

Cytological and Histopathological Correlation of Salivary Gland Tumours

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ABSTRACT

Background: Tumours of the salivary gland comprise 3-6% of all tumours of head and neck region. Fine Needle Aspiration Cytology (FNAC) is a widely recognized practical and non-expensive technique to differentiate between the benign and malignant lesions. The objectives of the study are, 1. To study the histopathology of benign and malignant tumours of salivary glands. 2. To correlate cytological and histopathological diagnosis of salivary gland tumours.

Method: FNAC was done under strict aseptic precautions with 18–22-gauge needles with 10cc syringe after getting informed and written consent. Slides were fixed in alcohol and stained with Haematoxylin and Eosin. The fixed surgical specimens were processed and sections of 5-micron thickness were cut and stained with Haematoxylin and Eosin

Result: Out of the 50 cases studied 39(78%) were benign and 11(22%) were malignant. In the present study out of 41 cases reported as benign in cytology, 38 were proved to be benign and three cases turned into malignant in histopathology. The sensitivity, specificity and accuracy of cytological diagnosis to diagnose benign lesions are 92.8%, 100% and 94% respectively. In the present study out of eight cases reported as malignant tumour, all were later proved in histopathology as malignant. The sensitivity, specificity and diagnostic accuracy of cytology to diagnose malignant tumours are 75.4%, 100% and 94% respectively.

Conclusion: Thus FNAC is the safe, reliable, quick, convenient and accurate method of diagnosis and should be considered as one of the first line investigations in the evaluation of salivary gland lesions.

Keywords: *Fnac, Diagnostic Accuracy, Benign, Malignant, Tumours*

Introduction

Tumours of the salivary gland are uncommon tumours and comprise 3-6% of all tumours of head and neck region ^[1]. Despite their relatively simple morphology the salivary gland gives rise to no less than 30 types of histological tumour. Among the different types of salivary glands, tumours most commonly involves the parotid ^[2]. The percentage of occurrence with respect to the gland is 42.9-90% in the parotid, and 8-19.5% in the submandibular gland. Tumour has higher chance of being malignant, if it arises from minor salivary gland. Salivary gland neoplasm clinically presents as a mass so it is easy to access by FNAC which is the diagnostic measure having least complication and renders specific diagnosis in the majority of cases, thus helps the surgeon to appropriately plan treatment which ranges from conservative management for non-neoplastic lesions, wide local excision for benign neoplasms, radical surgery for malignant tumors and chemotherapy/radiotherapy for metastasis and lymphoproliferative disorders. This study was done to evaluate the accuracy of FNAC to diagnose the salivary gland lesions and to correlate with histopathological diagnosis.

Materials and methods

This is a prospective study carried out in the department of pathology, Madurai Medical college, Madurai during the period from July 2014 to July 2016. Specimens from patients of Rajaji Hospital, Madurai presented with symptoms and signs of salivary gland enlargement (unilateral or bilateral) were processed and cytological and histopathological correlation was made in our department. Sensitivity and specificity of the FNAC to diagnose the lesions of salivary gland is monitored.

Inclusion criteria

Patients of all ages and both sexes with biopsy proven salivary gland tumours having cytological correlation were included in this study.

Exclusion criteria

Patients with bleeding diathesis were excluded from the study.

FNAC was done after getting informed and written consent. Under strict aseptic precautions maximum of three passes with 18–22-gauge needles with 10 or 20 cc syringe were tried. Slides were fixed in isopropyl alcohol and stained with Haematoxylin and Eosin.

The surgical specimens were received in 10% buffered neutral formalin. Gross examination was done and processed either in toto or as small bits of 2-3 mm thick in the usual way. Sections of 5-micron thickness were cut and stained with routine Haematoxylin and eosin stain.

Results

Among the 50 cases studied 39(78%) were benign and 11(22%) were malignant. Among the benign tumours pleomorphic adenoma was the most frequent tumour (29 cases). Among the 11 malignant salivary gland tumours, Mucoepidermoid carcinoma was most frequent (4 cases.) The peak incidence of salivary gland neoplasm was noted in the age group of 31- 40 years (30%) and lowest incidence in above 70 years of age.

In our study, the youngest patient was 11 years old and oldest was 90 years old. Among the 50 cases studied 27 patients were female (54 %) and 23 patients were male (46%). There is a female preponderance with a Male: Female ratio of 1:1.17.

Among the 50 cases studied, 43(86%) cases were found in parotid, Sub mandibular lesions were observed in 7 cases (14%). In our study the most common tumour seen in the parotid was the pleomorphic adenoma and the most frequent tumour seen in submandibular was also pleomorphic adenoma.

