Original Research Article

# Comparative study of Cytodiagnosis of salivary gland neoplasm with histopathology

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## Abstract

**Introductio**n: FNAC is the largest tool in diagnostic pathology. Cancer is the leading cause of death in India. Salivary gland neoplasms accounts for 6% of all head and neck tumors. There are many advantages of FNAC. But in head and neck lesions, it is easily accessible, having excellent patient compliance, also a minimally invasive procedure and helping to avoid surgery in non-neoplastic lesions. **Aims and Objectives**: To test the utility of FNAC, to establish the perfect diagnostic accuracy of cytology before operative procedure and also by comparison with histo pathology diagnosis and also to establish the sensitivity and specificity of this technique in neoplastic lesions. **Material and Method:** The present study was undertaken in the Pathology Department of GMERS medical college and hospital, Sola-Ahmedabad, Gujarat during the period of January 2015–June 2016. **Results:** Among all salivary gland neoplasms, pleomorphic adenoma was the most common salivary gland neoplastic lesion (79.55%). Mucoepidermoid carcinoma was the commonest malignancy seen. Majority of malignancies were present in the 51-60 years age group (62.50%). The mean age of salivary gland neoplasms was found to be 41.59 years. Male to female ratio was found to be 1.2:1 and in malignant lesions the male to female ratio was 3:1. **Conclusion:** Even though excision biopsy remains the gold standard for diagnosis of the salivary gland neoplastic lesion, cytological study can also establish the diagnosis of the majority of salivary gland neoplastic lesions and can be recommended as an adjunct and prior to histopathology.

**Key words**: Fine Niddle Aspiration Cytology, Salivary Gland Neoplastic Lesions, Histopathological Confirmation.

## Introduction

Lesions of salivary gland are comprised of developmental, inflammatory and neoplastic conditions. Most commonly seen swellings are cysts, pleomorphic adenoma, monomorphic adenoma, warthin'stumour, mucoepidermoid carcinoma, acinic cell carcinoma, adenoid cystic carcinoma, hemangioma and lymphoma [1]. FNAC is of great importance in the salivary glands because of its easy accessibility of the target site, excellent patient compliance, minimallyinvasive nature of the procedure and helping to avoid surgery in non-neoplastic lesions [2]. Martin introduced this techniquein the evaluation of head and neck lesions in 1930 and the procedure has since then become increasingly popular and is being frequently used in the evaluation of swellings of this region [3,4]. The FNAC has an accuracy rate exceeding 92% [5,6].

Manuscript received: 4th March 2018
Reviewed: 14th March 2018
Author Corrected: 19th March 2018
Accepted for Publication: 23rd March 2018

The idea to obtain cells and tissue fragments through a needle introduced into the abnormal tissue was by no means new. FNAC is one of the largest tool in diagnostic pathology in the forthcoming decade would be the development and application of aspiration cytology [7].

Cancer has become one of the ten main leading causes of death in India [8]. Among them Head and neck cancer comprises 23% of all cancers in males and 6% in females [9]. Salivary gland neoplasms accounts for 6% of all head and neck tumors. India has also the dubious distinction of having the world's highest reported incidence of Head and neck neoplasia in women[10].

There are many advantages of FNAC. But in head and neck lesions, it is easily accessible, having excellent patient compliance, also a minimally invasive procedure and helping to avoid surgery in non-neoplastic lesions.

It is also sensitive and specific for the diagnosis of malignancy requires little equipment and minimal discomfort to the patient. It is avoiding the use of frozen section and allows a definitive diagnosis of inoperable cases, is repeatable and cost effective [11].

Comparison of cytological diagnosis with histopathological findings in the surgical specimen aids in developing a level of comfort with the pathologist's cytological interpretation [12]. Stewart's opinion of the technique is still valid today as it was in1933 when he stated "diagnosis by aspiration is as reliable as the combined intelligence of the clinicians and pathologists makes it"[13].

## Aims and Objectives

1. To test the utility of FNAC in diagnosis of salivary gland neoplastic lesions.
2. To establish the perfect diagnostic accuracy of cytology before operative procedure and also by comparison with histopathology diagnosis.
3. To establish the sensitivity and specificity of this technique in salivary glandneoplastic lesion.

## Materials and Method

This is a prospective study which was undertaken in the Pathology Department of GMERS Medical College and Hospital, Sola-Ahmedabad, Gujarat during the period of January 2015 – June 2016. All the patients who were presented with superficially palpable salivary gland lesions, admitted in the hospital of this institute with clinical diagnosis of any salivary gland neoplasm were selected and included for this study. All those patients who were not ready to give complete history, known case of malignancy were excluded from our study.

