



**ORIGINAL RESEARCH PAPER**

**Pathology**

**SPECTRUM OF SALIVARY GLAND LESIONS IN A TERTIARY CARE HOSPITAL OF SOUTH BIHAR - A CYTOMORPHOLOGICAL STUDY.**

**KEY WORDS:** Salivary, Gland, Aspiration Cytology, mucoepidermoid, parotid .

<b>Dr. Vijay Kumar Jha</b>	MD, Tutor, Department of pathology, VIMS, Pawapuri, Nalanda, Bihar.
<b>Dr. Seema Sinha</b>	MD, Tutor, Department of pathology, VIMS, Pawapuri, Nalanda, Bihar.
<b>Dr. Imtiaz Ahmad</b>	MD, Associate professor, Department of pathology, VIMS, Pawapuri, Nalanda, Bihar.
<b>Dr. Ali Muzaffar*</b>	MD Assistant Professor, Department of pathology, VIMS, Pawapuri, Nalanda, Bihar. *Corresponding Author

**ABSTRACT**

**Introduction :** Salivary gland lesions are common disorders encountered in clinical practice. Various inflammatory disorders and neoplastic lesions including both benign and malignant tumours involve different salivary glands. FNAC is one of the most common, widely accepted, cost effective, rapid and minimally invasive techniques used to characterize and differentiate different salivary gland lesions that helps in patient management and prevents unnecessary surgical intervention.

**Aims and Objectives:** Prime target of this study was to find the spectrum of salivary gland lesions in our center that caters predominantly rural population. Study also intended to correlate cytomorphological and clinical findings.

**Material and Methods:** FNAC was performed on 230 patients with the salivary gland lesions in the rural tertiary care hospital over a period of three years extending from January 2018 to December 2020. Slides were prepared from the aspirate, stained by Papanicolaou and May-Grunwald Giemsa [MGG] stains and the cytomorphological features of the lesions were studied by two pathologists. Histopathological specimens of 32 cases out of 230 cases received were also included in the study.

**Results :** Total 230 patients with salivary lesions were included in the study. 129 case showed nonneoplastic/ inflammatory lesions and 101 showed neoplastic lesions. Chronic sialadenitis was most frequent entity amongst inflammatory pathology and pleomorphic adenoma (45 cases) was the most common neoplastic lesion. Among malignant lesions mucoepidermoid carcinoma was most common followed by carcinoma ex – pleomorphic adenoma and high grade or poorly differentiated carcinoma. Many patients presented with high pT stage.

**Conclusion:** The results of our study are consistent with previous studies and further supports FNAC as a reliable, accurate and cost effective method in diagnosis of salivary gland lesions. In this study many patients of malignant salivary lesions presented in advanced pT stage and some with associated complication like facial palsy. Awareness among patients is needed to enable early diagnosis and treatment in order to decrease morbidity and mortality associated with salivary neoplasm and malignancy.

**INTRODUCTION :**

Salivary glands consist of different exocrine glands producing saliva. These are parotid, submandibular, sublingual and minor salivary glands that are widely distributed throughout the oral cavity.<sup>1</sup> Salivary glands are involved by different inflammatory disorders and diverse range of tumours.<sup>2,3</sup> Salivary neoplasms account for 2-6% of all the head and neck tumors.<sup>4</sup> For the last four decades FNAC is one of the first line investigations which is highly accurate, widely used and cost effective method that helps in delineating benign salivary lesions from malignant masses.<sup>5,6,7,8</sup> Prior distinction between benign and malignant lesions is essential for proper management, deciding course of surgery and also in decreasing unnecessary surgical interventions.<sup>9</sup> In different studies, the sensitivity and specificity of FNA to distinguish benign from malignant salivary gland lesions have been reported to be between 33% and 100%, respectively, and between 67% and 100%, respectively.<sup>8</sup> Salivary gland lesions are common clinical problem and comprise a spectrum of entities including inflammatory and neoplastic conditions. Parotid is the most commonly involved gland seen in about 65-80 % of the cases. Acute and chronic sialadenitis are the most common nonneoplastic entities followed by benign tumours that includes pleomorphic adenoma, monomorphic adenoma, Warthin's tumour and mesenchymal lesions. Pleomorphic adenoma is the most common benign tumour followed by Warthin's tumour. Mucoepidermoid carcinoma is the most common malignancy involving salivary glands. Adenoid cystic carcinoma, acinic cell carcinoma, adenocarcinoma, ductal carcinoma and metastatic carcinoma constitute other malignant lesions of salivary glands.

