

Original article

Primary Salivary Gland Tumors- A two years study at Nobel Medical College

Niraj Nepal¹, Prabesh Kumar Choudhary¹, Manish Kumar Das¹, Meenakshi Basnet², Sagar Paudel²

¹Department of Pathology, Nobel Medical College and Teaching Hospital, Biratnagar, Nepal.

²Department of Otorhinolaryngology, Nobel Medical College and Teaching Hospital, Biratnagar, Nepal.

ABSTRACT

Introduction: Salivary gland tumors are a heterogeneous group of neoplasms that are relatively rare but represent a wide variety of both benign and malignant histopathologic subtypes. The aim of this study was to find out the histopathological distribution of primary salivary gland tumors and correlate fine needle aspiration cytology reports with histological findings.

Materials and Methods: A total of 83 patients attending the otorhinolaryngology department with salivary gland tumors were enrolled in our study. The histopathological findings were reported and correlated with cytological findings.

Results: The mean age of the patient with salivary tumors was 43.11 ± 13.02 years. Out of 83 cases, 3 (3.6%) patients were diagnosed as inflammatory lesions, 64 (77.1%) patients had benign salivary gland tumors and 16 (19.3%) of patients had malignant salivary glands tumors in histopathology. The sensitivity and specificity of FNAC in this series for detecting salivary gland malignancy were 68.8% and 98.5% respectively with an overall diagnostic accuracy of 92.8%. The most common salivary gland tumor was found to be pleomorphic adenoma (56.6%) and the most common malignant salivary gland tumor was found to be mucoepidermoid carcinoma (19.3%). The comparison of the incidence of salivary gland tumors in various age groups showed a statistically significant difference ($p=0.009$).

Conclusions: Benign salivary tumors are more common than malignant tumors with the most common occurrence in parotid glands. Pleomorphic adenoma is the most common benign tumor whereas; mucoepidermoid carcinoma is the most common malignant tumor in patients visiting Nobel medical college.

Keywords: : FNAC; Pleomorphic; Salivary; Tumors

Correspondence:

Dr. Niraj Nepal, MD
Assistant Professor, Department of Pathology,
Nobel Medical College and Teaching Hospital,
Biratnagar, Nepal.
ORCID ID: 0000-0001-5863-5445
Email: nepalniraj@gmail.com

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INTRODUCTION

Salivary gland tumors are a heterogenous group of neoplasms that are relatively rare but represent a wide variety of both benign and malignant histopathologic subtypes. The global incidence is 1 in 100,000 individuals and comprises less than 3% of all head and neck neoplasms.¹ The frequency of benign tumors of salivary glands is higher in females whereas malignant tumors occur more frequently in males.^{2,3}

The most common benign tumor is pleomorphic adenoma followed by warthin's tumor, whereas most common malignant tumor is mucoepidermoid carcinoma followed by adenoid cystic carcinoma.²⁻⁵ Benign tumors of salivary glands are most commonly seen in 30-70 years with a mean age of 45 years and peak incidence of malignant tumor in seen in 6th and 7th decades.^{6,7}

The parotid gland is the most common site comprising about 80% of salivary gland tumors, and about 10-15% are seen in submandibular glands and the remainder are distributed in sublingual and other minor salivary glands.⁸ About 80% of parotid gland tumors are benign.²

The diagnosis of salivary gland lesion is often challenging. Fine Needle Aspiration Cytology (FNAC) is a valuable diagnostic adjunct in the evaluation of salivary glands lesions due to superficial location and easy accessibility of the salivary glands. However, an accurate histopathological diagnosis is essential for the rational treatment of patients with salivary gland neoplasms. Salivary gland neoplasms are not adequately studied in Nepal and its incidence, distribution and the national burden are relatively unknown. The aim of this study was to find out the histopathological distribution of primary salivary gland tumors and correlate fine needle aspiration cytology reports with histological findings.

MATERIALS AND METHODS

This prospective study was conducted on the patients of salivary glands tumor, attending the Outpatient department of Otorhinolaryngology, Nobel medical college and teaching hospital, Biratnagar, Nepal for a period of two years from March 2017 to March 2019. Written consent was obtained and Fine Needle Aspiration Cytology (FNAC) was done in all patients suspected of having a salivary gland tumor and histopathological confirmation was done in patients who underwent surgery, by the department of pathology of Nobel medical college. Ethical clearance was obtained from the Institutional ethics committee of Nobel medical college and teaching hospital, Biratnagar, Nepal.

