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Cytological and Histomorphological Correlation of Salivary Gland Lesions: Study at a Rural Tertiary Healthcare Hospital

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Abstract

Aim/Objective: The objective of this study was to evaluate the diagnostic accuracy of FNAC in various salivary gland lesions and it's correlation with histopathology, which helps in the appropriate management of the patient. *Materials and Methods:* A total of 65 FNA were performed on salivary gland lesion from September 2016 to August 2017 at department of pathology of a Tertiary care centre. Surgically resected, formalin fixed specimen were received, they were processed and slides were prepared. The cytological and histopathological stained slides were studied, analysed and correlated clinically. *Results:* The cytological features of 65 cases were studied and following lesions were observed in FNAC study of 65 cases: 28 were pleomorphic adenomas (43%), 15 were of chronic sialadenitis (23%), 4 were Warthin's tumours (6%), 4 were mucoepidermoid carcinomas (6%), 4 were benign parotid tumour(6%), 2(3%)were carcinoma ex pleomorphic adenomas, 2 were metastatic deposits(3%), 4 were cystic lesions (6%) and 2 were malignant tumours (3%)(unclassified). The sensitivity, specificity, positive predictive value and negative predictive value of present study is 78.5%, 75%, 72.4%, 91.6%, 40.9% respectively. *Conclusion:* FNAC of the salivary gland is a safe and reliable technique in the primary diagnosis of salivary gland lesions. Though the rate of characterization of specific type of tumor is lower, due to variable cytomorphology in case of FNAC, histopathological examination may prove to be accurate and gold standard for diagnosis. This study implies that FNAC of the salivary gland tumours is safe, simple, rapid and cost-effective diagnostic method for the patient.

Keywords: FNAC; Sensitivity; Specificity; Cytology; Histopathology.

Introduction

Fine needle aspiration cytology (FNAC) is simple, accurate, and cost-effective for the patient. Salivary gland tumours are rare and they account for only 2-6.5% of all the head and neck tumours and their superficial location, easy accessibility and high diagnostic accuracy makes FNAC a popular method for evaluation [1]. Among the entire salivary gland lesion, 64-80% occur in the parotid glands, 7-11% occur in the sub-mandibular, less than 1% occur in the sublingual and 9-23% occur in the minor salivary glands [1,2]. A review of the various recent studies show that the diagnostic sensitivity of FNAC varied from 81-100%, that the specificity varied from 94-100% and that the diagnostic accuracy varied from 61-80% [2-6]. Hence, FNAC proves to be simple and accurate method for diagnosis and thus appropriate therapeutic management could be possible at the earliest. Hence, the present study was done to know the diagnostic accuracy, sensitivity, specificity of FNAC in diagnosing salivary gland lesion which helps in appropriate therapeutic management.

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Materials and Methods

After obtaining informed consent from patient, FNAC was done using 5ml syringe with a 23 gauge needle under aseptic precautions. The material was aspirated and smeared onto clean glass slides. In cystic lesions, 10 ml syringe with 22 gauge needle was used to aspirate the cyst fluid. Methanol fixed smears were stained with Pap (papanicolau), H&E

(hematoxylin and eosin) and MGG (May Grunwald's Giemsa) respectively. Surgically resected and formalin fixed specimens were received in pathology department, histopathology section. The tissues were processed and stained with H&E (hematoxylin and eosin) and few special stains. The cytological and Histopathological stained slides were studied, analyzed and were correlated clinically.

Results

FNA was performed on 65 patients with palpable swelling on salivary gland. Among these, histopathological correlations were available for 58 cases. All the cases occurred in the age group of 15-75 years. Most common age of presentation was 3rd to 4th decade. Male to female ratio of the lesion was 1.9:1.The number of cases which were seen in the parotid gland were 48, in sub-mandibular gland were 13 and in minor salivary gland were 4. There were 55(85%) benign lesions and 10(15%) malignant lesions. The most common gland involved was parotid gland.The duration of lesions varied from few months to many years. Clinically the benign tumors presented as a painless swelling since many years, while malignant tumors presented with persistent pain, fixity and rapid increase in size in a short duration.

On FNA, Out of the 65 cases, 28 were pleomorphic adenomas (43%), 15 were of chronic sialadenitis (23%), 4 were Warthin's tumours (6%), 4 were mucoepidermoid carcinomas (6%), 4 were benign parotid tumour (6%), 2(3%) were carcinoma ex pleomorphic adenomas, 2 were metastatic deposits from squamous cell carcinoma (3%), 4 were cystic lesions (6%) and 2 were malignant tumours (3%) (unclassified) (Table 1). Benign parotid tumours (2 cases) included basal cell adenoma and oncocytoma. Pleomorphic adenoma was the most common benign lesion where as mucoepidermoid carcinoma was the most common malignant lesion. Out of 65 cases, histological correlation was available for 58 cases (Table 2), remaining 7 cases had only cytological diagnosis and histopathology was not available (Table 3 and 4).