**MATERIALS AND METHODS**

Present study was carried out in the Department of Pathology , Vardhman institute of medical sciences, Pawapuri, Nalanda, Bihar, from January 2018 to December 2020 including 230 patients with various palpable salivary gland lesions. Patients from different departments of our institution were included in the study. We also included external cases that were received in the department for second opinion and slide review. In each patient detailed clinical history including age, sex, ultrasonographic and other relevant radiological findings were noted and meticulous clinical examination was done prior to procuring samples.

**Inclusion Criteria:**

All those patients having salivary gland lesions, irrespective of their age and sex, referred for cytological study from various clinical departments were selected.

**Exclusion Criteria:**

Patients not willing for fine needle aspiration cytology even after explaining the purpose, utility and consequence of the procedure were excluded from the study.

**Procedure methodology:**

FNAC was performed under full aseptic conditions using 10 ml syringe and 22gauge needle. The sample contained in the needle is expelled on to a clean and dry microscopy slide. Aspirate was smeared with the flat of a clean standard glass slide moving the slide steadily and evenly over the specimen slide while exerting a light pressure to form a thin, evenly spread film. Both air dried and wet fixed smears using

absolute isopropyl alcohol as fixative for 30 minutes, prepared. For each case 4-6 slides were prepared. Both PAP and MGG staining of smeared slides were done. Slides were examined by two of the pathologists.

**RESULTS :**

Out of 230 cases, males (125) outnumbered females (105) with a ratio of 1.19 : 1. The age of the patients ranged from 8-79 years. Most of the patients (N=166) were in age range of 20-50 years accounting for 72.17% of the total cases. The youngest patient was 08 year old male with acute sialadenitis whereas oldest patient was 79 years old male with high grade carcinoma in a long standing parotid tumour. Table-3 represents distribution of salivary lesions according to age. Most of the patients(75%) were from rural area and of low socioeconomic strata, remaining 25% cases were from urban areas. Most common clinical presentation was painful salivary gland swellings (55% of the total patients). About 40% of the patients presented with painless slow growing masses. Three of the patients presented with painful parotid swelling associated with facial palsy. All these cases were of malignant salivary lesions possibly with facial nerve invasion. Some of the patients presented with pain and rapid enlargement of pre-existing salivary gland swelling that turned out to be the cases of carcinoma ex- pleomorphic adenoma. Two of the patients presented with recurrence of parotid swelling after one year of surgical removal of parotid masses. These were cases of low grade mucoepidermoid carcinoma (Fig. 3A & B). Out of 230 cases, 129 (56.05%) were non-neoplastic comprising mainly of acute and chronic sialadenitis and inflamed mucocoeles/retention cysts. 101(43.95%) cases were neoplastic. Among neoplastic lesions, 64 (29.83%) were benign and 32 (13.92%) were malignant and 5 (2.17) were suspicious of malignancy on FNAC (Table 1 & 2). Parotid gland was most frequently involved by the neoplastic (82.1%) process and 81.08% of all the malignant lesions were located in the parotid gland. Among nonneoplastic or inflammatory disorders, submandibular gland was more frequently involved than other salivary glands. However all the three cases of adenoid cystic carcinoma (Fig.4A & B) were arising from submandibular gland. Table 4 represents distribution of different lesions according to site of involvement. Pleomorphic adenoma (Fig.1A & B) was most frequent in parotid glands. Total 6 pleomorphic adenoma cases were arising from submandibular glands and two of the cases were arising from minor salivary glands of soft palate. All 4 cases of Warthin's tumour (Fig. 2A, B, C) were arising from parotid gland. One case of pleomorphic sarcoma was arising from left parotid swelling that was later confirmed by histopathology and immunohistochemistry at higher center as a case of poorly differentiated angiosarcoma. Acinic cell carcinoma was arising from parotid gland and showed solid cystic areas with characteristic atypical cells in sheets with prominent nucleoli and abundant granular eosinophilic cytoplasm. One case of squamous cell carcinoma with pleomorphic atypical squamoid cells producing keratin pearls was seen in right parotid gland FNAC smears. Two cases of Non Hodgkins lymphoma(Fig.5A) out of which one younger male patient was HIV positive and on antiretroviral therapy. Most of the patients with carcinoma ex- pleomorphic adenoma showed features of high grade malignancy (Fig.5B).

