



Original Article

# Correlation of FNAC and histopathology in diagnosis of salivary gland lesions

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## Keywords:

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## ABSTRACT

**Background:** Value of fine needle aspiration cytology in preoperative diagnosis of salivary gland lumps has been established in various studies. This study aims to calculate sensitivity, specificity accuracy of FNAC, correlate FNAC findings with histopathology and find out reasons for common diagnostic pitfalls in FNAC.

**Materials and methods:** This study was performed in 67 patients that presented with salivary gland lumps at Department of pathology, Tribhuvan University Teaching Hospital, Institute of medicine, Kathmandu, Nepal from January 2009 to June 2010. FNAC was performed and was correlated with histopathological diagnosis to judge the sensitivity, specificity and accuracy of FNAC.

**Results:** Out of 36 cases there was cyto-histological correlation in 28 cases. Pleomorphic adenoma was the most frequent lesion in this study. Parotid gland was the most common site affected by salivary gland lesions. The sensitivity, specificity and accuracy for non-neoplastic lesions was 100%, 89.28%, 91.67%, for benign neoplasms was 100%, 86.95%, 91.67% and for malignant neoplasms was 57.14%, 100%, 83.33% respectively.

**Conclusion:** FNAC is a useful tool in preoperative diagnosis of salivary gland lesions and can be crucial for the management of the patient. Aspiration and reporting of salivary gland lesions demands a competent pathologist who considers all the possible diagnostic pitfalls in mind.

## INTRODUCTION

Approximately 3% of all head and neck neoplasms are salivary gland tumors.<sup>1</sup> Clinical examination and imaging without FNAC are not able to distinguish benign from malignant lesions.<sup>2</sup> The main role of FNAC is to distinguish

benign lesions from malignant neoplasms. Different articles conclude that FNAC is a simple and rapid technique for which expensive instruments are not needed.<sup>3</sup> FNAC, as a preoperative tool however has its own limitations. The small size of needle contrasts with great variety of salivary gland lesions so the sampled area may not be representative of pathology.<sup>4</sup> Majority of cells in salivary gland lesions arise from the same cell lines i.e. (epithelial

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and myoepithelial) and often undergo metaplastic changes (squamous, oncocytic, mucinous, sebaceous and chondroid metaplasia) which causes diagnostic problems in FNAC.<sup>5</sup> The rationale for this study was to identify the diagnostic reliability of FNAC in diagnosing benign and malignant lesions of salivary gland that present during the study period and analyze the reasons for diagnostic pit falls in cases that have cytohystological disagreement.

**MATERIALS AND METHODS**

This was a cross-sectional, comparative study done in Department of pathology, Tribhuvan University Teaching Hospital Institute of medicine, Kathmandu, Nepal for duration of 18 months from January 2009 to June 2010. During the study period 67 cases of FNAC of salivary gland lesions were performed out of which in 36 cases cytohystopathological correlation were possible. Air dried FNAC specimens were Giemsa stained and wet smears were stained by Papanicolau method. Histopathological specimen slides were stained using Hematoxylin and Eosin. The slides were examined and diagnosis was made and cytohystopathological correlation was made. FNAC diagnoses were divided into non-neoplastic lesions, benign neoplasms and malignant lesions. Available data were analyzed using SPSS 13.

**RESULTS**

Age range varied from 9-85 years.33 (49.2%) patients were male and 34 were female (51.8%). There was no sex predilection for any type of lesion. Non-neoplastic and benign lesions were more prevalent in the age group of 21-30 years (fig. 1). Parotid gland was the most common site involved (N=33; 49.2%) followed by submandibular gland (N=27; 45%). There were seven cases of minor salivary

gland lesions (N=7; 17.9%). Nonneoplastic lesion comprises 35 cases (52.2%) whereas benign and malignant neoplasm constituted 20 (29.8%) and 12(17.9%) respectively.

