

Cytological Pattern of Salivary Gland Lesions

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Abstract

Background: To study the cytological pattern of salivary glands swellings on fine needle aspiration cytology (FNAC).

Methods: Patients who underwent fine needle aspiration cytology (FNAC) for their salivary gland swellings, were included. Data was analyzed from various angles including site, diagnostic categories, diagnostic entities, age and gender.

Results: Parotid gland (74.3%) was the most frequently affected site, followed by submandibular gland (23.6%). The cases were divided into four main reporting groups i.e. unsatisfactory, inconclusive/ lesion of undetermined significance, non neoplastic and neoplastic constituting 0.7%, 3.6%, 22.9% and 72.9% of all the lesions respectively. Non neoplastic lesions included non specific sialadenitis, cystic lesions without any evidence of neoplasia and sialadenosis comprising 43.8%, 37.5% and 18.8% of these lesions respectively. Neoplastic lesions were divided into three categories namely benign, malignant and indeterminate. Benign tumors constituted 79 (56.4%), malignant neoplasms consisted of 8 (5.7%) and indeterminate category contained 15 (10.7%) of all cases. Mean age was 43 years and MF ratio was 1:1.7. Pleomorphic adenoma was the most frequent diagnosis among all cases, in all neoplasms as well as in benign neoplasms.

Conclusion: Parotid was the commonest site of involvement. Pleomorphic adenoma and mucoepidermoid carcinoma were the most common lesions in benign and malignant neoplastic categories respectively.

Key Words: Salivary glands, Parotid gland, Submandibular glands, Pleomorphic adenoma, Mucoepidermoid carcinoma.

Introduction

FNAC is an established pathological tool for preoperative evaluation of salivary swellings.¹ Rather it is a first line investigation for most of the palpable head and neck masses.² The salivary glands contain small proportion of pathological lesion in the human body. These consisted of 0.30% (100/34135) of cases in

one study.³⁻⁷ Salivary gland cytology is a challenging task due to less common occurrence of pathological lesions, histological diversity, overlapping features, rare entities, lack of uniform system of reporting and inherent limitations of cytological study like lack of architecture.^{1,2,8} One of the most difficult problem in salivary cytology is to differentiate a benign entity from malignant.² Several workers have performed cytohistological comparison in their studies to determine its accuracy, sensitivity, specificity, positive predictive value and negative predictive values. Most of these workers have reported good efficacy of FNAC e.g. a study from Italy has reported an overall accuracy of 92%. Even in experienced hands there is a proportion of cases in each study in which the diagnosis remains uncertain and there are false positive as well as false negative cases.^{4,5,6,9} Most frequent error is a false negative diagnosis.¹⁰ In spite of its inherent limitations and complex nature of salivary lesions, FNAC is a very useful investigation because it is safe, rapid, economical, least traumatic and contributes significant diagnostic information for better planning and management of cases.^{1,2,5} Currently, no uniform reporting or risk stratification system is in use for cytological study of salivary glands lesions/ tumors. However, some workers have proposed these systems.^{1,11}

Patients and Methods

This is a study of all the patients which were referred with their salivary glands swellings and underwent FNAC in Aziz Bhatti Shaheed Hospital, Gujrat, affiliated with Nawaz Sharif Medical College, from January 2012 to June 2016. Most of the lesions were sampled with 23 gauge needle and 5ml disposable syringe. 22 or 21 gauge needles and 10 ml syringe were used in some cases. The smears were prepared, stained and examined. Histopathological specimens/ reports of most cases were not available therefore no cytohistopathological correlation could be done.

