

# Role of Fine Needle Aspiration Cytology in Diagnosis of Salivary Gland Lesions

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**Abstract:** *Background:* FNAC of salivary gland lesions is the best technique for the diagnosis of salivary gland lesions. Salivary gland lesions represent clinical and morphological diversity, which is a difficult task for histopathological interpretation. *Aims and objectives:* To evaluate the spectrum of salivary gland lesions and to assess the diagnostic accuracy of FNAC for salivary gland lesions. *Material and methods:* Patients were referred to the Department of Pathology, GMERS Medical College Sola, Ahmedabad for period of 3 years, for palpable salivary gland swelling on whom FNAC procedure was performed were included in the study. *Results:* In our study, total 72 patients underwent FNAC during the period of 3 years. Out of 72 cases, 37 cases were non-neoplastic and 35 cases were neoplastic. Among 35 cases, 27 cases were benign and 8 cases were malignant. Male to female ratio was 1.7: 1. Majority of cases were seen in the 5<sup>th</sup> decade of life. Among all salivary lesions, commonest lesion was pleomorphic adenoma. Mucoepidermoid carcinoma was most common among all malignant salivary gland lesions. *Conclusions:* FNAC has significant diagnostic value in differentiating neoplastic from non-neoplastic lesions and offers valuable information for planning and subsequent disease management.

**Keywords:** Fine needle aspiration cytology, salivary gland, pleomorphic adenoma, mucoepidermoid carcinoma

## 1. Introduction

FNAC is a reliable pathological tool for preoperative evaluation of salivary lesions. FNAC is considered as a first line investigation for most of the palpable head and neck lesions. In spite of its inherent limitations and complex nature of salivary lesions, FNAC is a very useful investigation as it is safe, rapid, economical, least traumatic and contributes significant diagnostic information for better planning and management of cases<sup>[1]</sup>. The annual incidence ranging from 0.4 to 6.5 cases per lakh population. It accounts to less than 2-6.5% of all neoplasms of head and neck<sup>[2]</sup>. Non-neoplastic lesions range from an inflammatory disorder of infectious, granulomatous, or autoimmune etiology to obstructive, developmental and idiopathic disorders<sup>[3]</sup>. FNAC in suspected salivary gland swellings has two important roles. Firstly it can confirm the origin of swelling as preauricular and submandibular lymph node swellings can mimic salivary gland neoplasm clinically. Secondly it can provide a preliminary diagnosis about the nature of the disease process before proceeding to definite management plan.<sup>[4-5]</sup> A preoperative sonography combined with FNAC, CT scan and MRI in some cases provides necessary clues before surgery. Although FNAC is a tool for pre-operative evaluation, Histopathology still remains the gold standard for final diagnosis.

## 2. Material and Methods

A Retrospective study of 72 cases was conducted in department of pathology, GMERS medical collage sola over the period of 3 year. Detailed patient history, clinical examination, clinical diagnosis, radiological findings were noted. After examination of swelling, explanation of procedure and informed consent of patient was taken. The swelling was fixed and aspiration of salivary gland was done under aseptic precautions using 22-23 Gauge needle and a 10 ml syringe. Both aspiration and non-aspiration techniques were used wherever required. Following the aspiration, the adequacy and nature of the aspirated material was assessed and several smears were prepared. Smears were immediately fixed by air drying and in 100% alcohol, followed by different stains including Giemsa stain, Haematoxylin-Eosin stain and Papanicolaou stain. Cytopathological diagnosis was recorded in each cases.

### Inclusion criteria

All non neoplastic and neoplastic lesions of major and minor salivary glands.

### Exclusion criteria

Inadequate and improperly fixed aspiration smears.

## 3. Result

In our study, total 72 patients underwent Fine needle aspiration cytology during the period of 3 years.