Table 1: Cases diagnosed on FNAC

Lesion	No of Cases	Percentage
Benign Lesion		
Pleomorphic adenoma	28	43%
Chronic sialadenitis	15	23%
Cystic lesion	4	06%
Warthin's tumor	4	06%
Benign parotid tumour	4	06%
Total Benign lesions	**55**	**84.6%**
Malignant Lesion		
Mucoepidermoid carcinoma	4	06%
Carcinoma ex pleomorphic adenoma	2	03%
Metastasis	2	03%
unclassified	2	03%
Total Malignant lesion	**10**	**15%**
Total Cases	**65**	**100%**

Table 2: Cases diagnosed on Histology

Lesion	No of cases	Percentage
Benign Lesion		
Pleomorphic adenoma	23	39.6%
Chronic sialadenitis	13	22.4%
Cystic lesion	4	7.0%
Warthin's tumor	3	5.0%
Benign parotid tumour	8	13.7%
Total benign lesion	51	87.7%
Malignant Lesion		
Mucoepidermoid carcinoma	3	5.0%
Carcinoma ex pleomorphic adenoma	2	3.4%
Metastasis	1	1.7%
unclassified	1	1.7%
Total Malignant lesion	7	11.8%
Total	**58 (51+7)**	**100%**

Table 3: Cytohistological correlation of benign salivary gland lesions

Cytology	No of Cases	Histology Correlated	Histology not Correlated	Histology not Available
Pleomorphic adenoma	28	23	5	-
Chronic sialadenitis	15	10	3	2
Cystic lesion	4	3	-	1
Warthin's tumour	4	3	-	1
Benign parotid tumour	4	3	-	1
Total	55	42	8	5

Table 4: Cytohistological correlation of malignant salivary gland lesions

Cytology	No of cases	Histology correlated	Histology not correlated	Histology not available
Mucoepidermoid carcinoma	4	3	1	-
Carcinoma ex pleomorphic adenoma	2	2	-	-
Metastasis	2	1	-	1
unclassified	2	1	-	1
Total Malignant lesion	10	7	1	2

Table 5: Cytohistological correlation of present study with other studies

	No of Cases	Sensitivity	Specificity	Diagnostic Accuracy
Sonal verma[13]	197	88%	96.6%	94.05%
Panchal upasana et.al[14]	120	89.29%	91.67%	86.21%
Rehman[15]	50	78%	53.28%	88.57%
Jayaram[16]	53	90%	95%	73.6%
Lukas [17]	107	89.2%	85%	97.2%
Present study	65	78.5%	75%	72.4%

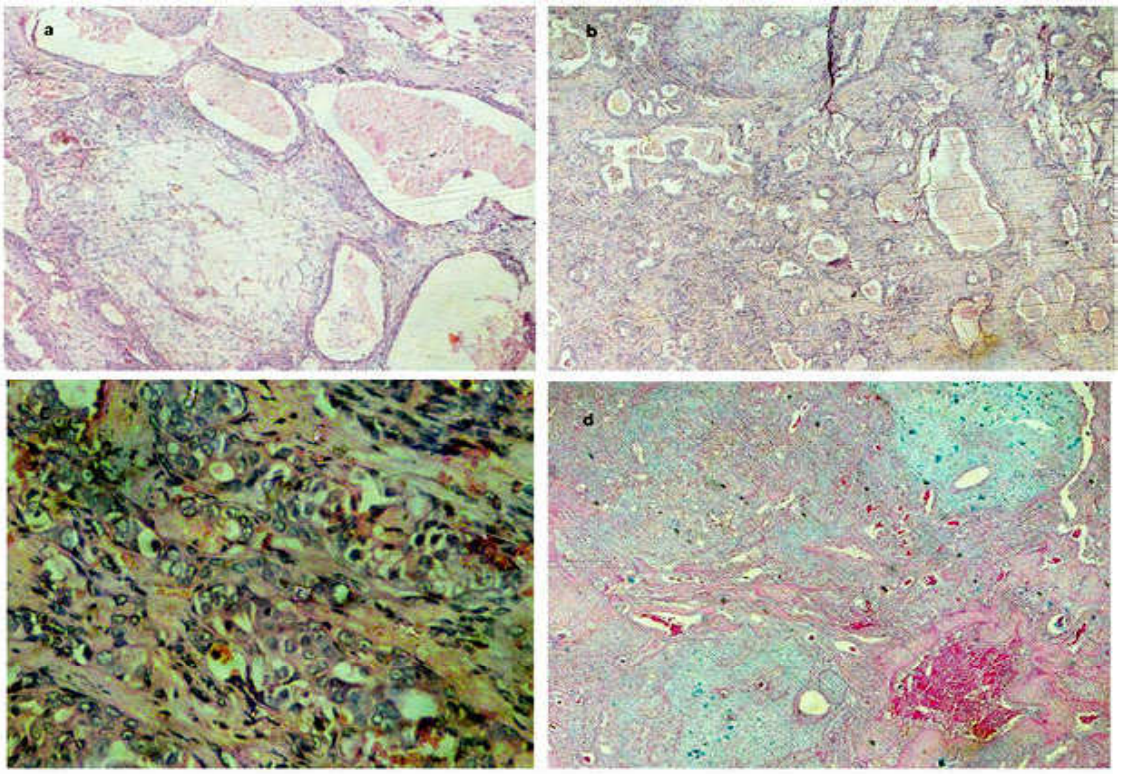

Fig. 1: a. Mucoepidermoid carcinoma shows extracellular mucin. H &E, 10X. **b.** Mucoepidermoid carcinoma with many cysts lined by squamoid cells. H&E, 4X. **c.** Mucoepidermoid carcinoma with malignant squamous cells and intermediate cells with mucin filled areas. H&E, 40X. **d.** Alcian blue stain shows mucinous areas(blue colour) in mucoepidermoid carcinoma.10X.

