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KEY WORDS: fine needle aspiration cytology, FNAC, Salivary gland, Parotid, Pleomorphic adenoma, sialadenitis

CYTOLOGICAL SPECTRUM OF SALIVARY GLAND LESIONS IN A TERTIARY CARE CENTRE- A ONE YEAR COMPILATION

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ABSTRACT

Background: Salivary gland neoplasms account for 2–6.5% of all the head and neck tumours, and fine needle aspiration cytology (FNAC) is a relatively faster diagnostic method which aids the clinicians to decide the initial line of management. This study was undertaken to evaluate the various cytomorphological features of salivary gland lesions by FNAC. **Materials And Methods:** This prospective, observational study was done for a period of 12 months from January 1, 2019 to January 1, 2020 at a tertiary care centre. A total of 127 FNAC were included in this study. The lesions were evaluated cytologically after staining and then correlated clinically and radiologically. **Results:** Out of the 127 cases studied, most common age group involved was adults between 31–40 years (18.1). The youngest patient was 3 years of age and the oldest was 94 years of age with a Male:Female (M:F) ratio of 1.96:1. The most common site of involvement was the parotid gland with a frequency of 79 (62.2%), the predominant benign lesions diagnosed cytologically were inflammatory lesions and suppurative lesions- 70 (55.11%) cases followed by pleomorphic adenoma of 22 (17.3%) cases., and the most common malignant lesion diagnosed was mucoepidermoid carcinoma, comprising of eight (9.88%) cases. Two cases of Mucoepidermoid Carcinoma were also reported in the age group of 0-20 years. **Conclusion:** This study describes the various cytomorphological features of salivary gland lesions and demonstrates how they serve as rapid test and aid patient management. Besides with ancillary techniques, the FNAC diagnosis can be as good as confirmatory tests despite being minimally invasive.

INTRODUCTION

Fine needle aspiration (FNA) cytology, introduced in 1920 [1] is a safe, rapid, simple, and economical diagnostic procedure for diagnosing salivary gland lesions. Around the world, the annual incidence of all salivary gland tumours is 0.4-13.5 cases per 100,000 [2]. However the sensitivity (81-100%) and specificity (94.3- 100%) varies [3-5]. FNAC helps to categorise as benign/ malignant in most cases [6] however few require ancillary techniques and histopathological correlation as status of capsule, vascular invasion etc can't be commented on by FNAC. [7]. The purpose of this study is to understand the varied cytomorphological patterns and the distribution of salivary gland lesions and tumours in FNAC.

MATERIALS AND METHODS

This hospital-based descriptive study was conducted for a period of 12 months from January 1, 2019 to January 1, 2020 at the Department of Pathology at our tertiary care centre, Karnataka, India. In total, 127 samples were collected during the study period. All patients with salivary gland swelling who underwent clinical examination in Outpatient department, KIMS, referred to the Department of pathology for FNAC were included in the study.

Relevant patient history related to salivary gland swelling was obtained. The site, size, consistency, and tenderness of the swelling of all the patients enrolled in the study were evaluated, and FNAC performed by a trained pathologist. The nature of the aspirated material was observed and recorded, fixed in slides, and stained with Giemsa, Hematoxylin and esoin and Papanicolaou stain and microscopically examined for cytological diagnosis. The FNAC diagnosis was correlated clinically and radiologically before signing out.

Informed written consent was taken from the patients or their by-standers if they are not sound enough to give consent. The study was approved by the ethical committee of KIMS, Hubballi and the statistical analysis was performed by utilizing "Statistical Package for Social Service" (SPSS) version 24.0 software.

RESULTS

Among the 127 patients who underwent FNAC of salivary glands during the study period, the most common age group involved was adults between 31–40 years 23 (18.1%) and 51–60 years 21 (16.5%) and the pediatric age group between 11–20 years 18 (14.2%). The youngest patient was 3 years of age and the oldest was 94 years of age, with a mean of age of 42.69±20.13 years. In total, 58 (45.7%) were female, and 69 (54.3%) were male, yielding a Male: Female (M: F) ratio of 1.96:1.

The most common site of FNAC was the parotid gland, with a frequency of 79 (62.2%), followed by the Submandibular gland 43 (33.9%), sublingual gland 3(2.4%) and minor salivary glands 2 (1.6%). The left side was more commonly involved in comparison to the right, with frequencies of 51.2% and 40.2%, respectively. Bilateral glands were involved in 6 (4.7%) cases while central region was involved in 5 (3.9%) cases.

