroma with epithelial cells – Pleomorphic Adenoma

**Discussion:**

FNAC is a safe procedure, cost-effective, lower rate of complication to the patient and aid to clinician in therapeutic management[1]. It is mainly done to differentiate benign and malignant lesions of salivary gland swellings. In the present study, diagnostic accuracy of 96.77% was achieved in diagnosing both benign and malignant lesions. The sensitivity was 75% and specificity was 100% respectively. The results were comparable to other previously reported studies[2-10](Table-3). A high diagnostic efficacy of FNAC in diagnosing salivary glands was achieved, but a lower diagnostic accuracy of FNAC in typing specific benign lesions was observed in this study with 6 cystic lesions.

Cytologically these were benign lesions as there was no features of malignancy in their respective smears. Of the 6 cystic lesions 4 cases were diagnosed on histology as chronic sialadenitis, 1 Pleomorphic adenoma and 1 warthin tumor. Similar type of findings was observed by Postema et al[8] when diagnosing cystic lesions and concluded that cytologic diagnosis of' cysts' should be interpreted with caution.

**Table - 3 : Cytohistological correlation with other studies**

| First author | No. of cases | Diagnostic accuracy | sensitivity | specificity | PPV | NPV |
|---|---|---|---|---|---|---|
| Jayaram G | 53 | 73.6% | 90% | 95% | - | - |
| Das D | 712 | 91% | 94.6% | 75% | - | - |
| Stramandinoli RT | 79 | 82.3% | 68.2% | 87.7% | 68.2% | 87.7% |
| Piccioni LO | 176 | 97% | 81% | 99% | 93% | 98% |
| Iqbal M | 49 | 96.4% | 62.5% | 96.97% | - | - |
| Stow N | 104 | 92.3% | 86.9% | 92.3% | 96.8% | 86.6% |
| Postema RJ | 380 | 96% | 88% | 99% | 95% | 97% |
| Rehman H | 50 | 78% | 53.28% | 88.57% | 72.7% | 79.9% |
| Lukas J | 107 | 89.2% | 85.0% | 97.5% | - | - |
| This Study | 62 | 96.77% | 75% | 100% | 85.71% | 96.36% |

Of the 6 malignancies, 2 were misdiagnosed in cytology as benign. One case diagnosed on cytology as a benign cystic lesion. The aspirate of the lesion yielded 2ml of straw coloured fluid, which on microscopic examination showed foamy macrophages and few ductal cells only and on histology diagnosed as adenoid cystic carcinoma. One case of MEC false negative results was reported on cytology as a Pleomorphic adenoma. The reason for low lesion prediction in typing specific malignant salivary gland lesions is due to the fact that a large number of benign and malignant neoplasms arise in salivary glands. There is also a considerable overlap of morphological features of these lesions causing diagnostic difficulties.

Majority of the lesion occurred during the age interval of 10-72 years with M:F ratio being 2:1, with most common age of presentation in 3rd decade (39yrs) of life as seen in the study done by Jain R[11]. In the present study, Parotid gland was most commonly involved (72.58%) which was observed by Choudhury A[12] in his study. Benign lesions in this study was 56(90.3%) which correlated with other studies which ranged from 43%-89%. Malignant lesions in the study was 9.67% which was less when compared to other studies[13]. The most common benign lesion reported in present study was Pleomorphic adenoma that correlated with various other previously reported studies [3,14]. Mucoepidermoid carcinoma was the most common malignant lesion reported in this study that correlated with Nguansangiam et al study. Diagnosis of low grade mucoepidermoid carcinoma requires histology for confirmation as it may be misdiagnosed as chronic sialadenitis, warthin's tumor and pleomorphic adenoma as observed in the present study. The common non-neoplastic lesion was chronic sialadenitis followed by benign cystic lesion and warthin's tumor with submandibular gland being commonly involved which correlated with the study by Atula T [15].

**Conclusion :**

FNAC of salivary gland pathology is a safe diagnostic tool that has a reliable sensitivity and specificity. Limitations are encountered while predicting specific lesions on cytology especially when dealing with cystic and some malignant lesions. Although FNAC of the salivary gland tumors has a high diagnostic accuracy(96.77% in the present study), it can further be improved by a wider sampling and ultrasound guided aspirations.

**References :**

1. Qizilbash H, Sianos J, Young J. E.M, and Archibald SD. "Fine needle aspiration biopsy cytology of major salivary glands", Acta Cytologica, 1985;29(4):503-512.
2. Jayram G, Dashini M. Evaluation of fine needle aspiration cytology of salivary glands: an analysis of 141 cases. Malays J Pathol. 2001;23:93-100.
3. Das DK, Petkar MA, Al-Mane NM, Sheik ZA, Mallik MK, Anim JT. Role of fine needle aspiration cytology in the diagnosis of swellings in the salivary gland regions: A study of 712 cases. Med Princ Prac. 2001;13:95-106.
4. Stramandinoli RT, Sassi LM, Pedruzzi PAG et al. Accuracy, sensitivity and specificity of fine needle aspiration biopsy in salivary gland tumors: A retrospective study. Med Oral Pathol Cir Bucal. 2010;15:32-7.
5. Piccioni LO, Fabiano B, Gemma M, Sarandria D, Bussi M. Fine needle aspiration cytology in diagnosis of parotid lesions. Acta Otorhinolarygol Ital. 2011;31:1-4.
6. Iqbal M, Anwar K, Ihsanullah, Mohammad J, Khan IA, Hussain G. The diagnostic value of fine needle aspiration cytology in masses of the salivary glands. JPMI 2011;25:73-7.
7. Stow N, Veivers D, Poole A. Fine needle aspiration cytology in the management of salivary gland lesions: an Australian experience. Ear Nose Throat J.2004;83:128-31.
8. Postema RJ, van Velthuysen MLF, van den Brekel MWM, Balm AJM, Peterse JL. Accuracy of fine needle aspiration cytology of salivary gland lesions in the Netherlands Cancer Institute. Head Neck 2004;26:418-24.
9. Rehman H, Khan MS, Wahid F, Ahmad I. Aprofile of parotid gland tumors from a tertiary care hospital in Peshawar. JPMI 2011;25:158-62.
10. Lukas J, Duskova J. Fine needle aspiration biopsy in the diagnosis of tumors and non-noplastic lesions of salivary glands. Bratisl Lek Listy. 2006;107:12-5.
11. Jain R, Gupta R, Kudesia M, and Singh S. "Fine needle aspiration cytology in diagnosis of salivary gland lesions: A study with histologic comparison", Cytojournal. 2013;10:5.
12. Choudhury A., Sultana T, Siddique BH and Amin ASA, "Diagnosis of parotid gland mass by the fine needle aspiration cytology (FNAC) and its histopathological correlation – 2years study in BSMMU, Dhaka", Bangabandhu Sheik Mujib Medical University Journal, 2011: 4(2):65-69.
13. Nguansangiam S, Jesdapatarakul S, Dhanarak N and Sosrisakorn K. "Accuracy of fine needle aspiration cytology of salivary gland lesions:routine diagnostic experience in Bangkok, Thailand". Asian Pacific journal of Cancer Prevention, 2012;13(4):1583-1588.
14. Boccato P, Altavilla G, and Blandamura S. "Fine needle aspiration biopsy of salivary gland lesions: a reappraisal of pitfalls and problems". Acta Cytologica, 1998;42(4):888-898.
15. Atula T, Grenman R and Laippala P. "Fine needle aspiration cytology of submandibular gland lesions". The Journal of Laryngology an Otology, 1995;109(9):853-858.