

Cytohistopathological Study of Salivary Gland Lesions in a Tertiary Care Hospital

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Abstract: ***Background:** Due to its low cost, quick turnaround time, high specificity, and sensitivity, fine needle aspiration cytology (FNAC) is a useful procedure for assessing suspected salivary gland lesions. Salivary gland lesions are still best assessed by a histopathological analysis of the tissue that has been removed from the affected glands. **Aim and objectives:** 1) To evaluate the cyto-histopathological spectrum of salivary gland lesions. 2) To find out the correlation of cytological findings from FNAC with histopathological diagnosis of salivary gland lesions. **Methods and Material:** Between January 2021 and June 2022, a one and a half year period, 35 patients with salivary glands swelling included in this study. A 10 mL disposable syringe and a 23/24-gauge needle were used during FNA procedures without the use of local anaesthesia from different sites of the salivary gland swelling. Haematoxylin and eosin staining of paraffin-embedded tissue slices taken from salivary gland tissue was performed. **Results:** Total 35 cases studied in which 21 were male and 14 were female (M: F = 1.5: 1). Age of patients ranged from 11 years to 84 years. Commonest gland involved was parotid (77.14%). According to the cyto-histological diagnosis, commonest benign neoplasm was pleomorphic adenoma. Amongst malignant neoplasms most common was mucoepidermoid carcinoma (2/35, 5.71%) and malignant epithelial neoplasms (2/35, 5.71%) on cytology. Total (22.86%) cases were diagnosed as malignant neoplasm on histopathology. Most common malignant tumour was mucoepidermoid carcinoma (8.57%). **Conclusion:** With sufficient sampling and an experienced cytopathologist, the majority of salivary gland lesions can be accurately diagnosed using FNA.*

Keywords: Salivary gland, FNAC, Histopathology, Pleomorphic adenoma, Mucoepidermoid carcinoma

1. Introduction

Salivary glands are exocrine organs responsible for production and secretion of saliva and consist of the parotid, submandibular, sublingual, and other minor glands that are numerous and widely distributed throughout the mouth and oropharynx. Salivary gland neoplasms are heterogeneous group of tumours of oral and maxillofacial pathology. They account for 6% of all head and neck tumors.¹

The salivary glands are the site of origin of a wide variety of inflammatory and neoplastic lesions, the histopathology of which is said to be the most complex and diverse of any organ in the body. The nature of the lesion often cannot be determined on clinical examination.

Fine needle aspiration cytology (FNAC) is a useful OPD procedure for evaluating suspicious salivary glands lesions due to its low cost, minimum morbidity, rapid turnaround time, high specificity, and sensitivity.²

Histopathological examination of the excised salivary gland tissue remains the gold standard diagnostic investigation in the evaluation of salivary gland lesions. Various radiological diagnostic tests can assist in the evaluation of these lesions i. e., plain radiograph, sialograms, CT scans, technetium scans, USG and MRI.

By cytological examination, the lesions can be divided into inflammatory, reactive, benign, or malignant and, if possible, specific diagnosis can be given.

FNAC provides a definite diagnosis in a large percentage of cases preoperatively and avoids unnecessary surgery. In case of high-grade malignancy or of recurrent cancer, a cytological diagnosis allows administration of palliative treatment.

Aims and Objectives

- 1) To evaluate the cyto-histopathological spectrum of salivary gland lesions.
- 2) To find out the correlation of cytological findings from FNAC with histopathological diagnosis of salivary gland lesions.

2. Material and Methods

This study was conducted in 35 patients with salivary gland swelling attending the ENT and surgical OPD of Geetanjali Medical College and Hospital, Udaipur over a period of one and half year from January 2021 to June 2022. All patients were clinically evaluated by detailed history, clinical examination, and haematological and radiological investigations. FNA was performed from different sites of the salivary gland swelling using a 10 mL disposable syringe and 23/24-gauge needle without local anaesthesia. FNA air-dried smears were stained with Giemsa stain and wet smears fixed in 95% ethyl alcohol were stained with Papanicolaou stain. Paraffin embedded tissue sections obtained from salivary gland tissue were stained with haematoxylin and eosin were performed. Salivary gland lesions were studied under the three groups including nonneoplastic lesions, benign and malignant tumors.

Inclusion Criteria

All patients referred to Pathology Department of Geetanjali Medical College and Hospital, Udaipur for FNAC of salivary gland lesions from January 2021 to June 2022 were included in this study.

Exclusion Criteria

Non-cooperative patients and calcified lesions unsuitable for FNAC were excluded from the study.

