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Role of FNAC in salivary gland lesions with histopathological correlation

KEYWORDS

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ABSTRACT

Objectives:
Fine needle aspiration cytology (FNAC) has been employed in pre-operative diagnosis of salivary gland lesions for many years. Various studies in the existing literature have shown a wide range of sensitivity and diagnostic accuracy of cytologic diagnosis. This study was aimed at evaluating salivary gland FNAC for sensitivity, specificity and diagnostic accuracy at a tertiary care center.

Methods: 280 patients were studied retrospectively over one year. FNAC was done using 20 cc syringes and 20-22 no. needles. histomorphology was assessed on routine H & E stained paraffin sections and Leishman.

Results: 80% of the lesions were neoplastic (61 % benign, 31 % malignant) and 20% were nonneoplastic. Pleomorphic adenoma was the most frequent benign neoplasm while mucoepidermoid carcinoma was the most frequent malignant lesion. Among the nonneoplastic lesions, the maximum numbers of cases were of chronic sialadentis. In the present study,FNAC has a sensitivity of 94.54% and specificity of 80.95 % for neoplastic lesions.

Conclusions: FNAC was found to be a useful diagnostic tool in the evaluation of salivary gland lesions because of its simplicity, excellent patient compliance and rapid diagnosis. This cost effective tool is invaluable in planning the surgical management of the patient

INTRODUCTION:

Fine needle aspiration cytology (FNAC) is a popular method for diagnostic evaluation of salivary gland masses due to their superficial nature and easy accessibility for the procedure. This technique assumes greater importance considering the lack of characteristic clinical or radiologic features that may suggest a particular diagnosis. Though, few symptoms and signs may suggest malignancy, most malignant salivary gland lesions cannot be differentiated from their benign counterparts on clinical criteria alone.[1]

The characteristic cytological features of the common salivary gland lesions are well-delineated in literature. However, there also exist cytological pitfalls and overlapping features that make an accurate diagnosis difficult in few cases. This has led to a wide-range of sensitivity (62-97.6%) and specificity (94.3-100%) of cytological diagnosis.[2-7] The reported diagnostic accuracy is high for benign neoplasms, but lower for malignant tumours. The accuracy of type-specific diagnosis of malignant salivary gland tumours is quite poor, as reported in the literature.[2-7]

The present study was designed to compare the cytological findings of salivary gland lesions with the histologic diagnosis, in order to assess the sensitivity, specificity and diagnostic accuracy of FNAC, with emphasis on discordant cases.

MATERIALS AND METHODS

The present study was a retrospective study of salivary aspirations on 280 patients. Histopathological correlation was done whenever possible. Specimens received in the surgical pathology section of G.R. Medical College, Gwalior, over a period of one year (2015- 2016) were included in the study. Our hospital is a tertiary care hospital and most of the patients are from the lower economic group. Detailed clinical history, results of local examination, general examinations and systematic examination were recorded in each case. FNAC was done using 20cc syringes and [20-22] no. needles after taking informed consent of the patient. Smears were stained with Leishman and H&E stain. Excisional biopsy specimens were fixed in 10% formalin. Gross and microscopic examination were performed in each case. H&E stain was done in all cases.

RESULTS:

In the present series, there were 124 males and 156 females. Out of 280 the maximum numbers of cases were in the age group of [21-40] years (140 cases, 50%). The parotid gland was most frequently involved (57.2% cases) There were 224 neoplastic lesions and 56 non neoplastic lesions (Table I). Of the 224 neoplastic lesions, 136 were benign and 88 were malignant. Pleomorphic adenoma was the most common benign neoplasm encountered. Mucoepidermoid carcinoma was the most frequent malignant neoplasm (Table II).

In 80 cases a diagnosis of neoplastic lesion was offered on FNAC and specific typing could not be done. In the non neoplastic group, there were 40 cases of chronic sialadentis, 100% for pleomorphic adenoma and 100% for mucoepidermoid carcinoma.

DISCUSSION

In the present study, slight female preponderance is observed. The parotid gland was involved in 57.2% cases. This is comparable with other studies in which parotid gland was involved in 69-83% cases [8,9,10,11] .There were 116 benign neoplastic cases (41 %). The incidence of benign neoplasm has been reported as 40%, 61% and 69% by different authors [8,9,10].Ten percent of our cases were malignant lesions as against 6%, 37% and 13% reported by other authors [8,9,11] . Twenty percent of cases were non neoplastic. In Other studies 40% of cases have been reported as non neoplastic.

Out of 124 cases diagnosed as pleomorphic adenoma on histopathological examination, 112 were correctly diagnosed by FNAC. In the remaining 12 cases, 4 were diagnosed as neoplastic lesion, 4 as adenoid cystic carcinoma and 4 as cystic lesion. In FNAC smears, features of pleomorphic adenoma are a mixture of epithelial and spindle-shaped cells along with chondromyxoid ground substance. [Fig.I] Cystic change occurring in salivary gland tumours can cause diagnostic confusion. In addition, pleomorphic adenoma may contain areas resembling adenoid cystic carcinoma[13]. Pleomorphic adenoma was the most frequent benign neoplasm (40%). This is in agreement with other studies in which 50% and 21.6% cases were of pleomorphic adenoma.[9,11]

Mucoepidermoid carcinoma was the most common malignant neoplasm (44 cases). We could offer a specific diagnosis of

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mucoepidermoid carcinoma in 12 cases, all of which showed histopathological correlation. 28 cases diagnosed as neoplastic lesion on FNAC showed mucoepidermoid carcinoma on histopathological examination. A cytological diagnosis of mucoepidermoid carcinoma requires a background of mucus and debris and a variable population of cells. Benign lesions like cysts may also contain mucous and debris and cause diagnostic problems. In our series, 4 cases diagnosed as a cyst on cytology showed mucoepidrmoid carcinoma on histopathological examination. In this case the aspirate may have come from the cystic part of mucoepidermoid carcinoma.