Case Selection

Inclusion Criteria

- All the consenting patients of either age or sex with salivary gland tumor who underwent surgical excision.

Exclusion Criteria

- Recurrent, metastatic and non-epithelial tumors.
- Any contraindication of FNAC such as bleeding diathesis, skin infection in the area of fine-needle aspiration and patient’s refusal.
- Patients who refused for histopathological confirmation.

Detailed history taking and clinical examination were done, and age, sex, and site of the tumor were recorded for demographic comparison. With informed written consent, FNAC was done under aseptic precautions with 10cc disposable syringe and 23 G needle from salivary gland lesions. The contents of the needle were expressed onto clean glass slides and fixed with 95% alcohol and staining was done by Giemsa stain. In case of insufficient aspirate, repeat aspiration was done.

The surgical specimens received from the department of otorhinolaryngology were fixed in 10% formalin in the department of pathology. Gross examination was done for size, border, infiltration, consistency, and presence of cystic and necrotic changes. All suspicious areas were sampled and sections of 2-3mm thickness were taken and processing was done. Microscopic examination was done after haematoxylin and eosin staining. Special stains like mucicarmine and PAS were done if needed. After examination, non-neoplastic lesions were reported according to conventional criteria and neoplastic lesions were reported according to the WHO classification of salivary glands tumors. The cytological diagnosis was correlated with histopathological diagnosis and in case of errors; reports were discussed with the department of otorhinolaryngology for further management of the patient.

Statistical Analysis

The results of the study were statistically analyzed using SPSS version 25, using a chi-square test. Results on continuous measurements are presented as mean ± standard deviation (min-max) and results on categorical measurements are presented in percentage and frequency. The sensitivity, specificity and diagnostic accuracy of FNAC were calculated. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 83 patients with salivary gland tumors were studied during the study period. The mean age of a patient with neoplastic salivary tumors was 43.11 ± 13.02 years with a minimum age of 22 years and a maximum age of 80 years.

Out of 83 cases studied, 5 (6%) patients were diagnosed as inflammatory lesions, 66 (79.5%) patients were diagnosed as benign salivary gland tumors and 12 (14.5%) of patients were diagnosed as malignant salivary glands tumors in fine needle aspiration cytology as shown in Table 1 and 2.

Table 1: Age distribution of inflammatory salivary gland lesions (FNAC)

FNAC	Cytology/ Histology	Age groups							Total
		11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	>70 years	
INFLAMMATORY	FNAC	1	1	1	1	1	-	-	5(6%)
	HPE	1	1	1	-	-	-	-	3(3.6%)
Acute sialadenitis	FNAC	1	1	-	-	-	-	-	2(2.4%)
	HPE	1	1	-	-	-	-	-	2(2.4%)
Chronic sialadenitis	FNAC	-	-	1	1	1	-	-	3(3.6%)
	HPE	-	-	1	-	-	-	-	1(1.2%)

Table 2: Age distribution of salivary gland tumors (FNAC)