Results

A total of 140 patients underwent FNAC during the period of study. These were divided into four main reporting categories (Table 1). Most of the lesions fell

into neoplastic category comprising 72.9% of the cases. Most commonly affected site was parotid having 74.2% of the cases. Pleomorphic adenoma (PA) was the commonest lesion (Figure 1,2). There were 71 cases of PA that constituted 50.7% of all the 140 cases. Mean age for all cases was 43 years, peak incidence was found in fifth decade (22.86%). The age ranged from 5 years to 80 years. More cases were seen in females than males. There were 89 females as compared to 51 males with a male to female ratio of 1:1.7. A total of 137 cases were found in parotid and submandibular

glands. Most of these i.e. 70 cases were found on right side, 63 on left side and four were bilateral. Among the four bilateral cases, 2 were bilateral sialadenitis in parotids, 1 was bilateral sialadenitis in submandibular glands and 1 case was of bilateral cysts in parotid glands. There were three types of non neoplastic lesions in the study (Table 2). Most of these were located in parotid (62.5%). Non specific sialadenitis was the commonest lesion with 43.8% of non neoplastic cases (Fig 3-4). Mean age of non neoplastic lesions was 43.6 years and M:F ratio was 1:2.2.

Table 1: Overall and site wise frequency of diagnostic groups

Main Groups	Total		Parotid		Submandibular		Palate	
	No	%	No	%	No	%	No	%
Unsatisfactory/ Inadequate	1	0.7			1	0.7		
Inconclusive/ Lesion of undetermined significance	5	3.6	3	2.1	1	0.7	1	0.7
Non Neoplastic	32	22.9	20	14.3	12	8.6		
Neoplastic	102	72.9	81	57.9	19	13.6	2	1.4
Total	140	100.0	104	74.2	33	23.5	3	2.1

Table 2: Lesion and Site Wise Frequency of Non Neoplastic Lesions (n=32).

Lesion	Total		Parotid		Submandibular		Palate	
	No	%	No	%	No	%	No	%
Sialadenitis	14	43.8	7	21.9	7	21.9	0	0.0
Cysts	12	37.5	10	31.3	2	6.3	0	0.0
Sialadenosis	6	18.8	3	9.4	3	9.4	0	0.0
Total	32	100.0	20	62.5	12	37.5	0	0.0

Table 3: Site and Frequency of Salivary Gland Neoplasms (n=102)

Sub groups	Lesion	Total		Parotid		Submandibular		Palate	
		No	%	No	%	No	%	No	%
Benign	PA	71	69.6	61	59.8	10	9.8		
	WT	5	4.9	5	4.9				
	Myoepithelioma	1	1.0					1	1.0
	Unspecified	2	2.0	1	1.0	1	1.0		
	Group Total	79	77.5	67	65.7	11	10.8	1	1.0
Malignant	Mucoepidermoid Carcinoma	5	4.9	5	4.9				
	Adenoid Cystic Carcinoma	1	1.0			1	1.0		
	Squamous Cell Carcinoma	1	1.0			1	1.0		
	Carcinoma	1	1.0	1	1.0				
	Group Total	8	7.8	6	5.9	2	2.0		
Indeterminate	Probably Benign	5	4.9	2	2.0	3	2.9		
	Probably Malignant	8	7.8	4	3.9	3	2.9	1	1.0
	Oncocytic Neoplasm	2	2.0	2	2.0				
	Group Total	15	14.7	8	7.8	6	5.9	1	1.0
Total		102	100.0	81	79.4	19	18.6	2	2.0

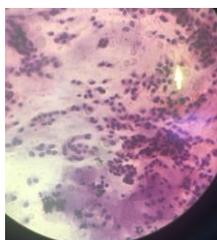


Fig 1: Pleomorphic adenoma. Epithelial and myoepithelial cells in mucinous background

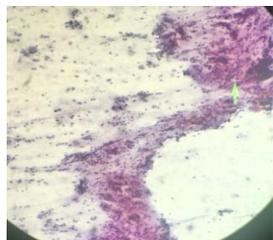


Fig 2: Pleomorphic adenoma-Epithelial and myoepithelial cell groups

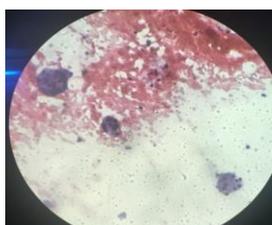


Fig 3: Chronic sialadenitis-Salivary gland acini with background of inflammatory cells