A cytological diagnosis of adenoid cystic carcinoma was given in 8 cases out of which 4 turned out to be pleomorphic adenoma on histopathological examination and the other case showed adenoid cystic carcinoma. In 28 cases of adenoid cystic carcinoma diagnosed on histology, a diagnosis of neoplastic lesion was provided on FNAC. Klijanienko observed 96% correlation for adenoid cystic carcinoma12. The distinction between pleomorphic adenoma and adenoid cystic carcinoma on FNAC may be difficult on account of several features-myxoid acellular material may be found in both and hyaline globules characteristic of adenoid cystic carcinoma may also be seen in pleomorphic adenoma. 2 case of adenocarcinoma was diagnosed as a neoplastic lesion on FNAC.

In case of Warthins Tumour, Klijanieko showed 90.1% correlation with histopathological examination[12]. In our series, we diagnosed 2 case of Warthins tumour on FNAC. However it turned out to be chronic sialadenitis on histopathological examination. For a diagnosis of Warthins tumour on FNAC, three components namely onocytes, lymphocytes and granular debris are required. If the sample is not representative, there may be difficulties in diagnosis. In Christallinis study, a diagnosis of non neoplastic lesion was given in 4 cases, which turned out to be Warthins Tumour on histology[4]. Diagnostic difficulties were encountered in cases of non representative sample, in the presence cystic change, due to complexity of cytologic patterns with overlapping morphological features. Many of the salivary gland tumours are composed of varying proportions of epithelial cells, myoepithelial cells and stroma. Since architecture is difficult to assess on FNAC, these varying features also attributed to diagnostic limitations. Klijanieko observed a cyto-histological correlation of 81.8% for chronic sialadenitis'.

In our study there was 90% correlation. In 4 cases of tuberculosis, we offered a correct diagnosis on FNAC, showing 100% correlation. The present study has a sensitivity of 94-54% and specificity of 80-95% for neoplastic lesions. FNAC was found to be simple, noninvasive and cost effective and rapid diagnostic tool for salivary gland lesions. It plays a key role in evaluation of salivary gland tumours thus helping further surgical management of the patient.

Nonneoplastic		**Neoplastic**					
Chronic sialadenitis	36	Benign		Malignant		Neoplastic lesion no specific diagnosis	
Cystic lesion	12	Pleomorphic adenoma	112	Mucoepidermoid carcinoma	12		
Tuberculosis	8	Warthins tumour	4	Adenoid cystic carcinoma	8		
				Squamous cell carcinoma	8		
Total	56		116		28	80	

Table 1: FNAC of salivary gland lesions

Nonneoplastic		**Neoplastic**	
Chronic sialadenitis	40	Benign	Malignant
Cystic lesion	4	Pleomorphic adenoma	124	Mucoepidermoid carcinoma	44
tuberculosis	8	Warthins tumour	8	Adenoid cystic carcinoma	32
Necrotising sialometaplasia	4	Benign lymphoepithelial lesion	4	Squamous cell carcinoma	8
				adenocarcinoma	4
total	56		136		88

Table 2: Histopathological diagnosis of salivary gland lesions

FNAC Diag	histological diagnosis									
	pleomorphic adenoma	chronic sialadenitis	warthins tumour	mucoepidermoid carcinoma	adenoid cysytic carcinoma	adenocarcinoma	tubercul osis	necrotising sialometaplasia	benign lymphoepithelial lesion	squamous cell carcinoma	cyst
chronic sialadenitis (36)		24	4					4	4		
cyst(12)	4			4							4
tubercul osis(8)							8				
pleomorphic adenoma (112)	112										
warthins tumour(4)		4									
mucoepidermoid carcinoma(12)				12							
adenoid cysytic carcinoma(8)	4				4						
squamous cell carcinoma(8)										8	
neoplastic(80)	4	12	4	28	28	4					
total(280)	124	40	8	44	32	4	8	4	4	8	

Table 3: Cytohistopathological correlation of salivary gland lesions

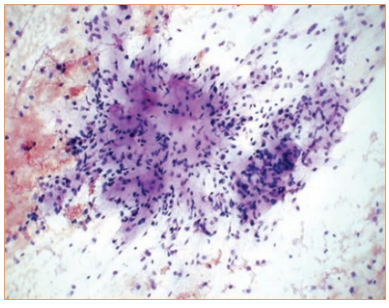

Fig 1:Pleomorphic adenoma: Loose cluster of epithelial cells in chondromyxoid stroma- Giemsa stain

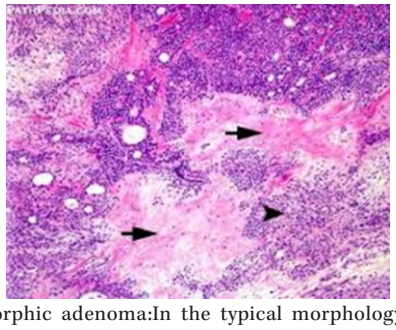

Fig2:Pleomorphic adenoma:In the typical morphology epithelial/myoepithelial areas (right arrowhead) are punctuated by myxochondroid areas (arrows). True cartilaginous and bone differentiation may also occur. The pink myxochondroid areas are a very characteristic feature of this tumor and a helpful finding in histopathology

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