FNAC	Cytology/ Histology	Age groups							Total
		11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	>70 years	
BENIGN	FNAC	-	10	30	12	10	3	1	66(79.5%)
	HPE	-	10	29	13	9	2	1	64(77.1%)
Pleomorphic adenoma	FNAC	-	8	24	8	7	1	-	48(57.8%)
	HPE	-	8	23	9	6	1	-	47(56.6%)
Warthin's tumor	FNAC	-	-	2	1	-	-	-	3(3.6%)
	HPE	-	-	3	1	-	-	1	5(6.0%)
Monomorphic adenoma	FNAC	-	-	1	1	-	1	-	3(3.6%)
	HPE	-	-	2	1	-	-	-	3(3.6%)
Basal cell adenoma	FNAC	-	-	1	1	1	-	-	3(3.6%)
	HPE	-	-	1	1	2	-	-	4(4.8%)
Schwannoma	FNAC	-	-	-	1	-	-	-	1(1.2%)
	HPE	-	-	-	1	-	-	-	1(1.2%)
Myoepithelioma	FNAC	-	-	-	-	2	1	-	3(3.6%)
	HPE	-	-	-	-	1	1	-	2(2.4%)
Lipoma	FNAC	-	2	-	-	-	-	-	2(2.4%)
	HPE	-	2	-	-	-	-	-	2(2.4%)
Benign salivary gland lesion	FNAC	-	-	2	-	-	-	1	3(3.6%)
MALIGNANT	FNAC	-	-	3	2	3	2	2	12(14.5%)
	HPE	-	-	4	2	5	3	2	16(19.3%)
Mucoepidermoid	FNAC	-	-	1	1	2	1	0	5(6.0%)
	HPE	-	-	2	1	4	1	1	9(10.8%)
Adenoid cystic carcinoma	FNAC	-	-	-	-	1	-	1	2(2.4%)
	HPE	-	-	-	1	1	1	-	3(3.6%)
Lymphoma	FNAC	-	-	1	-	-	1	-	2(2.4%)
	HPE	-	-	1	-	-	1	-	2(2.4%)
Adenocarcinoma	FNAC	-	-	-	-	-	-	-	0(0%)
	HPE	-	-	1	-	-	-	1	2(2.4%)
Suggestive of malignancy	FNAC	-	-	1	1	-	-	1	3(3.6%)
TOTAL	FNAC	1	11	34	15	14	5	3	83(100%)
	HPE	1	11	34	15	14	5	3	83(100%)

FNAC= Fine Needle Aspiration Cytology; HPE= Histopathological Examination

The sensitivity and specificity of FNAC in this series for detecting salivary gland malignancy was found to be 68.8% and 98.5% respectively with overall diagnostic accuracy of 92.8% as shown in Table.

Table 3: Correlation of FNAC and Histopathological examination findings

		Histopathological examination confirmation	
		Malignant	Benign
FNAC findings	Malignant	11(68.8%)	1(1.5%)
	Benign	5(31.2%)	66(98.5%)

For the purpose of further statistical analysis, 80 cases with definite neoplastic diagnosis in histopathology were included. Three cases of inflammatory lesion in histopathology were

excluded from the analysis. The most common salivary gland tumor was pleomorphic adenoma (56.6%) and most common malignant salivary gland tumor was mucoepidermoid carcinoma (10.8%). The mean age of patients with benign salivary gland tumor was found to be 40.36 ± 11.17 years and that of malignant tumor was found to be 54.13 ± 14.38 years. The mean age of patient with pleomorphic adenoma was 38.87 ± 10.44 years and that of mucoepidermoid carcinoma was 53.89 ± 13.79 years.

On further analysis of histopathological reports, the highest number of benign salivary glands tumor was observed in 31-40 years age groups (45.3%) followed by 41-50 years (20.3%), 21-30 years (15.6%) and 51-60 years (14.1%). Similarly, the incidence of malignant tumor was highest in 51-60 years age group (31.2%) followed by 31-40 years (25.0%) and 61-70 years (18.8%). The comparison of incidence of salivary gland tumor in various age groups showed statistically significant difference ($p=0.009$) as shown in Table 4.

Table 4: Comparison of age groups of patients with histopathological findings of salivary glands tumors

Age groups	Histopathological examination findings				p-value
	Benign		Malignant		
	Male/Female	Total	Male/Female	Total	
11-20 years	0/0	0(0.0%)	0/0	0(0.0%)	0.009*
21-30 years	4/6	10(15.6%)	0/0	0(0.0%)	
31-40 years	11/18	29(45.3%)	3/1	4(25.0%)	
41-50 years	5/8	13(20.3%)	0/2	2(12.5%)	
51-60 years	7/2	9(14.1%)	2/3	5(31.2%)	
61-70 years	0/2	2(3.1%)	3/0	3(18.8%)	
>70 years	1/0	1(1.6%)	2/0	2(12.5%)	
Total	28(43.8%)/36 (56.2%)	64(100%)	10(62.5%)/ 6 (37.5%)	16(100%)	

*statistically significant

The incidence of benign salivary gland tumor in male and female was 43.8% and 56.2% respectively with male to female ratio of 1:1.28. Similarly, the incidence of malignant salivary gland tumor in male and female was found to be 62.5% and 37.5% respectively with male to female ratio of 1.67:1. However, the difference was not statistically significant (p=0.144) as shown in Table 4.

