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Research Article

Fine needle aspiration cytology of salivary gland lesions: study in a tertiary care hospital of North Bihar

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ABSTRACT

Background: Fine needle aspiration cytology (FNAC) of suspected salivary gland lesions has an established role in preoperative diagnosis and management of patients. The aim of the present study was to evaluate the spectrum of salivary gland lesions in our setting and to assess the diagnostic accuracy of FNAC for salivary gland lesions.
Methods: In the present study, 189 cases were included in this study and cytohistological correlation was made in 84 cases only. FNA was performed from different sites of the salivary gland swelling using a 10 mL disposable syringe and 23/24-gauge needle without local anaesthesia. FNA air-dried smears were stained with Giemsa stain and wet smears fixed in 95% ethyl alcohol were stained with haematoxylin and eosin stain. Paraffin embedded tissue sections were stained with haematoxylin and eosin (H & E).
Results: Overall diagnostic accuracy of FNAC in our study was found to be 94.05% with 88% sensitivity and 96.6% specificity.
Conclusions: The high accuracy, sensitivity, and specificity of FNAC confirm that preoperative cytology is a useful, quick and reliable diagnostic technique indispensable for developing countries.

Keywords: FNA salivary gland, Diagnostic accuracy

INTRODUCTION

Fine needle aspiration cytology (FNAC) of suspected salivary gland lesions has now been accepted as an excellent, though challenging, primary method in preoperative diagnosis and management of patients. It has acquired an edge over incisional biopsy and frozen section.[1]

A stepwise approach has been recommended to the cytological diagnosis of salivary gland lesions. Firstly, one has to decide whether the lesion is of salivary gland origin or from adjacent tissues. The next step is to identify cells and their morphology to classify them into non-neoplastic or neoplastic. This essentially eliminates unnecessary surgery in about one third of cases.

When FNA smears reveal classical features of one or the other tumour, it becomes satisfying for a cytopathologist to designate benign or malignant nature of the neoplasm and further subtype it. However the heterogeneity of many salivary gland tumors and the overlap of cytomorphologic features in many instances present a challenging job to give precise diagnosis at times.

Although diagnostic accuracy of FNAC in the assessment of salivary gland swellings has been studied in various studies, it has not been widely assessed in our set up.[2-5] The aim of the present study was to evaluate the spectrum of salivary gland lesions in our setting and to assess the diagnostic accuracy of FNAC for salivary gland lesions.

METHODS

The present study was carried out in the Department of Pathology, DMCH, Laheriasarai (Bihar), retrospectively and prospectively during the period Jan 2012 to Jun 2013.

In the present study, 197 cases of salivary gland swelling were included in which cytological and histological studies were done. Eight cases were excluded due to scanty, inadequate aspirate on FNAC; thus only 189 cases were included in this study and cytohistological correlation was made in 84 cases only.

All patients were clinically evaluated by detailed history, clinical examination, and hematological and radiological investigations. FNA was performed from different sites of the salivary gland swelling using a 10 mL disposable syringe and 23/24-gauge needle without local anaesthesia. FNA air-dried smears were stained with Giemsa stain and wet smears fixed in 95% ethyl alcohol were stained with haematoxylin and eosin stain. Paraffin embedded tissue sections obtained from salivary gland tissue were stained with haematoxylin and eosin (H & E).

Salivary gland lesions were studied under the three groups – non-neoplastic lesions, benign and malignant tumors.

Statistical analysis

The cytological and histological analysis was reported in terms of frequencies and percentages. Furthermore, diagnostic accuracy of FNAC for salivary gland swellings was measured using Histopathology as Gold Standard. The overall diagnostic accuracy and the sensitivity and specificity were calculated with the help of statistical data by using the SPSS software (version 10).

RESULTS

In the present study, non-neoplastic lesions accounted for 55.56% (105/189), followed by 31.75% (60/189) benign tumours and 12.70% (24/189) malignant tumours (Table 1).

Table 1: Distribution of salivary gland lesions.

Cytologic diagnostic categories	Frequency (n)	Percentage (%)
Non-neoplastic	105	55.56 %
Benign	60	31.75 %
Malignant	24	12.70 %

Commonest gland involved was parotid (57.67%, 109/189), followed by submandibular gland (34.39%, 65/189) and minor salivary glands (7.94%, 15/189) in the present study (Table 2). The mean age of patients was 42 (±31) years and overall male to female ratio was 1.4:1.

Out of 197 patients who underwent FNAC, 8 cases were non-diagnostic due to lack of adequate material. A histopathological correlation was available in 84 cases. The remaining cases could not be correlated as few were referred to higher centres for excision or radiotherapy and so was difficult to follow up. Out of these, 22 cases were true positive, 2 was false positive, 3 were false negative and 57 were true negative.

Table 2: Distribution of type of gland involved.

Type of gland involved	Frequency (n)	Percentage (%)
Parotid	109	57.67 %
Submandibular	65	34.39 %
Minor	15	7.94 %

Chronic sialadenitis was the most common non-neoplastic lesion (54.29%, 57/105) followed by cystic lesions (20.95%, 22/105), acute on chronic sialadenitis (12.38%, 13/105) and chronic granulomatous inflammation (6.67%, 7/105) (Table 3). Pleomorphic adenoma (81.67%, 49/60) was the most common benign neoplasm. Warthin's tumour accounted for 5% (3/60) (Table 4). Mucoepidermoid carcinoma was the most common malignant lesion (41.67%, 10/24) followed by acinic cell carcinoma (20.83%, 5/24), carcinoma-ex pleomorphic adenoma (20.83%, 5/24) and adenoid cystic carcinoma (12.5%, 3/24) (Table 5).