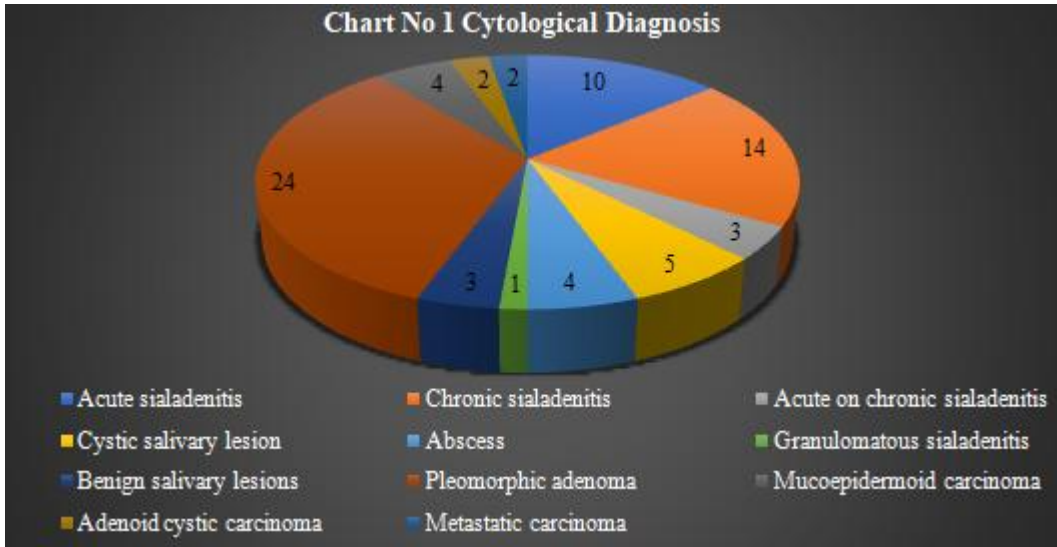
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**Table 1:** Age wise distribution of salivary gland lesion FNAC

| Age Groups (years) | Number of patients | Non neoplastic (%) | Benign (%) | Malignancy (%) |
|--------------------|--------------------|--------------------|------------|----------------|
| 0-10               | 04                 | 04                 | 00         | 00             |
| 11-20              | 07                 | 03                 | 04         | 00             |
| 21-30              | 08                 | 05                 | 03         | 00             |
| 31-40              | 12                 | 07                 | 04         | 01             |
| 41-50              | <b>19</b>          | 07                 | <b>08</b>  | 02             |
| 51-60              | 15                 | <b>08</b>          | 03         | 02             |
| 61-70              | 10                 | 02                 | 05         | <b>03</b>      |
| >70                | 01                 | 01                 | 00         | 00             |
| Total              | 72                 | 37 (51.38%)        | 27 (37.5%) | 08 (11.11%)    |