**Table 1: Distribution of various salivary lesions**

Diagnosis	No of Cases (n=230)	Percentage (%)
Non-neoplastic /inflammatory lesions	129	56.01
Neoplastic lesions	101	43.92
Inconclusive	000	00.00

**Table 2: Cyto-morphological spectrum of various salivary gland lesions**

Diagnosis	No of Cases (n=230)	Percentage (%)
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Acute sialadenitis	43	18.70
Chronic sialadenitis	56	24.35
Mucocele/Retention cyst	21	9.10
Granulomatous sialadenitis	03	1.30
Sialoadenosis	06	2.61
Pleomorphic adenoma	45	19.56
Monomorphic adenoma	15	6.52
Warthin's tumour	04	1.74
Suspicious of malignancy	05	2.17
Mucoepidermoid carcinoma	09	3.91
Carcinoma ex-pleomorphic	06	2.61
Adenoid cystic carcinoma	03	1.30
Acinic cell carcinoma	01	0.43
High grade/ poorly differentiated carcinoma	06	2.60
Adenocarcinoma	03	1.30
Non Hodgkins lymphoma	02	0.87
Metastatic SCC	01	0.43
Pleomorphic sarcoma	01	0.43

**Table 3: Age wise distribution of various salivary gland lesions**

Diagnosis	Age groups (yrs)							
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	70-80
Acute sialadenitis	01	13	21	05	03	00	00	00
Chronic sialadenitis	00	08	24	20	02	01	01	00
Mucocele/Retention cyst	00	07	03	04	05	02	00	00
Granulomatous sialadenitis	00	00	02	00	00	01	00	00
Sialoadenosis	00	00	03	02	01	00	00	00
Pleomorphic adenoma	00	00	23	12	06	03	01	00
Monomorphic adenoma	00	00	04	07	01	03	00	00
Warthin's tumour	00	00	00	00	00	02	02	00
Suspicious of malignancy	00	00	01	02	02	00	00	00
Mucoepidermoid carcinoma	00	00	01	02	05	01	00	00
Carcinoma ex-pleomorphic adenoma	00	00	00	00	00	02	04	00
Adenoid cystic carcinoma	00	00	00	01	02	00	00	00
Acinic cell carcinoma	00	01	00	00	00	00	00	00
High grade carcinoma	00	00	00	00	00	03	02	01
Adenocarcinoma	00	00	00	01	00	01	01	00
Non Hodgkins lymphoma	00	00	00	01	00	00	00	01
Metastatic squamous cell carcinoma	00	00	00	00	00	00	01	00
Pleomorphic sarcoma	00	00	00	00	00	00	01	00
<b>Total</b>	<b>01</b>	<b>29</b>	<b>82</b>	<b>57</b>	<b>27</b>	<b>19</b>	<b>13</b>	<b>02</b>

**Table 4: Distribution of various salivary gland tumours according to site**

Diagnosis	Parotid	Submandibular	Minor salivary
Acute and chronic sialadenitis	21	78	00
Mucocele/Retention cyst	05	12	04
Granulomatous sialadenitis	00	03	00
Sialoadenosis	04	02	00
Pleomorphic adenoma	37	06	02
Monomorphic adenoma	13	02	00
Warthin's tumour	04	00	00
Suspicious of malignancy	04	01	00
Mucoepidermoid carcinoma	07	02	00
Carcinoma ex-pleomorphic adenoma	06	00	00

