

Original Research Paper

Pathology

Aspiration Cytology of Salivary Gland Lesions – A 5 year study

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ABSTRACT Objectives and Background: A mass in the salivary gland region often presents a diagnostic challenge. The present study was conducted to study the non-neoplastic and neoplastic lesions of the enlarged salivary glands by FNAC in patients presenting with salivary gland enlargement to determine the pattern of disease affecting salivary glands and to study the spectrum of lesions with respect to age, sex and site of occurrence.

Materials and Methods: The present study comprised of 70 cases of FNAC presenting to the department of pathology with salivary gland swellings from July 2011 to June 2016 at Department of Pathology, MR Medical College, Kalaburagi. Smears made from the aspirated material were stained with hematoxylin and eosin and Papanicolaou stain and MGG.

Results: Out of the 70 cases, 50 cases were diagnosed as non-neoplastic lesions and 20 cases as neoplastic lesions (benign and malignant tumors). **Non-neoplastic** - Acute Sialadenitis (9) Chronic Sialadenitis (17) Cystic Lesions (19) Mucocele (2) Abscess content (2), Granulomatous Lesion of Salivary Glands (1). The majority of the patients were in the age group of 21-30 years and were males . In the present study, the parotid gland (39 cases) was the commonest site involved. Pleomorphic Adenoma (13 out of 16 benign tumours) and Adenoid Cystic Carcinoma (2 out of 4 malignant tumours) were the commonest of **benign** and **malignant** tumors respectively. **Conclusion:** This study documents that FNAC of the salivary gland lesions is accurate, simple, rapid, inexpensive, well tolerated and less

harm to the patient.

KEYWORDS : Salivary gland lesions, inflammatory lesion, FNAC.

Introduction

Fine Needle Aspiration Cytology (FNAC) of suspected salivary gland lesions has an established role in preoperative diagnosis and management of patients.¹ The major and minor salivary glands are subjected to developmental, inflammatory, immunopathic, degenerative and neoplastic diseases. Thus, the diseases of salivary gland form an important and yet an interesting group of lesions in respect to their diagnosis, treatment and prognosis.

Although salivary gland tumors account for 2-6.5% of all head and neck tumors, their superficial location, easy accessibility and high diagnostic accuracy makes FNAC a popular method for evaluating salivary gland tumors.²³

A review of the reported series presented in 1994 found that Diagnostic Sensitivity varied between 81-100%, Specificity was 94-100% and the accuracy of tumor typing was 61-80%.^{3,4} FNAC of the salivary gland tumors is accurate, simple, rapid, inexpensive, well tolerated and harmless to the patient.⁴ Salivary gland tumors can arise from either the major salivary glands (parotid, submandibular and or the minor salivary glands which are located sub lingual, throughout the submucosa of the upper aerodigestive tract. Malignant tumors comprise 15-20% of all parotid tumors, 37-43% of submandibular gland tumors and over 80% of minor salivary gland tumors.⁵ Between 64-80% of all primary epithelial tumors occur in parotid glands, 7-11% occur in the submandibular glands and 9-23% occur in the minor glands.⁶ In the files of Armed Forces Institute of Pathology (AFIP), about 1/3 rd of major gland and half of minor gland tumors are malignant.² The ratio of malignant to benign tumor is greatest (>2.3:1) in the sublingual gland, tongue, floor of the mouth and retro-molar area.³

The mean age at presentation for malignant salivary neoplasms is 55 to 65 years while benign lesions typically develop atleast a decade earlier, at a mean age of 45 years.⁵ Pleomorphic Adenoma is the most common benign neoplasm, accounting to 52.04% of the tumors, 80% of which is seen in the parotid gland. Mucoepidermoid Carcinoma is the most common malignant neoplasm, accounting to 4.06% of the tumors and it most commonly affects the major salivary glands, especially parotid gland (50% of Mucoepidermoid Carcinomas). Adenoid Cystic Carcinoma is the second most common malignant neoplasm, accounting to 1.63% of salivary gland is seen most commonly in the minor salivary glands (50-70% of Adenoid Cystic Carcinomas).⁷

Materials & Methods

The present study comprises of FNAC of 103 cases of salivary gland lesions encountered in M.R.Medical College Kalaburagi (July 2011 to June 2016). Aspiration was done at the Department of Pathology after a thorough clinical examination of the patient, in each instance.

The procedure was repeated in cases where the aspiration was acellular or inconclusive.

The patients were informed about the procedure and consent was obtained. The patients were made to take a suitable position on the bed. The swelling was palpated first and then the area was cleaned with 95% ethanol soaked pads. The swelling was fixed with the thumb and index finger of one hand. With the other hand, 05-10 ml disposable syringe with the 24-22 gauge needle attached to it was introduced through the skin and into the swelling. At this point, 10-20 rapid back and forth strokes are made within the lesion.