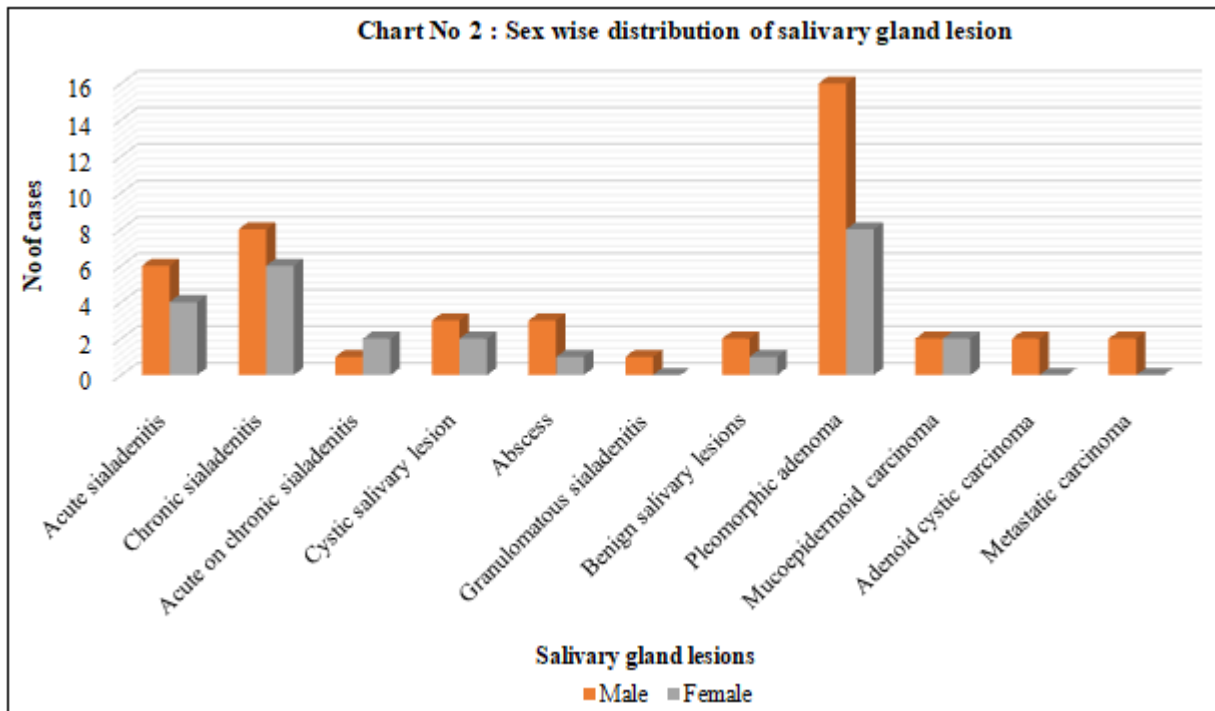
Out of 72 cases, 37 (51.38%) cases were non-neoplastic and 35 (48.6%) cases were neoplastic. Among 35 cases, 27 (37.5%) cases were benign and 8 (11.11%) cases were malignant (table 1).

Majority of cases were seen in the 5<sup>th</sup> decade of life. The age ranges from 2-75 year.

Youngest patient diagnosed as acute sialadenitis was 3year old male child and oldest was 75 year female diagnosed with acute sialadenitis.

**Table 2:** Cytological diagnosis of salivary gland aspirations

| Diagnosis                     | Number of patients | Male      | Female   | Percentage    |
|-------------------------------|--------------------|-----------|----------|---------------|
| Acute sialadenitis            | 10                 | 6         | 4        | 13.89%        |
| Chronic sialadenitis          | 14                 | 8         | 6        | 19.44%        |
| Acute on chronic sialadenitis | 03                 | 1         | 2        | 4.17%         |
| Cystic salivary lesion        | 05                 | 3         | 2        | 6.94%         |
| Abscess                       | 04                 | 3         | 1        | 5.56%         |
| Granulomatous sialadenitis    | 01                 | 1         | 0        | 1.39%         |
| Benign salivary lesions       | 03                 | 2         | 1        | 4.17%         |
| Pleomorphic adenoma           | <b>24</b>          | <b>16</b> | <b>8</b> | <b>33.33%</b> |
| Mucoepidermoid carcinoma      | 04                 | 2         | 2        | 5.56%         |
| Adenoid cystic carcinoma      | 02                 | 2         | 0        | 2.78%         |
| Metastatic carcinoma          | 02                 | 2         | 0        | 2.78%         |
| Total                         | 72                 | 46        | 26       | 100%          |



Male predominance with 46 cases where female comprising 26 cases with male to female ratio was 1.7: 1 (table 2).

Among all salivary lesions, commonest lesion was pleomorphic adenoma which comprised 24 cases of all the lesions. Mucoepidermoid carcinoma was commonest among all malignant salivary gland lesions (table 2).

**Table 3:** Site wise distribution of salivary gland lesions

| Site                 | No. of Cases | Percentage |
|----------------------|--------------|------------|
| Parotid gland        | 47           | 65.28%     |
| Submandibular gland  | 25           | 34.72%     |
| Sublingual gland     | 0            | 0%         |
| Minor salivary gland | 0            | 0%         |

Out of 72 cases, 47 cases were arise from parotid gland which accounts 65.28% (table 3).

#### 4. Discussion

The aim of FNAC is to distinguish non neoplastic lesions from neoplastic lesions and to further sub type wherever possible. FNAC diagnosis is needed to plan appropriate treatment protocol ranging from conservative surgery for non neoplastic lesions, wide local excision for benign lesions, radical surgery for malignant lesions and chemotherapy, radiotherapy for metastasis. A stepwise approach in FNAC of salivary gland lesions start from clinical examination and microscopic examination of smears.

