Original Article

Role of fine needle aspiration cytology in salivary glands lesions

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ABSTRACT

Background: Fine needle aspiration cytology is an inexpensive, atraumatic technique for the diagnosis of disease sites. We describes how it useful to the management of tumours, avoid inappropriate operations and allowing surgeons to plan quickly and more rationally. It is an economically valuable technique.

Aims: To evaluate the usefulness and accuracy of Fine Needle Aspiration Cytology (FNAC) in the diagnosis of Salivary glands lesions.

Methods: During this study, 100 patients with Salivary glands lesions, of all ages and both gender were included. All patients were evaluated by history, clinical examination. F.N.A.C. and ultrasound were done in selected cases. All the smears were stained with Haematoxylin and Eosin stain and Giemsa stain. The preoperative cytological findings were correlated with the postoperative histopathological diagnosis.

Results: FNAC diagnosis was benign in 49 cases (52.13%), and malignant in 7 cases (7.45%) of the cases. The diagnostic sensitivity was 66.66%, specificity was 100% and diagnostic accuracy was 86.36% respectively. No. of True Positive, True Negative, False Negative were 2, 17, 1 respectively and there was no any false positive result. Positive predictive value and Negative predictive value was 100% and 94.44% respectively.

Conclusion: FNAC is a safe and effective modality in diagnosis and treatment planning of patients with Salivary glands lesions.

Keywords: Fine Needle Aspiration Cytology (FNAC), salivary gland.

INTRODUCTION

FNAC is a well known safe diagnostic procedure. It has been use for the investigation of various organs for many years. FNAC is very useful as early diagnosis, treatment and management of the patient. In recent years it is so much popular – that clinicians and pathologists prefer it due to its simplicity, rapidity, safety, low cost, relatively good accuracy and effectiveness. Wide applicability of FNAC during recent years has reduced unnecessary 'surgical procedure and traumatic biopsy [1].

Salivary glands neoplasms are characterized by their wide variety as well as histologic diversity within same tumour. The cell origin of most of these tumours is basal cells of the excretory duct and intercalated ducts. Standard FNA technique is suitable and applicable not only for the parotid and submandibular glands but also for the sublingual and minor salivary glands. It is very useful for distinguishing between salivary and other non salivary pathology [2].

Although salivary glands tumour accounts for 2-6.5% of all head & neck tumour, their superficial location, easy accessibility and high diagnostic accuracy makes FNAC a popular method for evaluating salivary glands lesions [3]. Among the primary epithelial tumours, 64-80% occurs in the parotid glands, 7-11% occurs in the sub-mandibular, less than 1% occurs in the sublingual and 9-23% occur in the minor salivary glands [4,5]. The ratio of the malignant to the benign tumour is the greatest (>2.3:1) in the sub-lingual gland and in the minor salivary glands of the tongue, the floor of the mouth and the retromolar area [6]. A review of the recent reported series found 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% [6,7]. Hence, the appropriate therapeutic management could be planned earlier, whether it was local excision for benign neoplasms, conservative management for non-neoplastic lesions, radical surgery for malignant tumours and chemotherapy or radiotherapy for metastasis and lymphoproliferative disorders [8]. Hence, the present study was done to know the diagnostic accuracy, which helps in an early diagnosis and appropriate therapeutic management.

MATERIAL AND METHODS

Sample size

Total 100 cases of salivary gland swellings were aspirated at Department of pathology, Govt. Medical College, Bhavnagar during the period of June 2012 to August 2013. Out of which 94 cases were diagnosed as salivary gland tumours and they are included in study and 6 were remain undiagnosed due to inadequate material by FNAC and they are excluded from study. All the patients with suspected of Salivary glands lesions were investigated with fine needle aspiration cytology and if the lesion was excised its histopathological examination was done.

Method of collection of data:

The clinical details such as, age and sex of the patients, symptoms, clinical signs and other investigations were also be noted.

FNAC was done by our pathology department using a 22 gauge needle attached to a 10-ml syringe holder. A minimum of two needle passes were made in each case. The specimens were expelled over two or three slides, and thin smears were prepared between two slides and immediately fixed. Whenever fluid was aspirated, it was centrifuged and sediment was used for preparing smears and subsequently fixed and stained. All the smears were stained with Haematoxyline and Eosin stain and Giemsa stain.

The diagnoses for FNAC were classified into following categories: Benign, Malignant and inflammatory

FNAC results were classified into the following categories:

True-Negative (absence of malignancy correctly diagnosed);
True-Positive (presence of malignancy correctly diagnosed);
False-Negative (the cytological specimen failed to diagnose malignancy);
False-Positive (the cytological specimen was incorrectly considered or suspect of malignancy).