Fig 4: Chronic sialadenitis

Neoplastic lesions in the study were reported in three subcategories namely benign, indeterminate and malignant (Table 3). Most of these neoplastic lesions were benign (77.5 %, 79/102). Parotid contained most of the lesions i.e. 79.4%. PA was the commonest lesion comprising 69.6% of neoplastic cases (71/102). Warthin tumor (WT) was the second most common benign tumor. There were five cases of WT, all of which were found in parotid. Mucoepidermoid carcinoma (MEC) was the most common lesion in malignant category. All the five cases of this entity were seen in parotid glands. Mean age was 41.7 years for all neoplasms. Most of the PAs presented in third and fourth decade (39 out of 71) while most of the WTs presented in fifth decade (3 out of 5). Mean age was 39.2 years for PAs and 55 years for WTs. The mean age for MEC was 34 years. The M:F ratio was 1:1.76 for all, 1:2.6 for benign-neoplastic and 1:1 for malignant cases. Highest M:F ratio was observed for WT at 4:1.

Discussion

The frequency of neoplastic cases in the present study was 72.9%. The frequency ranged between 56% to 80% in other studies.^{3,4,6,12,13} The lowest frequency of 50% was noted in only one study in which the frequency of both neoplastic and non neoplastic lesions was same i.e. 50% each.⁸ Parotid is the most commonly involved site in almost all studies with frequency of parotid

involvement varying from 48.2 to 77.3%.^{5,6,7,8,14,15} Parotid was followed by submandibular glands with 23.6% of cases, the frequency comparable to 21.6% (19/88) reported in the study of Fernandes.¹⁵ The palate contained 2% of cases in present study, a finding similar to a study from Lahore.¹⁴ PA was the commonest lesion in our study as it was also commonest lesion in all studies.^{4,5,6,15} Soni et al and Fernandes et al have reported relatively lower frequencies of 43% and 45% respectively.^{3,15} Mean age for all cases was 43 years in present study and it was closest to mean age of 45 years in the study of Tessy.¹⁶ Ashraf et al have reported a lower mean age of 33.39 years.¹⁴ A study from Thailand has reported a higher mean age of 53 years.⁵ More cases were seen in females than males in present study with a male to female ratio of 1:1.7. The findings in M:F ratio are interesting. In two out of three studies from Pakistan, lesions are more common in females. In the study of Ashraf et al from Lahore it is 1:1.5, in the study of Iqbal et al from Karachi it is 1:1.5 (84 females vs 56 males) and in the study of Naz et al from Karachi it is 1:1.^{4,6,14} A study from Thailand reported a MF ratio of 1:1.2.⁵ On the other hand the lesions are more common in males in studies from India i.e. a MF ratio of 1.6:1, 1.1:1, 1.3:1 and 1.36:1 in the studies of Fernandes et al, Jain et al and Sarvaiya et al and Tessy et al respectively.^{7,13,15,16}

The benign category of neoplasms contained most lesions in our study (77.5% of neoplasms). Benign category is the largest category of neoplasms in other studies but with relatively lower frequencies i.e. 60.3% in the study of Tayal et al, 69.3% in the study of Soni et al, 58% in the study of Iqbal et al, 60.9% in the study of Naz et al and 72.5% in that of Jain et al.^{3,4,6,7,8} In a few studies the minor salivary glands are 2nd most frequent site after parotid.^{17,19} A possible explanation of this fact may be the availability of oral and maxillofacial surgery facilities in the institutions reporting a higher frequency of minor salivary gland tumors (SGTs). The study of Niazi et al was conducted in Lahore where a well established department of Maxillofacial surgery is present.¹⁷ The frequency of minor salivary gland lesions was at 2% in our study but there is wide variation in literature. This frequency varies from lower to higher as follows: Al Sarraj et al:0% (0/314), Jain et al:2.5%, Sarvaiya et al:10.2%, Tayal et al:12.3%, Vasconcelos et al:14.6% and Niazi et al:22.78%.^{7,8,13,17-19} WT was the second commonest among benign tumors in present study with a frequency of 6.3%. It is 2nd commonest benign tumour in several studies.^{4,19,20} Naz et al have reported this frequency at 7%.⁴ All five cases