Table 1: distribution of salivary gland tumours.

TUMOUR	CHOUDHARY et al[7]	PRESENT STUDY
Pleomorphic adenoma	70%	58%
Warthin tumour	8%	8%
Basal cell adenoma	2%	8%
Mucoepidermoid carcinoma	6%	8%
Adenoid cystic carcinoma	8%	4%
Carcinoma ex pleomorphic adenoma	2%	2%
Myoepithelial carcinoma	4%	2%

Table 2: Incidence of mucoepidermoid carcinoma.

STUDY	INCIDENCE OF MUCOEPIDERMOID CARCINOMA
Khandekar et al	22%
Present study	8%

Table 3: Diagnostic accuracy of FNAC of salivary gland tumours.

S.No	STUDY	BENIGN	MALIGNANT
1.	Maheswari et al	94.7%	71.4%
2.	Choudry et al	87%	91%
3.	Anita et al	93.3%	88.2%
4.	Shilpa et al	94%	91%
5.	Present study	94%	88.2%

Cytologically pleomorphic adenoma was the most common benign tumour and mucoepidermoid carcinoma was the most frequent malignant tumour. In the present study 31 cases were cytologically diagnosed as pleomorphic adenoma. Among them 29 cases were subsequently confirmed. The other two cases were reported as carcinoma ex pleomorphic adenoma and mucoepidermoid carcinoma in the histopathology. Three cases, which were given as mucoepidermoid carcinoma in cytology, were later confirmed by histopathology. One case was reported in cytology as Acinic cell carcinoma and confirmed by histopathology. Two cases of adenoid cystic carcinoma and two cases of salivary duct carcinoma which were reported in cytology were also confirmed by histopathology. In the present study out of 41 cases reported as benign salivary gland tumours in cytology 38 were proved to be benign salivary gland tumours and three cases turned into malignancy in the histopathology. The cytological diagnosis was false negative in three cases. The sensitivity, specificity and accuracy of cytological diagnosis to diagnose benign lesions are 92.8%, 100% and 94% respectively.

In the present study out of eight cases reported as malignant salivary gland tumour all were later proved in histopathology as malignant. The sensitivity, specificity and diagnostic accuracy of cytology to diagnose malignant tumours are 75.4%, 100% and 94% respectively.

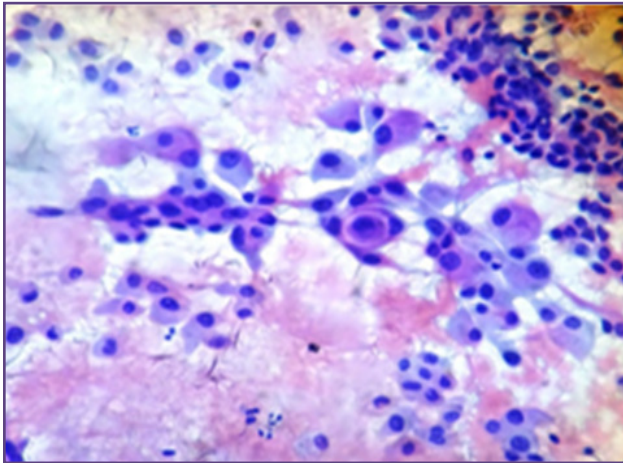


Fig. 1: Pleomorphic adenoma: Plasmacytoid myoepithelial cells in a myxoid stroma. H & E 400X.

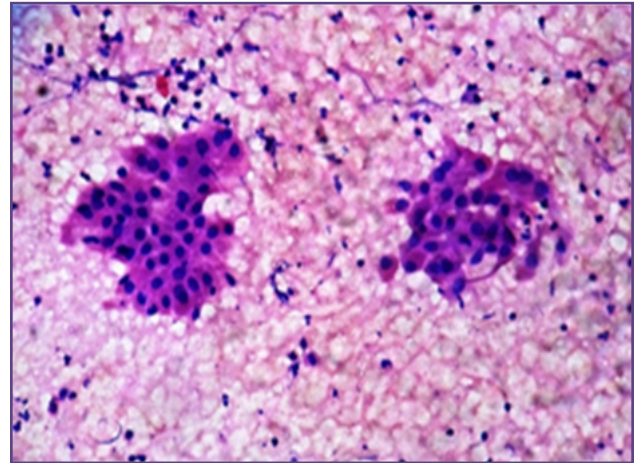


Fig. 2: Warthin tumour: Monolayered sheets of oncocytic cells. H&E400X.