The following statistical calculations were done:

Accuracy = Correct diagnosis / Total no. of cases x 100

Sensitivity = True positives / True positive + false negative x 100

Specificity = True negatives / True negative + false positives x100

PPV = True positive / True positive + false positive x 100

NPV = True negative / True negative + false negative

Ethical clearance: ethical permission was taken from ethical committee of our institute.

RESULTS

During the study period, 100 cases of salivary gland swellings were aspirated, out of which 94 were diagnosed as salivary gland tumours and 6 were remain undiagnosed due to inadequate material by FNAC. Out of all Salivary glands lesions, maximum number of cases were of benign lesions 49 (52.13%) followed by inflammatory lesion 38 (40.43%) and malignant lesions with 7 (7.45%) cases as shown in Table 1. Benign to malignant lesions ratio was 7:1.

Table 1 : Distribution of various Salivary glands lesions by FNAC

Salivary glands lesions	No. Of cases (%)
Benign	49 (52.13%)
Inflammatory	38 (40.43%)
Malignant	7 (7.45%)
Total	94 (100%)

The number of cases which were seen in the parotid gland, the sub-mandibular gland, sublingual gland and the minor salivary glands were 46 (48.93%), 43 (45.75%), 3 (3.19%) and 2 (2.13%) respectively as shown in Table 2.

Table: 2 Location of salivary gland lesions

Lesion	No. Of cases (%) n=94
Parotid gland	46 (48.94%)
Submandibular gland	43 (45.74%)
Sublingual gland	3 (3.19%)
Minor salivary gland	2 (2.13%)
Total	94 (100%)

Among 94 cases benign lesions were common than malignant lesions. Among the benign lesions, Pleomorphic adenoma (PA) was the most common tumor 45 cases (47.87%). Among malignant lesions Mucoepidermoid carcinoma (MEC) was most common 3 cases (3.19%) and Adenoid cystic carcinoma was second most malignant lesions 2 cases (2.13%) as shown in Table 3. PA and MEC were the commonest benign and malignant tumours.

Table 3: Sex Incidence of Various Salivary glands Lesions

Diagnosis	Female	Male	Total
Sialadenitis	12 (12.77%)	26 (27.66%)	38 (40.43%)
Pleomorphic Adenoma	19 (20.21%)	26 (27.66%)	45 (47.87%)
Basal cell adenoma	3 (3.19%)	1 (1.06%)	4 (4.26%)
Carcinoma ex Pleomorphic Adenoma	0	1 (1.06%)	1 (1.06%)
Actinic cell carcinoma	0	1 (1.06%)	1 (1.06%)
Mucoepidermoid carcinoma	1 (1.06%)	2 (2.13%)	3 (3.19%)
Adenoid cystic carcinoma	1 (1.06%)	1 (1.06%)	2 (2.18%)
Total	36 (38.30%)	58 (61.70%)	94 (100%)

All the cases occurred in the age group of 10-80 years and a majority of them were seen in the range of 21-30 years 27 cases (28.72%) with benign lesions 27 cases (28.72%) were most common in this age group. Most of the malignant lesions were seen in patients with age more than 35 years except one case of MEC was seen 15 years female. Among 94 cases, it was observed that all the Salivary glands lesions were more common in males i.e. 58 cases (61.70%), that was in females 36 cases (38.30%) with a male to female ratio of 1.7:1. Basal cell adenoma which had slight female predominance i.e. 3 cases (3.19%). Among all the lesions of salivary glands PA was most common in both sex with males 26 cases (27.66%) and females 19 cases (20.21%). Among the malignant lesions MEC was most common in both sex with 3 (3.19%) followed by Adenoid cystic carcinoma 2 cases (2.18%) [Table 3].

No. of True Positive, True Negative, False Negative were 2, 17, 1 respectively and there was no any false positive result. In above cytopathological study Sensitivity, Specificity, Positive predictive value, Negative predictive value, Accuracy were 66.66%, 100%, 100%, 94.44%, 86.36% respectively.

DISCUSSION

As previously mentioned, fine needle aspiration cytology technique has made rapid advances in last few decades. The advantages of this technique have been emphasized by various worked in diagnostic grounds. Its importance in diagnosing salivary gland lesions has been emphasized.

Salivary glands lesions can occur at all ages. In the present study, patients mean age was 42 years and range of age was 10-70 years which was compatible with other study [9-11] . In present study male predominance was seen with M:F ratio was 1.7 : 1, similar to other study [10,12], but unlike other studies were female predominance were noticed. In present study mainly aspiration were from parotid glands (48.94%) followed by submandibular glands (45.74%). Most of the other workers have also observed high incidence of parotid gland lesions. [10,12] . In present study all aspiration were done by using 22-23 G needle and 10 cc disposable syringe. Many workers used only 23 G needle for aspiration [10,13,14]. After aspiration, the material was smeared and was wet fixed in ether alcohol, many workers used only 95% alcohol as a fixative [12, 15, 16]. In present study, the smears were stained by H & E stain and Giemsa stain.

