Diagnostic Accuracy Of Fine Needle Aspiration Cytology In Salivary Gland masses

Farzana Manzoor¹, Bilal Ahmad Sheikh², Ruby Reshi³, Arshi Beg⁴, Saymah Rashid¹ and Bilques Khurshid⁵

¹. Senior Resident, Department of Pathology, Govt. Medical College, Srinagar.
². Professor, Department of Pathology, Govt. Medical College, Srinagar.
³. Professor and Head, Department of Pathology, Govt. Medical College, Srinagar.
⁴. Senior Resident, Department of Pathology, Tata Memorial Hospital, Srinagar.
⁵. Postgraduate, Department of Pathology, Govt. Medical College, Srinagar.

Abstract

Background: Fine Needle Aspiration Cytology (FNAC) is simple, safe, cost-effective, and minimally invasive & out patient procedure to establish preliminary diagnosis of salivary gland masses.

Aim of the Study: To study the diagnostic accuracy of FNAC in salivary gland masses by correlating with histopathology.

Materials & Methods: It was a two year study conducted on 43 cases of salivary gland masses. The diagnostic accuracy of FNAC was calculated by considering histopathological diagnosis as gold standard.

Results: Pleomorphic adenoma was the most common salivary gland lesion. In our study, sensitivity, specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) & diagnostic accuracy of FNAC were 90.9%, 100%, 100%, 96.97% & 97.67%. One case in our study was diagnosed as pleomorphic adenoma on cytology which turned out to be adenoid cystic carcinoma on histopathology.

Conclusion: FNAC is a reliable diagnostic technique in establishing preliminary diagnosis of salivary gland masses.

Introduction:

Fine Needle Aspiration (FNA) is cost effective & minimally invasive procedure carried out in out patient settings. In any unexplained salivary gland mass, FNA is the preferred biopsy method because incisional biopsy is associated with an increased risk of infection & potential contamination of surgical planes. Precise classification of salivary gland neoplasms by FNA is possible for many of the commonly encountered lesions, but remains problematic for a number of less common entities¹. Although a specific diagnosis may not be feasible, non neoplastic lesions usually can be distinguished from neoplastic lesions which further can be categorised into benign or malignant with an appropriate differential diagnosis sufficient for clinical management.

The present study was conducted to analyse the role of FNAC in diagnosing salivary gland masses.

Materials & Methods:

It was an observational study done over a period of 2 years (Mar 2016- Feb 2018). It included the cases where FNAC was followed subsequently by histopathology. FNA was done using 23-25 gauge, 30-50mm fine needle.

Corresponding Author:-Farzana Manzoor
Address:- Senior Resident, Department of Pathology, Govt. Medical College, Srinagar.
Giemsa & pap staining was applied. FNAC results were correlated with histopathological diagnosis established thereof. Data was entered in microsoft excel spreadsheet. The diagnostic accuracy of FNAC was calculating on www.openepi.com. Tabulation for study was done using SPSS 20.0.

Results:-
Of the 43 cases, 27 were male (62.79%) & 16 were female (37.2%). Age range varied from 11-75 years. Maximum number of cases were found in the age group of 20-29 years & 40-49 years. [Table 1]

Table 1:- Age and Gender Distribution Of Salivary Gland Lesions.

| Age Group | Female (n₁=16) | Male (n₂=27) | Total (n₁+n₂=43) |
|-----------|----------------|--------------|------------------|
| <10       | 0              | 1 (3.7%)     | 1 (2.32%)        |
| 10-19     | 1 (6.25%)     | 3 (11.11%)   | 4 (9.3%)         |
| 20-29     | 4 (25%)       | 5 (18.51%)   | 9 (20.93%)       |
| 30-39     | 1 (6.25%)     | 4 (14.81%)   | 5 (11.62%)       |
| 40-49     | 5 (31.25%)    | 4 (14.81%)   | 9 (20.93%)       |
| 50-59     | 3 (18.75%)    | 2 (7.4%)     | 5 (11.62%)       |
| 60-69     | 1 (6.25%)     | 1 (3.7%)     | 2 (4.65%)        |
| 70-79     | 1 (6.25%)     | 5 (18.51%)   | 6 (13.95%)       |
| 80-89     | 0              | 1 (3.7%)     | 1 (2.32%)        |
| 90-99     | 0              | 1 (3.7%)     | 1 (2.32%)        |

Parotid was the most common site (24 cases) followed by minor salivary glands (12 cases) & submandibular gland (7 cases). Amongst all salivary gland lesions, pleomorphic adenoma (21 cases) was the most commonly encountered & Mucoepidermoid carcinoma was the most common malignant diagnosis. [Table 2]

Table 2:- Histopathological spectrum of salivary gland lesions.

| S.No. | Category                          | No. of Cases (n=43) | Percentage (%) |
|-------|-----------------------------------|---------------------|----------------|
| 1     | Pleomorphic adenoma               | 20                  | 46.5           |
| 2     | Warthin Tumor                     | 2                   | 4.7            |
| 3     | Myoepithelioma                    | 1                   | 2.3            |
| 4     | Adenoid Cystic Carcinoma          | 2                   | 4.7            |
| 5     | Mucoepidermoid Carcinoma          | 5                   | 11.6           |
| 6     | Carcinoma ex pleomorphic adenoma  | 1                   | 2.3            |
| 7     | Epithelial Myoepithelial carcinoma| 1                   | 2.3            |
| 8     | Non-Hodgkin Lymphoma              | 2                   | 4.7            |
| 9     | Chronic Sialadenitis               | 3                   | 7.0            |
| 10    | Mucocele                          | 5                   | 11.6           |
| 11    | Necrotising Sialometaplasia       | 1                   | 2.3            |