Chronic sialadenitis, pleomorphic adeoma, mucoepidermoidcarcinoma was the most common non-neoplastic lesion, benign neoplasm and malignant neoplasm diagnosed in FNAC, respectively. Two cases of minor salivary gland lesions were malignant (28.57%). Various lesions of salivary glands and cytohystological correlation is shown in table 1. Out of 36 cases 28 cases had same cytohystological diagnosis (77.7%) whereas 8 cases (22.3) had cytohystological disagreement (22.3%).

Diagnostic reliability was judged based on sensitivity, specificity and accuracy. Sensitivity in various type of lesion ranged from 57%-100%. Specificity in various types of lesion ranged from 86-100% and accuracy ranged from 83-92%. (Table 2)

**DISCUSSION**

Classifying the salivary gland lesions into non-neoplastic, benign and malignant neoplasm may guide the clinician to make correct therapeutic decisions as to which patient requires further investigation, medical treatment or excision.<sup>6</sup> During the study period 67 patients underwent fine needle aspiration of salivary gland lesions, 36 of these patients underwent surgery and subsequent histopathological examination. The age range in this study varied from 9-85 years. Non-neoplastic lesions and benign neoplasm were common before the age of 50 (66.67%) in comparison to malignant lesion which were more common after the age of 50 (58.3%). In a study in Brazil, authors found malignant tumors peaked in seventh decade; benign tumors peaked in the fourth decade.<sup>7</sup> A noteworthy case is of acinic cell carcinoma in a 10 year old. According to section on acinic cell carcinoma in WHO publication on head and neck tumors, four percent of the patients with acinic cell carcinoma are under 20 years old. 32 (47.76%) patients were male and 37 patients were female (52.24%). There was no clear cut sex predilection for either benign or malignant lesions.Salivary gland lesions in general are however more common in females.<sup>2</sup> Chronic sialadenitis, pleomorphic adenoma and mucoepidermoid carcinoma were The most common non neoplastic, benign neoplasm and malignant neoplasm respectively. An article on pleomorphic adenoma states that pleomorphic adenoma is the most common salivary gland tumor and comprises about 79% of the major and 72% of minor salivary gland tumors.<sup>8</sup> Klijanienko J et al in his study found mucoepidermoid carcinoma is one of the most common malignant tumors of salivary glands.<sup>9</sup> Eight of 36 cases had cyto-histological disagreement. Cystic presentation of lesions was common reason for pitfall. A right parotid lump cystic in consistency was diagnosed as retention cyst due to presence of fluid and

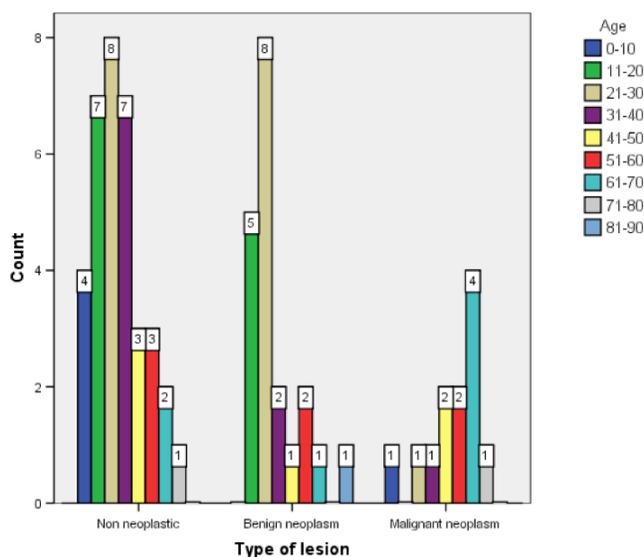


Figure 1: Age distribution of salivary gland lesions

**Table 1: FNAC and Histopathology correlation of salivary gland lesions**

FNAC DIAGNOSIS	No. of Cases	HISTOPATHOLOGICAL DIAGNOSIS										
		MC	MYC	ACC	EMC	PLGC	PA	SC	BCL	CS	CD	
CS	6	1									5	
BCL	4	1								3		
AB	1				1							
RL	1											1
PA	15	1	1					12	1			
WT	1	1										
MC	5	5										
PLGC	1					1						
ACC	2			2								
<b>TOTAL</b>	<b>36</b>	<b>9</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>12</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>1</b>	