In present study 94 cases were aspirated, 22 cases were correlated, out of 19 cases were correlate with correct histopathological findings (86.36%) and 3 cases were incompatible (13.63%) with histological diagnosis. Diagnostic accuracy in this study was 86.36% similar observations were made by others

[12, 17]. In present study out of 94 cases 49 cases were benign and 7 cases were malignant which was compatible with other studied. Many authors had found the same ratio of benign and malignant. In this study most common benign tumor was pleomorphic adenoma and malignant tumor was mucoepidermoid carcinoma. These finding were similar to other studies. In present study, PPV was 100% while NPV was 94.44% which had suggested that FNAC was useful to predict both benign and malignant pathology very well.

Chronic Sialadenitis

Many authors observed that smear showed many ductal cells, mixed with polymorphs, plasma cells and histiocytes with debris.

Pleomorphic Adenoma

In the present study total 49 cases of benign tumor, 45 cases were pleomorphic adenoma, accounting for 91% of benign tumor. The peak incidence was seen in 3rd decades of life. A male predominance was observed with M: F ratio was 1.4: 1. Pleomorphic adenoma was most common benign tumor of parotid gland. Similar to this study all authors observed presence of epithelial cells, forming cord or ductal structure. The epithelial cells were having round to oval nucleus with scanty cytoplasm. Stromal cells were having round to oval nuclei with scanty cytoplasm with in eosinophilic fibrillary matrix [13-15].

Basal cell adenoma Adenoma

In the present study total 49 cases of benign tumor, 4 cases were basal cell adenoma, accounting for 8.16% of benign tumor. The peak incidence was seen in 3rd decades of life. A female predominance was observed with M: F ratio was 1:3. 3 cases were located in submandibular gland and one case in parotid gland. All the authors observed cells of basal cell adenoma were of basaloid epithelial type and lack the abundant cytoplasma and distinct cell borders of myoepithelial cells. Many cells may present as naked – stomal material was scanty and noncharacteristic. Some authors were found that distinction from cellular pleomorphic adenoma with scanty stroma was not always possible [13]. Spindle shaped or plasmacytoid cells with well defined cytoplasm was against monomorphic adenoma.

Mucoepidermoid carcinoma

In the present study total 7 malignant cases, 3 cases were mucoepidermoid carcinoma , accounting for 42.8% of malignant tumor. A male predominance was observed with M:F ration was 2:1. Mucoepidermoid carcinoma was most common malignant tumor of parotid gland. All authors observed that smears were fairly cellular, showed groups of squamous cell having large hyperchromatic nucleus, with nucleus atypia and pink cytoplasm also mixed with mucin secreting cells and also signet ring shaped cells were seen. Mucoepidermoid carcinoma was found to be most common malignancy in minor salivary gland [10,13,14].

Adenoid Cystic Carcinoma

Two cases were aspirated. The incidence was seen in 4^{th} and 5^{th} decades of life. In was second most common tumor of salivary glands lesions. LU BJ Zhonghua et al. [14] was found that cytological distinction between adenoid cystic carcinoma, cellular pleomorphic adenoma and basal all adenoma could be difficult due to overlapping morphological features.

Carcinoma ex pleomorphic adenoma

One case was diagnosed cytologically. This is an uncommon event occur in 3-4% of pleomorphic adenoma. It is a salivary duct carcinoma or poorly differentiated carcinoma of no specific type. It has the highest false negative rate (35.3%) for FNB of all malignant salivary gland tumors [2]. The smear showed a dual population of malignant epithelial cells and benign cells and stromal components of pleomorphic adenoma.

Acinic cell carcinoma

ACCs comprise 1% of the salivary gland tumors and 95% of them occur in the parotid glands, accounting for about 2.5-4% of all the parotid tumors. One case was diagnosed cytologically. The incidence was seen in 6^{th} decades of life in male patient.

Thus looking at the sensitivity, specificity, accuracy, PPV and NPV, it can be considered that FNAC is useful as a primary investigation to diagnose as well as differentiate the salivary glands lesions. Hence, it might become useful in the selection of patients for surgery.

CONCLUSION

Along with clinical examination and other non-invasive investigations FNAC has an immense significance as a primary and most effective as well as cost effective screening test, in detecting and differentiating salivary glands lesions.

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