Fig 1:- Warthin Tumor of Parotid Gland.
The cytopathology correlated well with histopathology in all cases except one where adenoid cystic carcinoma was the final diagnosis which however was preliminarily labelled as pleomorphic adenoma on FNAC. [Table 3]

Table 3: Cyto-histological correlation of salivary gland lesions.

| Cytological Diagnosis | No. of Patients | Histopathological Diagnosis | No. of Patients |
|-----------------------|----------------|-----------------------------|----------------|
| Pleomorphic Adenoma   | 21             | Pleomorphic Adenoma         | 20             |
|                       |                | Adenoid Cystic Carcinoma    | 1              |
The sensitivity, specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) & diagnostic accuracy of FNAC were 90.9%, 100%, 100%, 96.97% & 97.67% respectively. [Table 4]

Table 4:- Cytohistological correlation to diagnose benign and malignant lesions of salivary gland.

| Cytological Diagnosis | No. of Patients | Histopathological Diagnosis | No. of Patients |
|-----------------------|-----------------|-----------------------------|-----------------|
| Benign                | 33              | Benign                      | 32              |
|                       |                 | Malignant                   | 1               |
| Malignant             | 10              | Benign                      | 0               |
|                       |                 | Malignant                   | 10              |

Discussion:-
In this study, age range varied from 11-94 years with male preponderance similar to studies by other authors. Parotid gland was the most common site involved which corresponds with earlier studies. Pleomorphic adenoma & mucoepidermoid carcinoma were respectively the commonest non neoplastic, benign & malignant lesions, the findings in harmony with previous studies.

In our study, there were no false positives and one false negative. Out of 21 cases reported as pleomorphic adenoma on fine needle aspiration cytology, 20 were consistent with diagnosis and 1 turned out to be adenoid cystic carcinoma on histopathology. This could be due to shared cytological features like uniform epithelial like cells, fibrillar myxoid stromal component and hyaline stromal globules in both pleomorphic adenoma and adenoid cystic carcinoma. Similar misdiagnosis has been reported in prior studies.

The sensitivity, specificity, Positive predictive value, negative predictive value and diagnostic accuracy were 90.9%, 100%, 100%, 96.97% and 97.67% which was comparable to other studies.

Conclusion:-
Analyzing the diagnostic accuracy of FNAC in relation to histopathology, it can be concluded that Fine Needle Aspiration Cytology is the critical part of initial work up of patients presenting with salivary gland masses with its prime ability to reliably distinguish benign and malignant lesions. Subsequent surgical biopsy affirms the FNAC diagnosis and categorizes the lesions into definitive diagnosis.

References:-
1. Jeffrey F. Krane & William C. Faquin: Edmund S. Cibas, Barbara S. Ducatman Cytology: Diagnostic Principles & clinical correlates. 3rd Ed. Saunders Elsevier; 2009, 97.67% respectively.
2. Dr. Deepak Joshi, Dr. Sejal Kakadiya, Dr. Biren Parikh. Study Of Fine Needle Aspiration Cytology In Head And Neck Lesions. Natl J Integr Res Med 2015; Vol. 6(6).
3. Bhardwaj Aparna, Pandey Apoorva, Kishore Sanjeev, Kaushik Sanjay, Maithani Tripti. Annals of Pathology and Laboratory Medicine 2016; Vol. 03, No. 05, (Suppl).
4. Syed Mosaddaque Iqbal, Imran Munir Memon, Syed Iqbal Hussain. Diagnostic role of FNAC with histopathological correlation of salivary gland swellings. Pak J Surg 2013; 29(4):248-251.
5. Dr. Deepak Joshi, Dr. Sejal Kakadiya, Dr. Biren Parikh. Study Of Fine Needle Aspiration Cytology In Head And Neck Lesions. Natl J Integr Res Med 2015; Vol. 6(6).
6. Handa U, Dhingra N, Chopra R, Mohan H. Pleomorphic Adenoma: cytologic variations & potential diagnostic pitfalls. Diagn Cytopathol 2008;37:11-5
7. Fernandes H, D’ Souza C R S, Thejaswini B N; Role of Fine Needle Aspiration Cytology in Palpable Head and Neck Masses, Journal of Clinical and Diagnostic Research. 2009 Oct ;(3):1719-1725
8. Bhardwaj Aparna, Pandey Apoorva, Kishore Sanjeev, Kaushik Sanjay, Maithani Tripti. Annals of Pathology and Laboratory Medicine 2016; Vol. 03, No. 05, (Suppl).
9. Sarda AK, Bal S, Singh MK, Kapur MM. Fine needle aspiration cytology as a preliminary diagnostic procedure for asymptomatic cervical lymphadenopathy. JAPI 1990; 38 (3).
10. Khafaji BM, Nestok BR, Katz RL. Fine-needle aspiration of 154 parotid masses with histologic correlation. Cancer Cytopathol 1998; 84(3):153-159.
11. Stewart, C., Mac Kenzie, K., Mc Garry, G. and Mowat, A. Fine-needle aspiration cytology of salivary gland: A review of 341 cases. Diagnostic Cytopathology 2000; 22: 139–146.
12. Mihashi H, Kawahara A, Kage M, Kojiro M, Nakashima T, Umeno H, Sakamoto K and Chiziwa H. Comparison of Preoperative Fine-needle Aspiration Cytology Diagnosis and Histopathological Diagnosis of Salivary Gland Tumors. The Kurume Medical Journal 2006; 53: 23-27.