Adenoid cystic carcinoma	00	03	00
Acinic cell carcinoma	01	00	00
High grade/ poorly differentiated carcinoma	04	02	00
Adenocarcinoma	03	00	00
Non Hodgkins lymphoma	02	00	00
Metastatic SCC	01	00	00
Pleomorphic sarcoma	01	00	00

Histopathology was carried out in 32 (13.92%) cases as majority of the patients are lost in follow up and some malignant cases were referred to higher center for surgical management. One of the patients diagnosed as pleomorphic adenoma in cytology showed features of low grade mucoepidermoid carcinoma with perineural invasion. One case diagnosed cytologically as acute suppurative sialadenitis was confirmed as high grade /poorly differentiated carcinoma of salivary gland. Cytological diagnosis of three cases of mucoepidermoid carcinoma, one adenoid cystic carcinoma and pleomorphic adenoma were consistent with histopathological findings. Two out of four suspected cases of malignancy were operated and both were confirmed histopathologically as low grade mucoepidermoid carcinoma. Table 5 represents comparative study of FNAC and histopathological findings.

**Table5: Comparison of cytological diagnosis and histopathological findings**

Cytological Diagnosis	Number of cases	Benign / Neoplastic	Histopathological Diagnosis	No. of cases
Acute Sialadenitis	02	Benign	Acute sialadenitis	01
Chronic sialadenitis	05	Benign	Chronic sialadenitis	05
Adenosis	03	Benign	Acinic cell hyperplasia	03
Pleomorphic adenoma	17	Benign	Pleomorphic adenoma	16
			Low grade mucoepidermoid carcinoma	01
Mucoepidermoid carcinoma	04	Malignant	Mucoepidermoid carcinoma	04
Adenoid cystic carcinoma	01	malignant	Adenoid cystic carcinoma	01

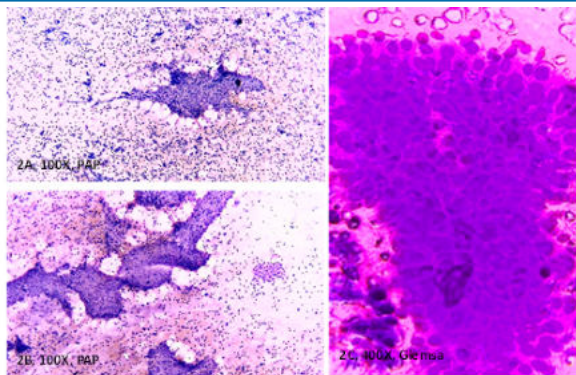


Fig.2 Warthin's tumour: Fig.3A, B, C clusters of oncocytic cells on a lymphocyte rich background

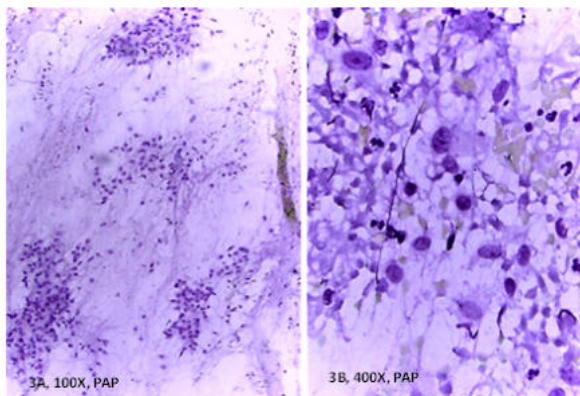
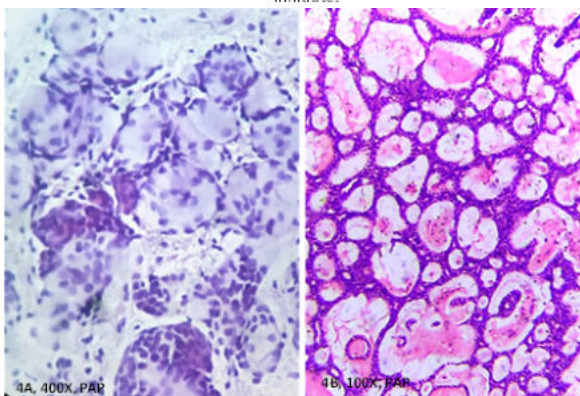