3. Results

Total 35 cases studied in which 21 were male and 14 were female (M: F = 1.5: 1). Age of patients ranged from 11 years to 84 years with maximum number of 11 cases seen in age group 31-40 years, followed by 9 cases in 51-60 years. (Table 1)

Table 1: Age distribution of cases in the present study

Age group (years)	Number of cases	% Of cases
11-20	4	11.5
21-30	4	11.5
31-40	11	31.4
41-50	5	14.3
51-60	9	25.7
61-70	1	2.8
71-80	0	0
81-90	1	2.8
Total	35	100

Commonest gland involved was parotid (77.14%, 27/35), followed by submandibular gland (14.28%, 5/35) and minor salivary glands (8.57%, 3/35) whereas no case of sublingual salivary gland lesion was observed in the present study. (Table 2)

Table 2: Distribution of cases according to site

Site	No of cases	% of cases
Parotid	27	77.14
Submandibular	14	14.28
Minor glands	3	8.57
Total	35	100

Cytological findings

According to the cytological diagnosis out of 35 cases the commonest benign neoplasm was pleomorphic adenoma (18/35, 51.4%), followed by basal cell adenoma (3/35, 8.57%), and Warthin's tumour (2/35, 5.71%). Amongst malignant neoplasms most common was mucoepidermoid carcinoma 2 (5.71%) and malignant epithelial neoplasms (2/35, 5.71%) followed by adenoid cystic carcinoma 1 (2.86%) and poorly differentiated squamous cell carcinoma 1 (2.86%). Total 6 (17.14%) cases of non-neoplastic lesion diagnosed in cytological finding. (Table 3)

Table 3: Distribution of cases according to the cytological findings

Cytological diagnosis	Number of cases	% Of cases
Acute sialadenitis	1	2.86
Chronic sialadenitis	2	5.71
Benign Cystic lesion	3	8.57
Pleomorphic adenoma	18	51.4
Basal cell adenoma	3	8.57
Warthin's tumor	2	5.71
Mucoepidermoid carcinoma	2	5.71
Adenoid cystic carcinoma	1	2.86
Malignant epithelial neoplasms	2	5.71
Poorly differentiated SCC	1	2.86
Total	35	100

Histopathological findings

Among 35 cases, only 5 (14.28%) cases were non neoplastic lesions. Majority of cases were benign tumours (22/35, 62.86%). Among benign tumors, most common was pleomorphic adenoma 16 (45.71%) followed by basal cell adenoma (3/35, 8.57%) and Warthin's tumor (3/35, 8.57%). Total 8 (22.86%) cases were diagnosed as malignant neoplasm on histopathology. Most common malignant tumour was mucoepidermoid carcinoma (3/35, 8.57%) followed by adenoid cystic carcinoma (2/35, 5.71%). (Table 4)

Table 4: Distribution of cases according to the Histopathological diagnosis

Histopathological diagnosis	Number of cases	% Of cases
Acute sialadenitis	1	2.86
Chronic sialadenitis	2	5.71
Benign Cystic lesion	2	5.71
Pleomorphic adenoma	16	45.71
Basal cell adenoma	3	8.57
Warthin's tumor	3	8.57
Mucoepidermoid carcinoma	3	8.57
Adenoid cystic carcinoma	2	5.71
Acinic cell carcinoma	1	2.86
Epithelial-Myoepithelial carcinoma	1	2.86
Carcinoma ex pleomorphic adenoma	1	2.86
Total	35	100

Cyto-histological correlation

Table 5: Cyto-histological correlation

Cytological diagnosis	Histopathological diagnosis											
	Acute sialadenitis	Chronic sialadenitis	Benign Cystic lesion	Pleomorphic adenoma	Basal cell adenoma	Warthin's tumor	Mucoepidermoid carcinoma	Adenoid cystic carcinoma	Acinic cell carcinoma	Epithelial-Myoepithelial carcinoma	Carcinoma ex pleomorphic adenoma	Total
Acute sialadenitis	1	-	-	-	-	-	-	-	-	-	-	1
Chronic sialadenitis	-	2	-	-	-	-	-	-	-	-	-	2
Benign Cystic lesion	-	-	2	-	-	-	-	-	1	-	-	3
Pleomorphic adenoma	-	-	-	16	-	1	-	-	-	1	-	18
Basal cell adenoma	-	-	-	-	3	-	-	-	-	-	-	3
Warthin's tumor	-	-	-	-	-	2	-	-	-	-	-	2

Mucoepidermoid carcinoma	-	-	-	-	-	-	2	-	-	-	-	2
Adenoid cystic carcinoma	-	-	-	-	-	-	-	1	-	-	-	1
Malignant epithelial neoplasms	-	-	-	-	-	--	-	1	-	-	1	2
Poorly differentiated SCC	-	-	-	-	-	-	1	-	-	-	-	1

4. Discussion

Sex distribution

In the present study, male to female ratio was 1.5: 1. This was comparable to previous studies by Choudhary et al (2011)³, Omhare et al (2014)⁴ and Rohilla et al (2017)⁵ which also showed a slight male predominance.