Discussion

Most tumors of major salivary glands are unilateral and single. Bilaterality and multiplicity are common only in Warthin tumor but can also be seen with benign mixed tumor and acinic cell carcinoma.Tumors of minor salivary glands can be found anywhere in the oral cavity, including the hard and soft palate, cheek, gingiva, tonsillar area, and tongue [7]. Their frequency seems to be roughly proportional to the amount of normal glandular tissue in this area, which may explain their marked predilection for the hard palate. They can also occur in the lip (particularly upper lip), nasal cavity and paranasal sinuses, ear, jaw, pharynx, larynx, trachea, and bronchi. Furthermore, tumors of the salivary gland type may arise from a variety of glandular structures, particularly breast and sweat glands [8].

Little is known about the etiology of salivary gland tumors, and high-risk populations have not been identified except for the rare lymphoepithelioma-like carcinoma [8]. An increased incidence of benign mixed tumors and other neoplasms has been observed following therapeutic childhood irradiation, and a possible increase in carcinomas (particularly of mucoepidermoid type) has been noted among atomic bomb survivors [9]. A sudden, sustained, and as yet unexplained doubling in the incidence of salivary gland carcinoma was documented years ago in the male population of the San Francisco–Oakland area, which apparently was unrelated to the AIDS epidemic [10].

In the present study, all the cases occurred in the age group of 15-75 years. Most common age of presentation was 3rd to 4th decade. Male to female ratio of lesion was 1.9:1. In children, the most common salivary gland tumor is benign mixed tumor, but the proportion of malignant tumors is higher than in adults. Among the malignant neoplasms, mucoepidermoid carcinoma, adenoid cystic carcinoma, and acinic cell carcinoma are the most common lesions accounted in various studies.

Pleomorphic adenoma was the most common benign lesion whereasmucoepidermoid carcinoma was the most common malignant lesion in this study.The most common benign lesion reported in present study is pleomorphic adenoma that was correlated with various other previously reported studies [11,12]. One of the common non-neoplastic lesion was chronic sialadenitis followed by benign cystic lesion and warthin'stumor. In the diagnosis of salivary gland lesions, FNAC has gained the popularity as diagnostic tool due to its low cost and safe procedure with minimal risk to the patient and aid to the clinicians in the management planning [12]. The sensitivity, specificity and diagnostic accuracy, positive predictive value, negative predictive value of present study is 78.5%, 75%, 72.4%, 91.6%, 40.9% respectively that is correlated with various other previously reported studies (Table 5) [13-17].

The prognosis of salivary gland tumors is determined by the clinical staging, location, and microscopic type. This has led to the proposal of a prognostic score in which these various parameters are included.Malignant tumors of the submaxillary gland have a higher incidence of recurrence and metastases than parotid tumors of the same type [13]. For adenoid cystic carcinoma, the prognosis is best when located in the palate, intermediate when in the parotid gland, and worst in the submaxillary gland. For parotid malignant tumors, the presence of facial nerve paralysis is an ominous prognostic sign. In regard to microscopic types, the prognosis is best for the low-grade variants of mucoepidermoid and acinic cell carcinoma and worst for the high-grade variants of these tumors and for adenoid cystic carcinoma, malignant mixed tumor, salivary duct carcinoma, and squamous cell carcinoma [14].

DNA ploidy analysis and AgNOR determinations have shown higher values in high-grade carcinomas (such as salivary duct carcinoma) than in low-grade carcinomas or benign mixed tumors but have not yet proved to have independent prognostic value [18]. Amplification of *HER2* oncogene and p53 oncoproteinexpressionhave been claimed to correlate with aggressive behavior, but it is not clear that these parameters represent independent prognostic determinators. Lately, it has been claimed that high expression level of geminin predicts a poor clinical outcome in salivary gland carcinomas [19].

Conclusion

FNAC of the salivary gland is a reliable technique in the primary diagnosis of salivary gland lesions. FNAC of the salivary gland tumours has a high diagnostic accuracy, though rate of characterization of specific type of tumor is lower, due to variable cytomorphology. In such cases, histopathological examination may prove to be accurate and gold standard for diagnosis of salivary gland lesions. FNAC of salivary gland lesions can be more accurate but it has certain limitations in the form of limited availability of histology. However multiple sampling and good experience will be helpful to arrive a correct diagnosis. This study implies that FNAC of the

salivary gland tumours is safe, simple, rapid and cost-effective diagnostic method for the patient.

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