Fig.4 Mucoepidermoid carcinoma, Fig.4 A, 100X & B, 400X showing pleomorphic tumour cells on a mucinous background containing neutrophilic infiltrate.



Adenoid cystic carcinoma, Fig.4A FNAC smears showing clusters of basaloid cells and tumour cells around hyaline globules Fig. 4B Histopathology section, H&E stain 100X, showing basaloid tumour with cribriform pattern

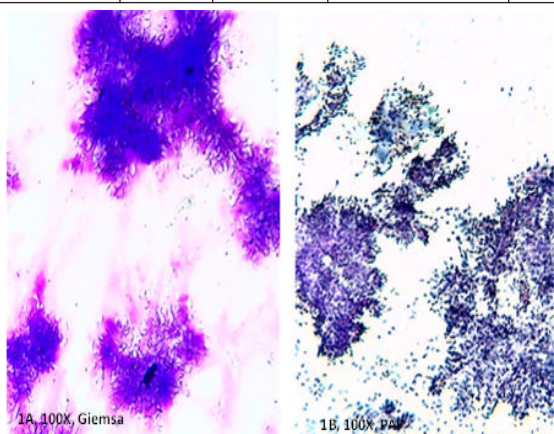


Fig.1Pleomorphic adenoma, FNAC smears, Fig.1A Giemsa stain 100x, Fig. 1B PAP stain 100X showing mixed population of cells with abundant chondromyxoid material

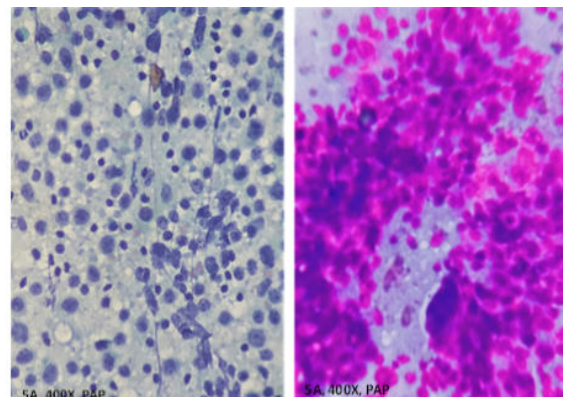


Fig.5A NHL large cell type showing dispersed large atypical lymphoid cells with prominent nucleoli % Fig.5B. High grade salivary tumour showing sheets of atypical cells with nuclear hyperchromasia, irregularity and scanty cytoplasm.

**DISCUSSION :**

FNAC is method of choice for evaluation of salivary gland lesions for over four decades.<sup>8</sup> The goal of cytological evaluation of salivary gland lesions is to characterize salivary gland lesions correctly using one of these major categories: 1) nonneoplastic/inflammatory; 2) benign neoplasms; and 3) low-grade and high-grade malignancies.<sup>8</sup> Delineating benign and malignant lesions is of prime importance for deciding treatment and course of surgery.<sup>9</sup>