The most commonly diagnosed lesions on FNAC were inflammatory lesions and suppurative lesions 70 (55.11%) cases. The most common neoplasm observed was pleomorphic adenoma 22 (17.3%) cases. MEC, was the most common malignant lesion, comprising of eight (9.88%) cases (Table 1).

The pediatric population (age ≤20 years) made up 25 (19.7%) cases and the rest of the 102 (80.31%) cases were adults (age >20 years). Among the pediatric population, most were diagnosed as benign lesions by FNAC, in which inflammatory and suppurative lesions were the most common 17 (13.4%), followed by pleomorphic adenoma in 3 (2.3%) cases, and one case each of sialoblastoma and lymphangioma. 2 cases of Mucoepidermoid Carcinoma were also reported in this age group (0-20 years). Twelve pediatric cases fall in the age group 11–20 years and eight cases fall in the age group <10 years. Among the adult population, 17 (13.4%) cases were diagnosed as malignant lesions, in which MEC was most common 12 (9.44%), followed by Carcinoma ex pleomorphic

adenoma in 2 cases, Squamous cell carcinoma deposits in 2 cases and one case each of basal cell carcinoma and poorly differentiated carcinoma.

Table 1- Shows the various cases included in the study- the site and diagnosis both by conventional as well as Milan System. Figure 1 & Figure 2 show the cytology of various lesions included in the study. Figure 3 show bar chart showing frequency of the lesions in various glands, classified according to Milan System.

DISCUSSION

FNAC is a commonly accepted, sensitive and specific technique for the diagnosis of both neoplastic and non-neoplastic lesions of the salivary gland [8]. In the present study, the age of the patient ranged from 3-94 year. The maximum number of cases investigated by FNAC was seen between the ages of 31-40 years, which accounted for 23 (18.08%) cases followed by 51-60 years with 21 (16.5%) [Figure/Table 1]. Other studies showed a relatively late peaking around 40- 60 years [9- 11]. This study showed a male preponderance of salivary gland lesions which is consistent with other studies [12, 13]. Parotid was the most common site of FNAC 79 cases (62.20%) of all the salivary gland lesions in the present study, followed by the submandibular gland 43 (33.85%). This finding was similar to the studies conducted by Poudal et al and Devi et al, [14, 15] but Vaidya et al [16], reported the submandibular gland to be the most common site.

The enlargement of salivary gland may occur due to non-neoplastic lesions which includes a spectrum of disorders. Sialadenitis and suppurative lesions of the salivary gland may occur due to infective agent, stones, malignancy, autoimmune or idiopathic causes. In this study, 70 (55.11%) cases showed features of sialadenitis with parotid gland preponderance (53.7%), of which the submandibular gland accounted for 45 (45.7%) cases unlike other studies which showed submandibular gland predominance [17]. Chronic inflammations and duct obstructions in chronic sialadenitis may lead to metaplastic (squamous, mucous and oncocytic) changes in the ductal epithelium which can be mistaken for few benign and malignant neoplasms [18], especially in FNAC.

In this study, malignancies existed in 19 cases (15%), benign neoplasms in 28 (22%), and other non-tumorous lesions in the remaining 79 cases (62.2%). The rate of malignancy in our study was consistent with the existing literature, which ranged from 15% to 32% in an unselected population [19]. The most common carcinoma of the salivary gland was mucoepidermoid carcinoma (63.15%, 12/19 of malignant lesions) followed by 2 cases each of Squamous cell carcinoma deposits and carcinoma ex pleomorphic adenoma. Mucoepidermoid carcinoma is composed of a mixture of squamous cells, mucus secreting and intermediate cells occasionally focal sebaceous gland, goblet cells also seen. They are the most common form of primary malignant tumour of the salivary glands [7]. The accuracy of FNAC for diagnosing metastatic lesions and recurrent lesions is generally high. Small nodal metastases can be missed and very well-differentiated squamous cell carcinoma can be misinterpreted as benign [7]. This study reported 2 Squamous cell carcinoma deposits with primaries from SCC Lip and SCC of Oral cavity, one case of recurrent mucoepidermoid carcinoma in a 60 year woman was also reported. Pleomorphic adenoma was the most frequently encountered benign tumor, comprising 22 (78.57 %, 22/28) cases which is consistent with the studies by Vaidya et al, and Tahoun and Ezzat [20]. The diagnosis of a pleomorphic adenoma is made after the identification of the 3 components- extracellular matrix, myoepithelial and ductal cells. However, the varying proportion of the constituent elements and inadequate sampling wherein only one element is needled, are a challenge as they can cause diagnostic dilemmas. Cellular pleomorphic adenoma can mimic high grade tumours and cause diagnostic difficulties. The differential diagnoses include low-grade carcinomas, monomorphic adenomas and metastases, and the plasmacytoid appearance of the myoepithelial cells may be mistaken for malignant lymphomas or plasma cell proliferations [18,21,22].