Table 3: Frequency distribution of non-neoplastic lesions.

Cytologic diagnosis of non-neoplastic lesions	Frequency (n)	Percentage (%)
Chronic sialadenitis	57	54.29 %
Cystic lesions	22	20.95 %
Acute on chronic sialadenitis	13	12.38 %
Chronic granulomatous inflammation	7	6.67 %

Table 4: Frequency distribution of benign neoplasms.

Cytologic diagnosis of benign neoplasms	Frequency (n)	Percentage (%)
Pleomorphic adenoma	49	81.67 %
Warthin's tumor	3	5.00 %

Table 5: Frequency distribution of malignant lesions.

Cytologic diagnosis of malignant lesions	Frequency (n)	Percentage (%)
Mucoepidermoid carcinoma	10	41.67 %
Acinic cell carcinoma	5	20.83 %
Carcinoma-ex pleomorphic adenoma	5	20.83 %
Adenoid cystic carcinoma	3	12.50 %

Overall diagnostic accuracy of FNAC in our study was found to be 94.05% with 88% sensitivity and 96.6% specificity. The positive predictive value (PPV) and negative predictive value (NPV) was calculated to be 91.7 % and 95% respectively. A discordance rate of 5.95% was found in our study.

DISCUSSION

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.[6] Our study explains the role of this procedure in our setup to diagnose salivary gland lesions and the spectrum of disease pathology in our population. The rate of unsatisfactory samples on FNAC is varied from 3% to 12%.[7-10] In present study it was 4.06%. This difference may be due to inexperience of the pathologist and sampling errors.

The rate of nonneoplastic lesion in this study was 55.56%. It is in concordance with those of other studies, ranging from 20% to 72.9%.[7,11-13]

In the present study, benign neoplasms accounted for 60 cases (31.75%). The rate of benign neoplasm was lower than other reports which ranged from 49 to 83%.[7-10] We observed the pleomorphic adenoma as the commonest benign neoplasm similar to those previously reported number of studies.[7,11-13] Various authors have reported that the incidence of malignant tumours ranged from 15% to 32%, and in the present study it accounted for 12.70% similar to Nguansangiam et al, which have found a lower rate of malignant neoplasms.[7,11,12] In our study, the most common malignant salivary gland tumor was mucoepidermoid carcinoma which accounted for 41.67% of all malignant neoplasms followed by acinic cell carcinoma and malignant mixed tumours. In contrast, Nguansangiam et al. have found that lymphoma is the commonest primary malignant salivary gland tumor followed by mucoepidermoid carcinoma.[7]

Parotid gland was observed as the commonest site of salivary gland lesions; 57.67% (109/189) of all salivary gland lesions involved the parotid gland in this series. Almost similar distribution of salivary gland neoplasms in the parotid gland has also been described by Choudhury et al.[14]

A review of literature revealed a wide variation in the sensitivity and specificity of FNAC for salivary gland swelling in different populations and setups.[15-17] The diagnostic sensitivity varied between 81% and 100%, specificity was 94-100% and the accuracy of tumour typing was 61-80%.[18] Klijanienko et al found a sensitivity of 94%, specificity of 97% and accuracy of 95%.[19] Similarly Jain et al revealed 92.8% sensitivity and 93.9% specificity in a study involving 80 cases of salivary gland swellings, out of which 14 cases were of malignant salivary gland neoplasms.[20]

We found an overall diagnostic accuracy of FNAC to be 94.05%. There were three cases of false negative diagnosis. Two cases were one each of low grade mucoepidermoid carcinoma and adenoid cystic carcinoma which were initially diagnosed as pleomorphic adenoma on FNAC. Pleomorphic adenoma is a biphasic neoplasm and no two pleomorphic adenomas look alike. Epithelial metaplasia, mainly squamous and oncocytic, and significant cytologic atypia may at times be worrisome. Aspiration of mucoid paucicellular fluid or lack of stromal component may lead to a false positive diagnosis especially that of low grade mucoepidermoid carcinoma. Adenoid cystic carcinoma is a close differential of pleomorphic adenoma. This differentiation is very important as the surgical management is different. Adenoid cystic carcinoma shows basement membrane like material which may be misinterpreted as stromal component. Attention to nuclear morphology helps in distinguishing these two entities. One case initially diagnosed as Warthin's tumour was found to be low grade acinic cell carcinoma on histopathology. Interstitial infiltration of lymphoid cells is a prominent feature in some acinic cell carcinomas and cause confusion with Warthin's tumour.[21]

There were 2 cases of false positive diagnosis. In one of that case there were extensive squamous elements without any other component and therefore a diagnosis of neoplastic lesion was given with a possibility of metastatic squamous cell carcinoma. The final histology revealed the diagnosis of pleomorphic adenoma. The other case with false positive diagnosis was that of carcinoma-ex pleomorphic adenoma which was later diagnosed on section as pleomorphic adenoma.

Few studies conducted on FNA salivary gland swellings yielded similar results as our study. Anita Omhare et al reported pleomorphic adenoma as the most common benign tumor while mucoepidermoid carcinoma was the most common malignant diagnosis.[22]

CONCLUSION

In conclusion, we found a good concordance between FNAC and final histology. The high sensitivity, specificity and diagnostic accuracy of FNAC confirm its indispensable role in conjunction with clinical and radiological findings to provide the best possible initial assessment which in turn guide management options. Problems and pitfalls in diagnosis may be avoided if reported with caution. Multiple sampling helps to avoid misinterpretation as does avoiding giving a type-specific diagnosis. Moreover a word between the pathologist and the clinician aid in diagnosis as in any other case.

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