The reported rate of unsatisfactory samples on FNAC varied from 3% to 12%.<sup>13-16</sup> In present study we did not have any unsatisfactory smears. Youngest patient in this study was 8 years old with features of acute sialadenitis of parotid gland while oldest patient was 79 years old with poorly differentiated/high grade carcinoma. Present study observed the age range of 8 to 79 years with mean age of 34.2 years. Nguansangiam et al.<sup>12</sup> observed the age range from 4 to 100 years with mean age 40-53 years in many studies.<sup>12,16</sup> Present study observed male predominance with a ratio of 1.19:1 which was similar to the study done by Choudhury et al.<sup>16</sup> Female predominance

is seen in some of the studies.<sup>8,12</sup> The rate of nonneoplastic lesion in this study was 56.05%. while other studies have described nonneoplastic lesions ranging from 20 to 72.9%.<sup>12-15</sup> Younger patients were more commonly affected by nonneoplastic/inflammatory pathology. In the present study most common age group for nonneoplastic lesions was 20 to 40 years (83.7% of all nonneoplastic lesions) which is consistent with other studies.<sup>10</sup> Chronic sialadenitis was the most frequent nonneoplastic lesion followed by benign cysts and inflammatory conditions mostly involve submandibular glands which is consistent with the findings of Atul et al. In the present study, benign neoplasms accounted for 64 cases (27.83%). The rate of benign neoplasm reported in various studies ranged from 49 to 83%.<sup>12-16</sup> However, present study observed 27.83% benign neoplastic lesions. Pleomorphic adenoma was the most common benign neoplasm followed by monomorphic adenoma which is consistent with the studies by Nguansangiam et al.<sup>12</sup> and others.<sup>12,15</sup> Canon Ersoz et al.<sup>17</sup>

Total 37 (16.1%) out of 230 cases were malignant in present study. Various previous studies have described malignant lesions ranging from 15-32%. [19, 20] Nguansangiam et al.<sup>12</sup> have reported lower rate of malignant neoplasms. In present study, the most common malignant lesion was mucoepidermoid carcinoma (24.3% of all malignant neoplasms) which is consistent with studies by Bhatia, Canon Ersoz et al and Arul P et al.<sup>10,17,18</sup> Next to mucoepidermoid carcinoma was carcinoma ex pleomorphic adenoma (16.2% of the malignant lesions). Occurrence of relatively high incidence of carcinoma ex pleomorphic adenoma is likely due to long standing tumours with increased risk of malignant transformation. Many of the patients presented with parotid swelling for more than 5-10 years and tumour size larger than 5cm in 10 of the malignant cases. Three patients presented with parotid swelling of long duration and recent onset of facial palsy and pain. All these cases revealed high grade carcinoma. Nguansangiam et al.<sup>12</sup> have reported lymphoma as the most frequent primary malignant salivary gland tumors followed by mucoepidermoid carcinoma. Parotid was the most commonly involved gland by the neoplastic lesions (82.1% of all neoplastic lesions and 78.4% of all malignant cases).<sup>10,17,18</sup> Many of the previous studies have documented similar findings.

Diagnosis of low grade mucoepidermoid carcinoma is difficult because it may be misdiagnosed as chronic sialadenitis, Warthin's tumor, mucous retention cysts, and pleomorphic adenoma.<sup>9</sup> present study showed a discordant case diagnosed cytologically as pleomorphic adenoma and excision biopsy confirmed low grade mucoepidermoid carcinoma.

Lymphomas arising from an intraparotid lymph node are relatively common and may present as a mixed population of large malignant cells and benign lymphocytes.<sup>8</sup> Extranodal marginal zone lymphoma of MALT type, follicular lymphoma, and diffuse large B-cell lymphoma are most common lymphomas diagnosed in salivary glands.<sup>8,15</sup> In this study two cases of Non Hodgkins lymphoma with cytological features of diffuse large cell type were seen. One of the patient was retropositive on antiretroviral therapy.

**CONCLUSION:**

FNAC being a simple, minimally invasive, rapid and cost effective procedure with high sensitivity and specificity is considered as first line method of choice for evaluation and management of patients with various salivary gland lesions. Meticulous evaluation of smears is needed to diagnose correctly and to exclude possibility of false negative and false positive cases. Sample adequacy is equally important in rendering proper diagnosis. In present study many

patients presented with advanced tumour stage and with associated complications. Appropriate awareness among public and those involved in treatment is needed for early diagnosis and treatment. Providing testing facilities to rural population is equally important.

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