Pleomorphic adenoma, Warthin's tumor, low-grade mucoepidermoid carcinoma and acinic cell carcinoma, liquefactive necrosis in SCC can all occasionally be predominantly cystic, and hence pose a problem of false negatives as it can be confused with other benign cystic lesions of the salivary gland. This study had 11 cystic lesions of which 9 were benign and the rest two were mucoepidermoid carcinoma.

However FNAC samples may not be representative of the whole lesion many times especially in cystic lesions and large lesions which may have heterogenous areas. Moreover some tumours and lesions may show overlap of cytomorphologic features and hence mandates reporting with differentials rather than a type –specific diagnosis, ancillary techniques for confirmation or histopathological correlation.

CONCLUSION

This study describes the various cytomorphological features of salivary gland lesions and demonstrates how they serve as rapid test and helps to decide the management. Besides, with application of ancillary techniques in problematic cases, the FNAC diagnosis can be as good as confirmatory tests despite being minimally invasive.

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Table 1- Shows The Cases Included Ij In The Study - The Site And Diagnosis Both By Conventional And Milan System (Capital letters used inappropriately)

DIAGNOSIS	SEX								TOTAL
	MALE				FEMALE				
	PAROTID	SUB-MANDIBULAR	SUB LINGUAL	MINOR GLANDS	PAROTID	SUB MANDIBULAR	SUB LINGUAL	MINOR GLANDS	
SIALADENITIS/ OTHER INFLAMMATORY LESION	15 (11.81%)	14 (11.02%)	0 (0%)	0 (0%)	14 (11.02%)	12 (9.44%)	0 (0%)	0 (0%)	55 (43.30%)
BENIGN CYSTIC LESION	4 (3.14%)	1 (0.78%)	1 (0.78%)	0 (0%)	0 (0%)	3 (2.36%)	0 (0%)	0 (0%)	9 (7.08%)
SUPPURATIVE LESION	5 (3.93%)	3 (2.36%)	0 (0%)	0 (0%)	4 (3.14%)	3 (2.36%)	0 (0%)	0 (0%)	15 (11.81%)
INCONCLUSIVE	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
PLEOMORPHIC ADENOMA	12 (9.44%)	0 (0%)	0 (0%)	0 (0%)	7 (5.51%)	1 (0.78%)	1 (0.78%)	1 (0.78%)	22 (17.32%)

WARTHIN'S TUMOUR	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	2 (1.57%)
BASAL CELL ADENOMA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
MONOMORPHIC ADENOMA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
SIALOBLASTOMA	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
LYMPHANGIOMA / VASCULAR LESION	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)	0 (0%)	1 (0.78%)
MUCOEPIDERMOID CARCINOMA	4 (3.14%)	2 (1.57%)	0 (0%)	0 (0%)	2 (1.57%)	3 (2.36%)	0 (0%)	1 (0.78%)	12 (9.44%)
BASAL CELL CARCINOMA	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
CARCINOMA EX PLEOMORPHIC ADENOMA	2 (1.57%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (1.57%)
POORLY DIFFERENTIATED CARCINOMA	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
SQUAMOUS CELL CARCINOMA DEPOSITS	0 (0%)	1 (0.78%)	0 (0%)	0 (0%)	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	2 (1.57%)
MALIGNANT ADNEXAL TUMOUR DEPOSITS	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
MILAN SYSTEM OF CLASSIFICATION									
NON DIAGNOSTIC	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)	0 (0%)	0 (0%)	0 (0%)	1 (0.78%)
NON NEOPLASTIC	24 (18.9%)	18 (14.17%)	1 (0.78%)	0 (0%)	18 (14.17%)	18 (14.17%)	0 (0%)	0 (0%)	79 (62.2%)
ATYPIA OF UNDETERMINED SIGNIFICANCE	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
NEOPLASM	14 (11.02%)	0 (0%)	0 (0%)	0 (0%)	10 (7.87%)	1 (0.78%)	2 (1.57%)	1 (0.78%)	28 (22.04%)
SUSPICIOUS OF MALIGNANCY	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
MALIGNANT	9 (7.08%)	3 (2.36%)	0 (0%)	0 (0%)	3 (2.36%)	3 (2.36%)	0 (0%)	1 (0.78%)	19 (14.96%)
TOTAL	47 (37.0%)	21 (16.5%)	1 (0.78%)	0 (0%)	32 (25.2%)	22 (17.32%)	2 (1.57%)	2 (1.57%)	127 (100%)