AB : Abscess, ACC: Acinic cellcarcinoma, BCL : Benign cystic lesion, CD : Castleman's disease, CS : Castleman's disease, EMC : Epithelial Myoepithelial Carcinoma, MC : Mucoepidermoid carcinoma, MYC : Myoepithelial carcinoma, PA: Pleomorphic adenoma, PLGC: Polymorphous Low Grade Carcinoma, RL: Reactive lymphadenitis, SC: Schwannoma, WT: Warthin,s tumor

**Table 2: Comparison of diagnostic reliability of FNAC in various lesions**

	SENSITIVITY	SPECIFICITY	ACCURACY
<b>Non-neoplastic lesions</b>	100	89.28	91.67
Benign neoplasm	100	86.95	
Malignant neoplasm	100	86.95	

histiocytes in aspiration smear. Histopathological diagnosis was acinic cell carcinoma, microcystic variant. Ali ZS et al studied FNAC smears of seven cases acinic cell carcinomas diagnosed on histopathology. Two of the seven cases in his study showed cystic material and histiocytes only.<sup>10</sup> Another case of tender cystic right parotid lump diagnosed as abscess in FNAC was proven to be epithelial and myoepithelial carcinoma that had gone cystic degeneration with subsequent infection. Tongeren JV et al, reported a case of bilateral synchronous epithelial-myoeipihelial carcinoma which had cystic presentation.<sup>10</sup> Pleomorphic adenoma usually show good cyto-histo correlation. However when the FNAC smears from pleomorphic adenoma predominately show spindle cells in a myxoid background rarer lesions like myoepithelial neoplasm and schwannoma should come into differential diagnosis as happened with two of the cases.

Similar erroneous diagnosis pleomorphic adenoma in cases of myoepithelial carcinoma and schwannoma have been described been described.<sup>8,11,12</sup>

Presence of mucin in aspirate that otherwise appeared typical of pleomorphic adenoma turned out to be case of mucoepidermoid carcinoma. An article by Handa U et al states that cystic degeneration and mucin production are common in pleomorphic adenoma.<sup>8</sup> A case of myoepithelial carcinoma was missed due to presence of spindle cells that a were thought to be fibroblasts in background of

chronic inflammatory cells in FNAC. FNAC diagnosis was chronic sialadenitis. Intermediate cells of mucoepidermoid carcinoma were reported as oncocytic in FNA smears thus resulting in false diagnosis of Warthin's tumor and a case diagnosed as reactive lymphadenitis of intraparotid lymph node turned out to be Castleman's disease in biopsy. Warthin's tumor is a common false negative diagnosis in cases of mucoepidermoid carcinoma.<sup>13</sup>

In a case similar to ours FNAC smears of that reported case were suggestive of reactive lymphadenitis of the intraparotid lymph node and the diagnosis of Castleman's disease was only possible on biopsy.<sup>14</sup>

The sensitivity, specificity and accuracy for non-neoplastic lesions were 100%, 89.28%, 91.67%, for benign neoplasms were 100%, 86.95%, 91.67% and for malignant neoplasms were 57.14%, 100%, 83.33% respectively. According to the various authors, the accuracy of needle aspiration in malignant tumors range from 80.4% to 97%, sensitivity from 54% to 97.6% and specificity from 86% to 100% respectively.<sup>15-17</sup>

## CONCLUSION

FNAC can be used as preoperative investigations of salivary gland lesions. It can be used to differentiate benign from malignant lesions preoperatively. Type specific diagnosis are more difficult in malignant cases, however as seen from this study absence of malignancy can be correctly identified in fine needle aspirations.

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