Depending upon the sites, the salivary gland tumor was highest in parotid gland (79.7%) followed by submandibular gland (14.1%) and remaining 6.3% of salivary gland tumors was located in minor salivary glands. However, the difference in incidence was not statistically significant (p=0.229) as shown in Table 5.

Table 5: Correlation of malignancy of salivary tumors with site distribution of tumors

Site	Histopathological examination findings		p-value
	Benign	Malignant	
Parotid	51(79.7%)	12(75.0%)	0.229
Submandibular	9(14.1%)	1(6.3%)	
Minor	4(6.3%)	3(18.8%)	
Total	64(100%)	16(100%)	

DISCUSSION

The incidence of salivary gland tumors and correlation between benign and malignant neoplasms is not adequately studied in Nepal. In our study, mean age of patient with neoplastic salivary tumor was 43.11 ± 13.02 years with minimum age of 22 years and maximum age of 80 years. Similarly, the mean age of patients with benign salivary gland tumor was found to be 40.36 ± 11.17 years and that of malignant tumor was found to be 54.13 ± 14.38 years, which is comparable with the observation by Chatterjee et al.⁹ which showed incidence of benign tumors higher in lower age group as compared to malignant tumors. Similar study conducted in Bharatpur, Nepal by Shrestha S et al. showed benign salivary gland tumors common in age group of 31 to 40 years and malignant salivary gland tumors in 41 to 50 years, comparable to our study.¹⁰

The sensitivity and specificity of FNAC in this series for detecting salivary gland malignancy was found to be 68.8% and 98.5% respectively with overall diagnostic accuracy of 92.8% which is

in accordance with the observation by Quizilbash et al.¹¹, Kocjan et al.¹², Postema et al.¹³ and Omhare et al.¹⁴ as shown in Table 6.

Table 6: Diagnostic accuracy of FNAC in various series

Aurthor	No. of cases	Accuracy (%)
Quizilbash et al (1976) ¹¹	101	93
Kocjan et al (1990) ¹²	29	86
Postema et al (2004) ¹³	388	96
Omhare et al (2014) ¹⁴	86	88
Present study	80	92.8

In total of 80 cases, 64 (80%) patients were diagnosed as benign salivary gland tumors and 16 (20%) of patients were diagnosed as malignant salivary glands tumors which is comparable to the study done by Mihashi H et al. which showed 79.1% of benign tumors and 20.9% of malignant tumors.¹⁵ Similar hospital-based study done in Eastern Nepal by Nepal A et al. also showed 81% of benign tumors and 79% of malignant tumors.¹⁶ However, study conducted in Bharatpur, Nepal by Shrestha S et al. showed 62.5% malignant and 37.5% benign tumors.¹⁴

The sex ratio of benign salivary gland tumor (male: female) was found to be 1:1.28 whereas that of malignant salivary gland tumor was 1.67:1 which is similar to other studies which shows benign tumors more common in female and malignant tumor more commonly in male.¹⁷

Parotid gland (79.7%) was the most commonly involved salivary gland which correlates with other studies.^{18,19} The most common salivary gland tumor was found to be pleomorphic adenoma accounting for 73.4% of benign tumors and 58.8% of all tumors comparable to other studies.^{19,20} The most common site of pleomorphic adenoma was parotid gland (76.6%) which is in accordance with other studies done by Subhashraj k et al.¹⁹ and Ito FA et al.²¹ Warthin's tumor was second most common benign tumor (7.8%) comparable to study done by Chung YF et al.²²

In our study, most common malignant tumor was mucoepidermoid carcinoma which comprise 56.3% of all malignant tumors which is in accordance to finding of Ito et al.²¹ The most common malignant tumor of submandibular glands in our study was mucoepidermoid carcinoma which is in contrast to the study done by Richardson et al. which showed adenoid cystic carcinoma as

most common malignant submandibular tumors.²³ Two cases of adenocarcinoma was seen accounting for 3.9% of all tumors located in parotid glands comparable to the other studies.^{13,19}

CONCLUSIONS

Benign salivary tumors are more common than malignant tumors with most common occurrence in parotid glands. Benign tumors are more common in female and malignant tumors in male. Pleomorphic adenoma is most common benign tumor followed by Warthin's tumor whereas; mucoepidermoid carcinoma is most common malignant tumor in patient visiting Nobel medical college. FNAC is safe and effective preoperative evaluation technique with acceptable diagnostic accuracy for categorization of various salivary gland lesions.

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