**Table 4:** Comparison with Other Study (Percentage of cases)

| Study             | Non neoplastic (%) | Benign (%) | Malignancy (%) |
|-------------------|--------------------|------------|----------------|
| Abdul Rauf et al  | 14.7%              | 77.5%      | 7.8%           |
| Divija et al      | 51.19%             | 36.71%     | 12.1%          |
| Rajat gupta et al | 67.1%              | 24.4%      | 8.5%           |
| Our study         | 51.38%             | 37.5%      | 11.11%         |

**Table 5:** Site wise comparison with other study (Percentage of cases)

|              | parotid | submandibular | minor |
|--------------|---------|---------------|-------|
| Divija et al | 84.37%  | 13.28%        | 2.34% |
| Stuti et al  | 64%     | 31%           | 5%    |
| Our study    | 65.28%  | 34.72%        | -     |

#### Non neoplastic lesions

In the current study non neoplastic lesions constituted 51.38% of the cases. Studies conducted by divija et al, rajatgupta et al revealed 51.19% and 67.1% respectively (table 4). Sialadenitis was most commonly seen in 37.49% of cases. Similar results were obtained in other studies done by divija et al and abdulrauf et al revealing that the most common non neoplastic lesion in salivary gland as sialadenitis. The age range of nonneoplastic salivary gland lesions was from 10 to 80 years. The parotid gland was the most commonly affected site followed by submandibular gland. Smears in chronic sialadenitis comprised clusters of ductal epithelial cells along with the presence of lymphomonuclear cells in the background [6]. Acute sialadenitis showed numerous polymorphonuclear neutrophils and cell debris while aspirate in cases of mucocele was watery in consistency and smears exhibited numerous foamy macrophages admixed with lymphomonuclear cells [6].

#### Benign Tumors

Among the benign tumors of salivary gland, pleomorphic adenoma was the most common comprising 68.58 % of all neoplasms and 88.89% of benign neoplasms. This is in concordance with studies done by divija et al who reported the incidence of pleomorphic adenoma as 74.63% of all neoplasms and 95.91% of benign neoplasms. The pleomorphic adenoma is a notorious neoplasm and is readily identified because of its biphasic pattern, comprising epithelial/myoepithelial cells and magenta chondromyxoid stroma [6].

### Malignant Tumors

Mucoepidermoid carcinoma was the most common malignant tumor in the present study constituting 11.42% of all neoplasms and 50% of malignant neoplasms followed by adenoid cystic carcinoma and metastatic carcinoma constituting 5.71% of all neoplasms of salivary gland. Similar results were observed by Divija et al who reported 11.29% of cases as mucoepidermoid carcinoma in their study. Adenoid cystic carcinoma is second most common malignant neoplasm in the present study. Divija VK et al reported adenoid cystic carcinoma as the most common

neoplasm in their study. The aspirates from adenoid cystic carcinoma usually have two components: epithelial cells and acellular basement membrane material seen as homogenous spherical structures. The cytological smears from mucoepidermoid carcinoma show presence of mucus producing cells and intermediate cells exhibiting varying degree of atypia according to which the tumor is categorized as low, intermediate and high grade. Low-grade tumor has to be differentiated from Warthin's tumor, benign salivary gland cyst, branchial cleft cyst, sialolithiasis and pleomorphic adenoma with excess of mucoid stroma [7].