FNAC was done in cytopathology section of central clinical laboratory or in respective ward in which the patient was admitted. The FNAC procedure was carried out using 20ml disposable syringe with 23 gauze needle attached to Franzen's aspiration handle [14]. Multiple wet smears were prepared from obtained material. Few smears were fixed in 95% ethyl alcohol and others were air dried and routinely stained with Papanicalaou (PAP) / Haemotoxyl in and Eosin (H & E) stains.

Findings of FNAC were recorded and patients were advised non-operative treatment and follow up or biopsy and surgical intervention depending upon the pathology.

The received post-operative surgical biopsy specimen were fixed in 10% neutral formalin and gradually subjected to gross examination, processing, paraffin embedding, section cutting, staining by H & E and mounting by DPX. The cytomorphological features of various diseases were studied. FNAC and HPE of the same lesion were correlated where available. Our study was also compared with other studies done in different city and country and in different year.

## Results

**Table-1: Cytodiagnosis of Salivary gland neoplastic lesions.**

| Sr. No. | Lesion | No. of Cases | % | Total (%) |
|---|---|---|---|---|
| 1. | Benign | | | 72 (81.82%) |
| | Pleomorphic Adenoma | 70 | 97.25% | |
| | Monomorphic Adenoma | 02 | 2.75% | |
| 2 | Malignant | | | 16 (18.18%) |
| | Mucoepidermoid Carcinoma | 04 | 25.0% | |
| | Pleomorphic Adenoma Undergoing Malignant Change | 04 | 25.0% | |
| | Squamous Cell Carcinoma | 02 | 12.5% | |
| | Undifferentiated Carcinoma | 06 | 37.5% | |
| **Total** | | | | **88** |

In the present study, total 88 cases were studied for cytohistological correlation in the salivary gland neoplastic lesions. Out of these 88 cases, 72 cases (81.82%) were benign and 16 cases (18.18%) were malignant.

Out of these 72 benign cases, 70 cases were of pleomorphic adenoma and only 2 cases were of monomorphic adenoma. Out of 16 malignant cases, 4 were of Mucoepidermoid Carcinoma and Pleomorphic Adenoma Undergoing Malignant Change each, 2 were of Squamous Cell Carcinoma and remaining 6 cases were of Undifferentiated Carcinoma.

**Table-2: Age distribution of salivary gland neoplastic lesions.**

| Sr. No. | Lesions | 00-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | >60 |
|---|---|---|---|---|---|---|---|---|
| 1. | Pleomorphic Adenoma | 00 | 02 | 20 | 10 | 10 | 26 | 02 |
| | % | -- | 2.85 | 28.56 | 14.29 | 14.29 | 37.14 | 2.87 |
| 2. | Monomorphic Adenoma | 00 | 00 | 02 | 00 | 00 | 00 | 00 |
| | % | -- | -- | 100.0 | -- | -- | -- | -- |
| 3. | Mucoepidermoid Carcinoma | 00 | 00 | 00 | 00 | 00 | 04 | 00 |
| | % | -- | -- | -- | -- | -- | 100.0 | -- |
| 4. | Pleomorphic Adenoma Undergoing Malignant Change | 00 | 00 | 00 | 00 | 00 | 02 | 02 |
| | % | -- | -- | -- | -- | -- | 50.0 | 50.0 |
| 5. | Squamous Cell Carcinoma | 00 | 00 | 00 | 00 | 00 | 02 | 00 |
| | % | -- | -- | -- | -- | -- | 100.0 | -- |
| 6. | Undifferentiated Carcinoma | 00 | 00 | 00 | 02 | 02 | 02 | 00 |
| | % | -- | -- | -- | 33.33 | 33.33 | 33.33 | -- |
| | Total | 00 | 02 | 22 | 12 | 12 | 36 | 04 |
| | % | -- | 2.27 | 25.0 | 13.64 | 13.64 | 40.9 | 4.55 |

Out of these 88 cases, 36 cases (40.9%) were between 51-60 years age group followed by 22 cases (25.0%) were between 21-30 years age group. Mean age group for salivary gland neoplastic lesions were found to be 41.59 years.

**Table-3: Sex distribution of Salivary gland neoplastic lesions.**

| Sr. No. | Lesion | Male | % | Female | % |
|---|---|---|---|---|---|
| 1. | Pleomorphic Adenoma | 36 | 48.49 | 34 | 51.51 |
| 2. | Monomorphic Adenoma | 00 | --- | 02 | 100.0 |
| 3. | Mucoepidermoid Carcinoma | 02 | 50.0 | 02 | 50.0 |
| 4. | Pleomorphic Adenoma Undergoing Malignant Change | 04 | 100.0 | 00 | --- |
| 5. | Suamous Cell Carcinoma | 04 | 66.67 | 02 | 33.33 |
| 6. | Undifferentiated Carcinoma | 02 | 100.0 | 00 | |
| | **Total** | **48** | **54.55** | **40** | **45.45** |

Overall slight male predominance is seen (54.55%). Male to female ratio was 1.2:1. Where as in malignant salivary gland lesions, males account for (75%) cases.