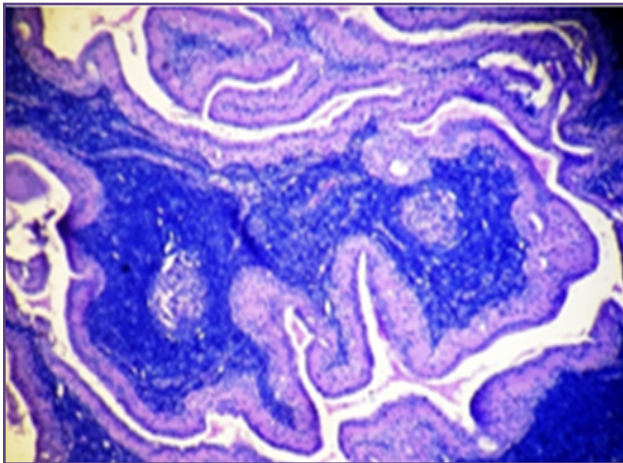


Fig. 3: Warthin tumour: Papillary projection lined by oncocytic cells seen with lymphoid stroma. H&E. 400X.

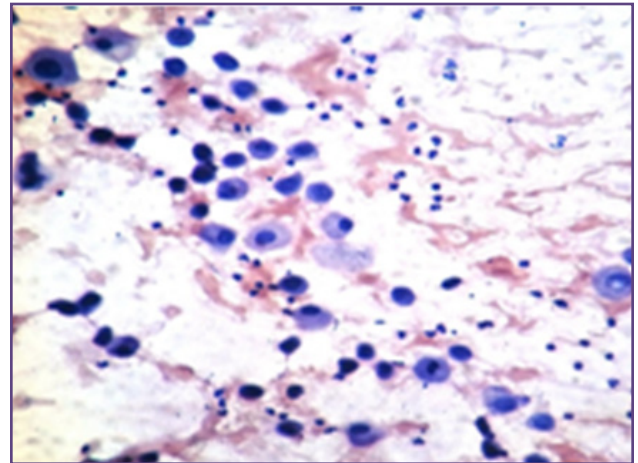


Fig. 4: Mucoepidermoid carcinoma: Epidermoid cells and Mucoid cells with intracellular mucin.

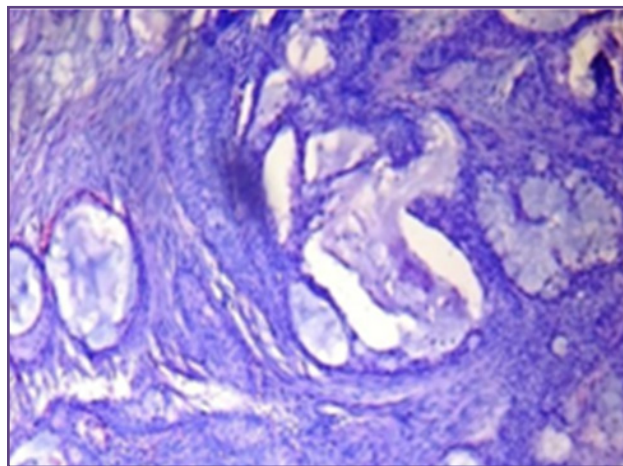


Fig. 5: Low grade mucoepidermoid carcinoma: Solid area and cystic spaces filled with mucin. H&E.100X.

Discussion

FNAC is a widely recognized practical and non-expensive technique for diagnosing salivary gland lesions and it has no risk of fistula or tumour capsule disruption. Anita et al^[3] reported that preoperative FNAC will help the clinician for management planning. This present study had 50 cases of salivary gland tumours. An attempt has been made to categorize the cases using MILAN system for reporting salivary gland pathology by cytology and correlating with histopathology. Age distribution and gender distribution of the cases have been studied. An attempt has been made to evaluate the agreement between cytological and histopathological diagnosis.

The salivary gland lesions in the present study show the incidence rate of 1.32% which is fairly correlating with similar studies conducted in other centers.

Most cases in our study were in fourth decade.

In the present study females outnumber males and the female:male ratio was 1.17:1. In the study done by Anita Omhare et al^[4] the female:male ratio was 1:0.34 and the study done by A. Singh et al^[5] showed the ratio as 1.4:1.

In the present study, predominant site for salivary gland tumours is the parotid region (86%) followed by submandibular (14%) salivary glands. This correlates with most of the study conducted in other institutions.

In the present study the benign tumours (category IVA of MILAN system) constitute 78% of all lesions, malignant tumours (category VI of MILAN system) constitute 22%. That correlates with the study done by Mihashi et al^[6] (79.1%,20.9%).