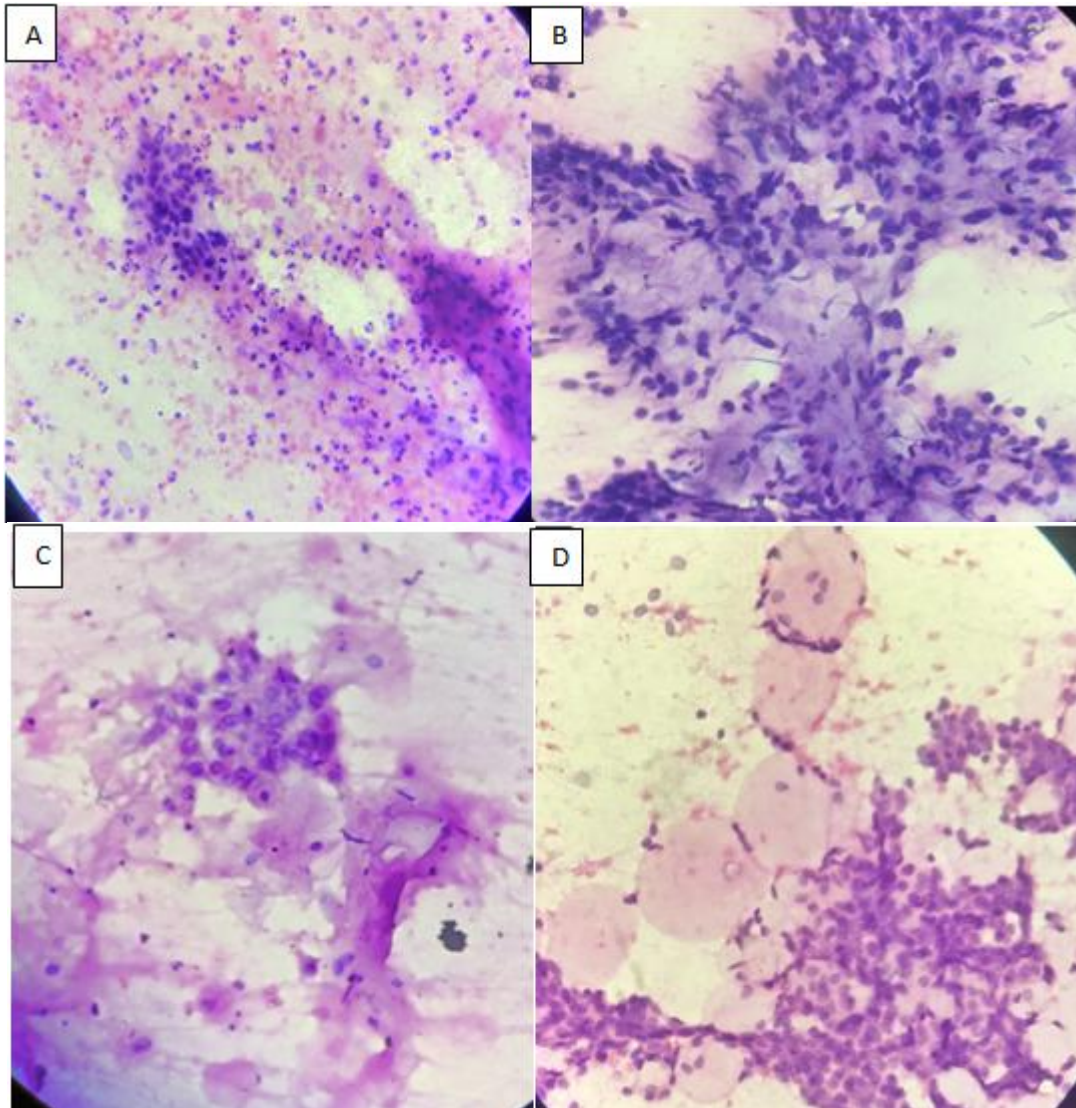


Fig A: Acute sialadenitis (H & E stain)

Fig B: Pleomorphic adenoma (H & E stain)

Fig C: Mucoepidermoid Carcinoma (H & E stain)

Fig D: Adenoid cystic carcinoma (H & E stain)

### 5. Conclusions

FNAC has significant diagnostic value in differentiating neoplastic from non-neoplastic lesions and offers valuable information for planning and subsequent disease management. It is most suitable for use on outpatient basis even in peripheral hospitals and dispensaries as it is quick, safe, minimally invasive, reliable, cost effective and readily acceptable by patient. FNAC is to be used in conjunction

with clinical findings, radiological and laboratory investigations.

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