Out of these 88 cases, only 34 cases were available for follow-up and histopathological confirmation. Out of these, 26 (76.47%) cases were same as histopathological diagnosis. Where as in 08 (23.53%) cases the cytologic diagnosis and final histopathological diagnosis were different.

## Discussion

The present study was carried out in the Department of pathology, GMERS medical college and hospital, Sola-Ahmedabad, Gujarat. Total of 88 aspirates from salivay gland neoplastic lesions from different participants were studied to test the efficacy and overall utility of cytology in the salivary gland neoplastic lesions.

In this prospective study, a total 88 aspirates were obtained of salivary gland neoplastic lesions. Pleomorphic Adenoma was the most commonly found salivary gland neoplastic lesion (79.55%). Mucoepidermoid carcinoma was the commonest malignancy seen. Majority of malignancies were present in the 51-60 years age group (62.50%). The mean age of salivary gland neoplastic lesions was found to be 41.59 years. Male to female ratio was found to be 1.2:1 and in malignant lesions the male to female ratio was 3:1.

Out of 88 cases with neoplastic salivary gland lesions, 34 cases were available for follow-up and histopathological confirmation. Out of these, 26 (76.47%) cases were same as histopathological diagnosis. Whereas in 08 (23.53%) cases the cytologic diagnosis and final histopathological diagnosis were different.

In present study pleomorphic adenoma was the commonest benignsalivary gland lesion 70 (97.22%). In malignancy, mucoepidermoid carcinoma and pleomorphic adenoma with malignant change were the commonest malignant salivary gland lesions. (25.0% each)

**Table-4: comparison of present study with other studies**

| Sr. No. | Author | Year | Benign (%) | Malignant (%) |
|---|---|---|---|---|
| 1. | Cajulis et al[15] | 1997 | 67.21 | 32.79 |
| 2. | Cristallini et al[16] | 1997 | 90.90 | 09.10 |
| 3. | Yang et al[19] | 1997 | 69.10 | 30.90 |
| 4. | Shafkat et al[17] | 2002 | 84.09 | 15.91 |
| 5. | Khandekar et al[18] | 2006 | 80.55 | 19.45 |
| 6. | Present Study | 2009 | 81.82 | 18.18 |

Cajulis et alreported that the most common benign neoplasm of salivary gland was pleomorphic adenoma [15]. Cristallini et al reported most common salivary gland benign tumour was pleomorphic adenoma which is followed by warthin'stumour [16]. Shafakat et al found that pleomorphic adenoma was the commonest tumour (73%) of all primary salivary gland tumours [17]. Khandekar et al reported pleomorphic adenoma as the commonest benign neoplasm of salivary gland [18]. In the present study, pleomorphic adenoma was the commonest salivary gland neoplastic lesion, similar finding were reported by other authors also.

Shows age distribution of various salivary gland neoplastic lesions. In our study the most common age group affected was 51-60 years age group (40.99%) followed by 21-30 years age group (25.00%). Majority of malignancies were present in the 51-60 years age group (62.50%). The mean age of salivary gland neoplastic lesions was found to be 41.59 years. Cristallini et al (1997) in their study reported a mean age of 58.00 years in patients with salivary gland lesions[16]. Yang et al (1997) in their study reported a mean age group of 56 years in patients with salivary gland lesions[19]. The above studies had comparable results to the present study.

## Summary and Conclusion

We recommend that FNAC is the most reliable technique in diagnosis of salivary glandneoplasms. FNAC is a simple, rapid, safe, less complicative, cost effective, with minimal pain and is well tolerated by the patient including the pediatric population and on an OPD basis. It is a quick, convenient and accurate method of tissue diagnosis and should be considered as first line investigation in the evaluation of lesions in salivary gland region.

Thus to conclude, while excision biopsy remains the gold standard for diagnosis of salivary gland neoplastic lesion, cytological study can establish the diagnosis of the majority of salivary gland neoplastic lesions and can be recommended as an adjunctto histopathology.

**Take Home Message-** Cytological diagnosis by Fine Needle Aspiration Cytology must be undertaken before excision biopsy. Majority of the diagnosis can be done by cytology.

**Author Contribution-**First author Dr. Chetan Dharaiya has collected all data and done study in his institute. Second and corresponding author Dr. Mahesh Patel has prepared the study design and drafted in presentable manner for publication in journal.

**Funding:** Nil, **Conflict of interest:** None initiated
**Permission from IRB:** Yes

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**How to cite this article?**

Dharaiya C. M, Patel M. B. Comparative study of Cytodiagnosis of salivary gland neoplasm with histopathology. Trop J Path Micro 2018;4(1):88-92. doi: 10.17511/jopm.2018.i1.16.

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