Age

The peak incidence of salivary gland lesions was found in 31-40 years. Choudhary et al (2011)³ and Omhare et al (2014)⁴ also found the same age incidence in their studies on the salivary gland lesions.

Site of the lesion

Commonest gland involved was parotid (77.14%, 27/35), followed by submandibular gland (14.28%, 5/35) and minor salivary glands (8.57%, 3/35), which was in concordance with Omhare et al (2014)⁴, Rohilla et al (2017)⁵ and Rameeza and Hemalata (2022)⁶.

Histological and cytological findings

According to the cytological diagnosis, cystic lesions (8.57%) was the most common non-neoplastic lesion (5.71%) followed by chronic sialadenitis and acute sialadenitis (2.86%) which was similar to Tessy et al (2015)⁷.

Benign neoplasms constituted to majority of all salivary gland lesions in the present study and pleomorphic adenoma was the commonest lesion which was in accordance with Omhare et al (2014)⁴, Shetty et al (2016)⁸ and Verma (2016)⁹. 16 cases of pleomorphic adenoma were confirmed by histopathology.

In present study, basal cell adenoma was second most frequent benign tumor after pleomorphic adenoma in contrast to the studies by Choudhary et al (2011)³ and Shetty et al (2016)⁸ which reported warthin's tumor as 2nd most common tumor. All 3 cases of basal cell adenoma diagnosed by cytology were confirmed histopathologically.

The other cytologically benign lesion encountered in the present study was Warthin's tumor. The incidence of Warthin's tumor was 5.71% (2 /35). 2 cases were confirmed by histologically and 1 case of warthin 's tumor was discordantly diagnosed as pleomorphic adenoma on FNAC smears.

Amongst malignant neoplasm most common was mucoepidermoid carcinoma which was similar to the finding of Wang et al (2017)¹⁰, Devi et al (2016)¹¹ and Tessy et al (2015)⁷ also reported mucoepidermoid carcinoma as the commonest malignant neoplasm. Diaz et al (2014)¹² have observed that adenoid cystic carcinoma was most common malignant tumor followed by poorly differentiated carcinoma, carcinoma with squamous differentiation and

adenocarcinoma. In contrast, Nguansangiam et al (2012)¹³ have reported that lymphoma is the most common primary malignant salivary gland tumor followed by mucoepidermoid carcinoma.

Cytologically 2 cases were diagnosed as mucoepidermoid carcinoma both cases were confirmed histopathologically and one case of mucoepidermoid carcinoma was misdiagnosed as Poorly differentiated SCC on FNAC due to absence of mucus and intermediate cells in the aspirate.

Adenoid cystic carcinoma was the 2nd most common neoplasm as also reported by Wang et al (2017)¹⁰ and Shetty et al (2016)⁸. Cytologically, 1 case was diagnosed as adenoid cystic carcinoma, which was confirmed histopathologically. One case of adenoid cystic carcinoma was diagnosed as malignant epithelial neoplasms on FNAC.

Cytologically 3 cases were diagnosed as benign cystic lesions, 2 cases were confirmed by histopathology and one diagnosed as acinic cell carcinoma. Postema et al (2004)¹⁴ found that inadequate sampling from areas of predominantly cystic areas may lead to erroneous diagnosis of benign cystic lesions.

In the present study, case of epithelial myoepithelial carcinoma was reported as pleomorphic adenoma in cytology. Orell et al (2011)¹⁵ states that the cytological diagnosis of epithelial myoepithelial carcinoma is challenging due to the difficulty in discerning biphasic pattern and recognizing the myoepithelial cells as clear cell in smears.

Two cases of malignant epithelial neoplasm were diagnosed on FNAC, One was diagnosed as carcinoma of ex pleomorphic adenoma and one was diagnosed as adenoid cystic carcinoma by histologically.

5. Conclusion

Fine needle aspiration cytology is a safe and economic procedure with acceptable diagnostic accuracy especially in the experienced hands. It has an important role in the preoperative evaluation and categorization of various salivary glands lesions. Salivary lesions remain one of the most challenging entities in cytopathology, mainly because of the diversity of histologic subtypes and the often-overlapping morphologic features of the lesions. Proper sampling of lesions and adequate cellularity of the smears are the pre-requisites for an accurate diagnosis. The diagnostic accuracy of FNAC as correlated with the histopathological diagnosis was 95% in the present study and correlates with other studies. This study highlights the utility of FNAC in distinguishing benign and malignant salivary gland tumors which are of utmost value in planning the further management of the patients. In conclusion, most of the salivary gland lesions can be accurately diagnosed via

FNA with adequate sampling and cytopathologist experience.

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