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Negative pressure is created by withdrawing the plunger about 2-3 cc. The negative pressur is given to optimize the extraction of tissues. When material appeared in the needle hub, the aspiration is stopped, the negative pressure is released and the needle is withdrawn from the patient. Hemostasis is achieved with the gauze and local pressure. The needle was removed from the syringe, air was drawn into the syringe, the needle reattached and the material was expressed onto a clean glass slide. Smears are gently prepared using a second slide.

For pap and H and E staining, the slides were immediately fixed in Carnoy's fixative/95% ethanol and the rest of the slides were air dried for MGG staining. All the slides were labelled. In cases of fluid aspiration, slides were made from uncentrifuged and as well as from centrifuged material. Special stains were performed as and when required. The slides were examined under light microscope.

Results

This study was carried out on 70 patients with salivary gland lesions referred to the department of pathology, M.R Medical College Kalaburagi, Basaweshwar Teaching & General Hospital Kalaburagi, were included in this study. Age of the patients ranged from 03 years to 77 years and the maximum number of lesions were seen in the age group 21-30 years (24.2%), followed by 31-40 years (21.4%) and 61-70 years (17.1%).

In the present study, a male predilection was seen. Among the 70 cases studied, 37 cases (52.8%) were males and 33 cases (47.14%) were females. With male to female ratio 1.1:1.

In the present study, the parotid gland (39 cases) was the commonest site involved., Submandibular gland and minor salivary glands were involved in 29 cases and 2 cases respectively.

Among the total number of 70 cases, 50 cases were non neoplastc lesions, 16 were benign tumors and 4 malignant tumors. (table 1,2 and 3) Out of 50 non-neoplastic lesions, maximam patients with cystic lesion were studied 19 (38%), chronic sialadenitis 17(34%), acute sialadenitis 9 (18%), 2 (4%) cases of mucocele and 1(2%) case of granulomatous lesión seen in parotid gland and 2 cases showed abscess(4%).

Cystic lesions were the most commonest non-neoplastic lesions seen in 3^{rd} decade of life followed by Chronic sialadenitis in 5th decade, Acute sialadenitis in 2^{rd} and 3rd, Mucocele in 2nd and granulomatous lesion also in 2nd decade of life.

Parotid gland was the most commonest gland 27 (54%) involved among nonneoplastic lesions with 11cases of cystic lesions, 9 cases of Chronic sialadenitis, and 5 cases of acute sialadenitis and 1 case of granulomatous lesion. Followed by Submandibular gland 21(42%) with 8 cases of Chronoic sialadenitis, 4 of Acute sialadenitis and 8 cases of Cystic lesions.

Minor salivar glands with least involvement with 2 cases (4%) cases diagnosed as Mucocele. (table 4)

Male preponderance was seen in non-neoplastic lesions with 26 cases, acute sialadenitis and chronic sialadenitis 10 and 4 respectively. Females with less common, 24 cases with commonest being Cystic lesions 9 cases.

In this study 16 cases of Benign tumours were encounterd, of which two types of tumours were diagnosed on FNAC. Pleomorphic adenoma 11 (81.2%), Warthins tumor 2 (12.5%), Basal cell adenoma 1(6.2%).

In the present study Parotid gland was the commonest salivary gland involved with 13(81%) cases, submandibular gland 3(19%) cases, no cases were seen in Minor salivary glands (Table 5)

Among the total number of 4 malignant tumors in the present study

1(25%) cases were of a Mucoepidermoid carcinoma,1(25%) cese of Adenoid cystic carcinoma,2(50%) case of poorly differentiated adenocarcinoma.

In the present study Malignant tumors were most commonly seen in 5th decade 3 cases, followed by one cases in 7th decade and one case each in 6th decade. (Table 6)

Discussion

Salivary gland neoplasm accounts for 2 to 6.5% of all neoplasms of the head and neck.¹ Salivary gland tumors can arise from either the major salivary glands, parotid, submandibular or the minor salivary glands which are located throughout the submucosa of the upper aerodigestive tract. Sixty four to Eighty percent of all primary epithelial tumors occur in the parotid glands, 7-11% occur in the submandibular glands, and 9-23% occur in the minor salivary glands.¹ 15-30% of tumors in the parotid glands are malignant in contrast to about 40% in the submandibular glands, 50% in the minor salivary glands.⁸ These tumors usually occur in adults with a female predominance, but about 5% occur in children younger than 16 years.³ WT are more common in males.⁹¹⁰ The mean age at presentation for malignant salivary gland to explasms is 55 to 65 years while benign lesions typically develop atleast a decade earlier, at a mean age of 45 years.