in our study were found in parotid, a finding similar to the study of Niazi et al.¹⁷ MEC was the commonest malignant tumor with 4.9 % (5 cases) of all neoplasms. It is been found commonest malignant tumour in most other studies.^{3,6,17,18} In the present study, the indeterminate category contained 14.7% (15/102) of neoplastic cases. It is not possible with cytological studies to categorize all the neoplasms into benign and malignant categories only. This category may contain significant number of cases in cytological studies.¹ Mean age was 41.7 years for all neoplasms. Sarraj et al and Niazi et al have reported very closer mean ages of 42 years and 44 years respectively.^{5,17} Mean age for benign neoplasms was 40 years. Jain et al has reported an almost similar age of 37.4 years.⁷ Mean age was 42 years for malignant cases in present study. Other authors have reported variable mean ages for malignant cases like Jain et al, who has reported a lower age of 33 years while Soni et al and Sarvaiya et al have observed higher ages of 50.4 and 48.2 years respectively.^{3,7,13} In present study, most of the PAs presented in third and fourth decade (39 out of 71) while most of the WTs presented in fifth decade (3 out of 5). Soni et al has reported similar findings that PA was commonly seen in 3rd to 5th decade while WTs were seen in the higher age group.³ Among malignant lesions, MEC occurred in younger patients in present study i.e. the youngest patient being 17 years of age. Niazi et al and Vasconcelos et al have reported similar findings of MEC in younger patients.^{17,19} The M:F ratio was 1:1.76 for all neoplasms in present study. It correlates with MF ratio reported by Vasconcelos et al (1:1.06) and Laishram et al (1:1.08) but contrasts with that of Sarvaiya et al (1.04:1).^{12,13,19} There were 22.9% non-neoplastic lesions in the present study. Our finding is closer to that of Iqbal et al at 20% and Fernandes et al at 19% while Naz et al and Tayal et al mentioned higher frequencies at 39.6% and 50% respectively.^{4,6,8,15} Non neoplastic cases in our study comprised of three types i.e. sialadenitis, cysts and sialadenosis, a finding same as that of Jain et al and Fernanades et al.^{7,15} Sialadenitis (Non specific) was the most common lesion in non neoplastic category in our study. It is the most common lesion in several other studies.^{3,6,7} Some studies have reported significant cases of granulomatous sialadenitis (Caseating granulomatous sialadenitis, Tuberculous sialadenitis).^{4,6,8} Our study did not contain any such case like the studies of Fernandes et al, Jain et al, Sarvaiya et al and Soni et al.^{3,7,13,15} One of the reasons may be that such cases may have been reported as granulomatous lymphadenitis due to lack of salivary

cells in the smears. There may be other epidemiological factors as well. Benign cystic lesions were second commonest non neoplastic lesion in present study, a finding similar to that of Iqbal et al and Naz et al.^{4,6} Mean age was 43.6 years for non-neoplastic lesions in present study. Other authors have reported lower ages i.e. commonest age group is 20 to 29 years in study of Tayal et al and Jain et al has reported the occurrence of these cases in younger patients at lower mean age of 20.5 Years.^{7,8} Another study has observed that non- neoplastic lesions were common in the 3rd to 4th decade of life.³ The M:F ratio was 1:2.2 for non neoplastic lesions in our study. Indian studies have reported opposite M:F ratios in favor of males by Sarvaiya et al at 2:1 and 4.32:1 by Tayal et al.^{8,13} Different epidemiological factors may be responsible for this contrast.

Conclusion

Parotid was the commonest site of involvement. Pleomorphic adenoma and muco-epidermoid carcinoma were the most common lesions in benign and malignant neoplastic categories respectively.

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