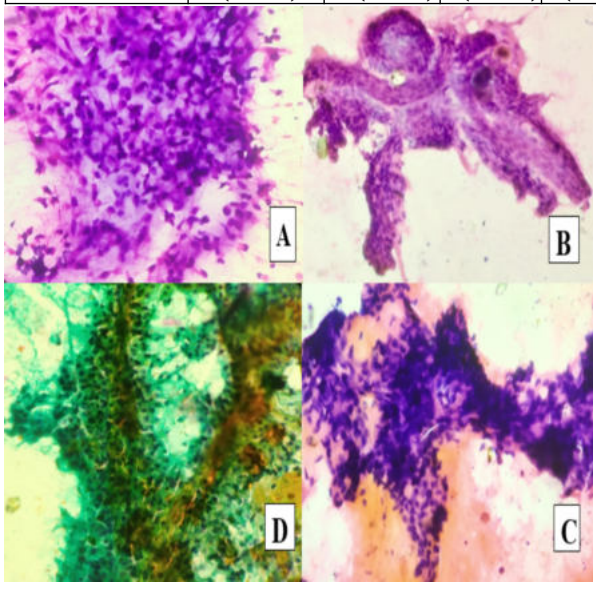

Figure 1- Showing FNAC of A- Pleomorphic adenoma showing myoepithelial cells and occasional ductal cells in a fibrillary background (H and E 100x) B- Monomorphic adenoma showing cells with round to oval nuclei with scant cytoplasm arranged in trabeculae (H and E 100x) C- Basal cell neoplasm showing basaloid cells with scant cytoplasm (H and E 100x) D- Warthins tumour showing oncocytic cells in a scant lymphoid background (PAP 100x)

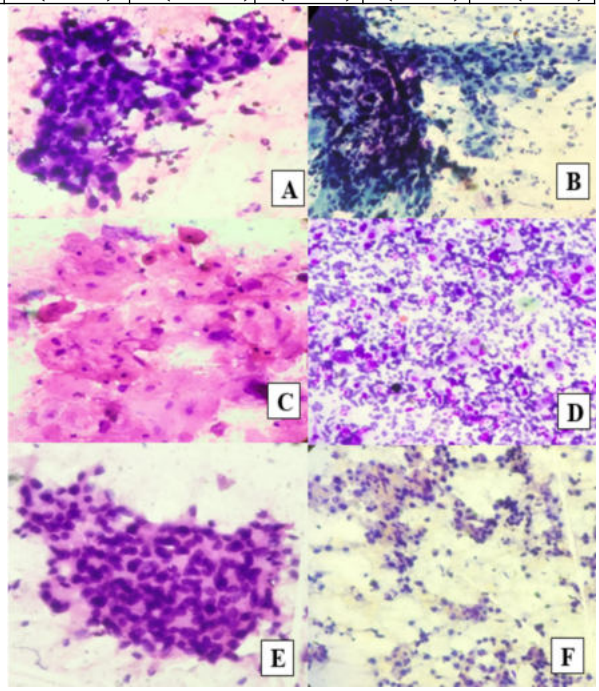

Figure 2- A & B- Carcinoma ex pleomorphic adenoma H& E and PAP respectively (100x), C & D- Squamous cell carcinoma deposits H & E (100x) and Wright's (40x), E- Mucoepidermoid Carcinoma, F- Sialoblastoma (Wright's 40X)

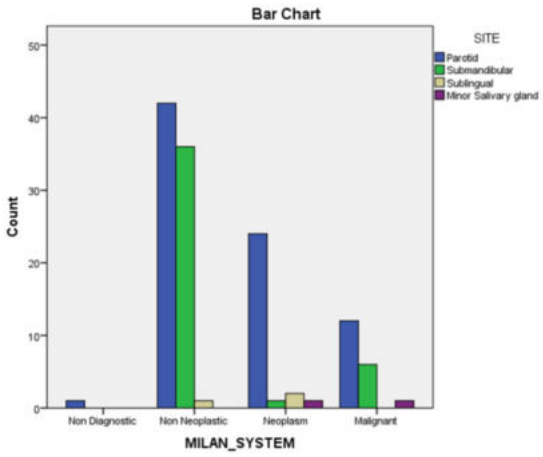

Figure 3- Shows Lesionsof The Various Salivary Glands Categorised Accordingly To Milan System Of Classification

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