In the present study the most frequent salivary gland tumour was the pleomorphic adenoma (Fig no.1, 58%). Next comes Warthin tumour (Fig.no.2). This correlates with the study conducted by Choudhary et al^[7] 22(70%). Table no. 2 gives comparison study for distribution of salivary gland tumours.

In the present study pleomorphic adenoma is the most frequent benign salivary gland tumour which correlates with the study conducted by Uma dhayal et al^[8]. The most common malignant salivary gland tumour in our study is mucoepidermoid carcinoma (Fig.3). Next comes adenoid cystic carcinoma and salivary duct carcinoma. Acinic cell carcinoma was reported in one case. Khandekar et al^[9] also had mucoepidermoid carcinoma as the most common malignant tumour in his study.

Considering all salivary gland tumours together, the FNAC diagnosis was confirmed by the similar histopathological diagnosis in 46 of 50 cases. In the present study Out of 31 cases reported in FNAC as pleomorphic adenoma 29 were

found to be pleomorphic adenoma and the other two were reported as mucoepidermoid carcinoma and carcinoma ex pleomorphic adenoma in the histopathology. Khandekar et al^[9] reported that cystic change which occurs in salivary gland tumours will confuse the cytopathologist and areas mimicking mucoepidermoid carcinoma may present in pleomorphic adenoma.

The FNAC diagnosis was not in agreement with the histopathological diagnosis in three out of 50 cases and one smear was inadequate for evaluation.

Excluding the case with inadequate sampling the sensitivity, specificity and accuracy of FNAC to diagnose the benign and malignant tumours was 92.8%, 100%, 94% and 75.4%, 100%, 94% respectively. Table no.5 gives the comparison study for diagnostic accuracy of FNAC of salivary gland tumours.

In the present study the accuracy of FNAC to diagnose the benign salivary gland lesions is 94%, and the accuracy to diagnose malignant lesions is 88.2%. This correlates well with the study conducted by Anita et al (93.3%, 88.2% respectively). This indicates that FNAC is a reliable, useful and rapid diagnostic tool.

In the present study the FNAC diagnosis in three cases was not in agreement with the histopathological diagnosis.

Those were as follows, A 56 year old female presented with parotid swelling. FNAC smear showed sheets and clusters of epithelial cells which are spindle in shape with round to oval nuclei and eosinophilic cytoplasm. The cells exhibited mild pleomorphism. Provisional diagnosis of myoepithelial neoplasm was given, which later found to be myoepithelial carcinoma in histopathology. Shelly Sehgal^[10] et al reported that myoepithelial carcinoma may mimic myoepithelioma cytologically.

A 65 year old female had complaints of parotid swelling. FNAC smear studied shows features of benign mixed tumour with an abundant metachromatic and fibrillary stroma. Provisional diagnosis of pleomorphic adenoma was given, which later turned out to be carcinoma ex pleomorphic adenoma in histopathology. Yang et al reported that carcinoma ex pleomorphic adenoma may be missed if there is sampling and observation error.

In the present study one case of mucoepidermoid carcinoma was misdiagnosed as pleomorphic adenoma in cytology. The smear studied shows epithelial cells arranged in sheets and clusters in a myxoid background. The nuclei were bland. A. Shingh et al reported that epithelial mucus can be mistaken for the myxoid material of pleomorphic adenoma. He also reported that, diagnosis of low grade

mucoepidermoid carcinoma is difficult because it may be misdiagnosed as chronic sialadenitis, mucous retention cysts and Warthin's tumor of the salivary gland. Panchal upsana et al reported that mucoepidermoid carcinoma may be misdiagnosed as pleomorphic adenoma. Out of 50 cases one case was reported as inadequate smear for evaluation. This constituted 2% of the cases. Anita OmHare et al^[3] reported the incidence of inadequate sample as 6%.

Conclusion

FNAC is a simple, rapid and sensitive technique for the diagnosis of salivary gland lesions. There is a very good agreement between cytology and histopathology in diagnosing salivary gland tumours. However, many benign lesions will mimic malignant lesions in cytology and the vice versa also can occur. In our experience, we feel, however, that sufficiently high accuracy can be achieved by FNA study by reducing the sampling error and this can be a useful guide in making decisions for further management in patients with salivary gland lesions. In an era where advances in technology have added enormously to the burden of healthcare costs and facilities like ultrasound, sialography, **Computed Tomography (CT)** sialography and immune markers are available to aid the diagnosis of salivary gland tumors, the continued and accelerated use of the FNA cytology has reduced the costs and has released significant resources for alternate uses, a matter, that the pathologist can feel justifiably proud of.

Abbreviations

CT – Computed tomography

FNAC – Fine Needle Aspiration Cytology

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Competing Interests

None declared

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