In a retrospective study done by Akhter J, Hirachand S and Lakhey M, from (2006), on FNAC of 40 salivary gland swellings, 16 cases (40%) were benign neoplasms, 5 cases (12.5%) malignant neoplasms, non-neoplastic cysts 3 cases (7.5%) and inflammatory lesions 16 cases (40%).¹¹(Fig 1&2)

PAs are the most common type of tumors accounting for 60-70% of all the tumors occurring in Salivary Glands¹ and 65% of parotid gland tumours. In the present study, PA was the most common tumor accounting for 13 cases (81.2%) of all benign tumors with peak age incidence seen in the 3rd decade with a male predominance. (Fig.3)

Warthins tumor is the one of the second most common benign salivary gland tumor (5-6%) and nearly all occur in the parotid or periparotid area. Among 16 cases of benign salivary gland tumors in the present study, 2 cases were diagnosed as Warthin's tumor on FNAC accounting for 12.5% of all the tumors. Both of them were found in the parotid gland and in male, cases were seen in 6th and 8th decade each. (Fig.4)

One cases of Basal cell adenoma were encountered in the present study, accounting for 6.2% of all the tumors and was present in parotid gland, in male patient.

Adenoid cystic carcinoma is a rare tumour accounting for less than 1% of all head and neck malignancies and 10% of all salivary gland neoplasms. Majority of the tumors arise in the major salivary glands, minor salivary glands of the oral cavity and mucous glands of upper respiratory tract. MEC constitutes 5-10% of all the salivary gland tumors and 9/10th of these tumors occur in the parotid gland.¹²

In our study, out of 4 cases of malignant salivary gland tumors, there was 1 case each of ACC and MEC, accounting for 25% of all malignant tumors which were diagnosed by FNAC.

We found 2 cases of poorly differentiated adenocarcinoma in 2 cases (50%). Malignant tumors were found equally in male amd female with 2 cases each. (Fig 5 and 6)

Conclusion

FNAC is a highly reliable technique for pre-operative diagnosis of salivary gland tumors in hands of experienced pathologists. An accurate cytologic diagnosis can avoid needles surgery. Due to the minimally invasive nature of this technique, FNAC offers valuable information for planning of subsequent therapeutic

management. However, there still remain few cases that may be inaccurately diagnosed on cytology due to overlapping features and in these cases histopathology is the only modality for final diagnosis.

With high accuracy, sensitivity, and specificity it is observed that FNAC of salivary gland lesions has an important role in early diagnosis and better management of case.

Table 1:: Age and sex wise Distribution

Age	Male	Female	Total
0-10	01	02	03
11-20	03	02	05
21-30	06	11	17
31-40	09	06	15
41-50	03	05	08
51-60	07	02	09
61-70	07	05	12
71-80	01	00	01
Total	37	33	70

Chart 1: Gland wise distribution of cases



chart 2: lesion wise distribution of cases



Table2: Gland wise distribution of Non neoplastic lesion.

Lesions	Parotid	Submandi	Minor salivary	Total
	gland	bular gland	glands	
Ac. sialadenitis	05	04	00	09(18%)
Ch. Sialadenitis	09	08	00	17(34%)
Cystic lesions	11	08	00	19(38%)
Granulomatous lesion	01	00	00	01(2%)
Abscess content	01	01	00	02(4%)
Mucocele	00	00	02	02(4%)
Total	27(54%)	21(42%)	02(4%)	50

Table 3:: Gland wise distribution of benign lesions

lesions	Parotid	Sub	Minor	total
		mandibular		
Pleomorphic adenoma	10	03	00	13(81%)
Warthins tumor	02	00	00	02(12%)
BASAL CELL ADENOMA	01	00	00	01(6%)
TOTAL	13(81%)	03(18.7%)	00	16

Table 4:Gland wise distribution of Malignant lesion

Lesions	Parotid	Submandib	Minor salivary	Total
	gland	ular gland	gland	
Poorly differentiated	02	00	00	02(50%)
adenocarcinoma				
ADENOID CYSTIC-Ca	00	01(25%)	00	01(25%)
MUCOEPIDERMOID	01(25%)	00	00	01(25%)
CARCINOMA				
TOTAL	03(75%)	01(25%)	00	04(100%)

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Fig 1: CHRONIC SIALADENITIS. FNAC smear, neutrophills, lympocytes, macrophages with cellular debris, GEIMSA, 400x



Fig 2: Granulomatous lesion of parotid gland. FNAC smear, clusters of inflammatory cells epithelioid cells in necrotic background, GEIMSA, 400x



Fig 3: Pleomorphic adenoma (gross and microscopy) Pleomorphic Adenoma bimodal population of epithelial and myoepithelial cells, GEIMSA, 400x



Fig 4: Warthins tumor, oncocytic cells, in loose clusters with lymphoid cells. GEIMSA, 400x



Fig 5: Mucoepidermoid carcinoma. FNAC large pleomorphic cells with cytoplasmic vaculation in mucoid background, GEIMSA, 400x



Fig 6: Poorly differentiated adenocarcinoma, with highly pleomorphic cells. Giemsa 40x &100x



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