

Original Article

Role of Fine Needle Aspiration Cytology (FNAC) in Preoperative Diagnosis of Parotid and Submandibular Gland Neoplasm

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Abstract

Background: The overall incidence of salivary gland neoplasm is 2.5-3.0 per 100000 per year. Salivary gland malignancies account for about 5% of head-neck malignancies. Though, it is uncommon but not rare in our country. Fine Needle Aspiration Cytology (FNAC) has been widely used for many years as a method for assessing salivary gland lesion preoperatively. It is a simple, quick, inexpensive and minimally invasive technique used to diagnose different types of salivary gland neoplasm.

Objectives: To see the frequency of malignancy in parotid and submandibular salivary gland neoplasm and also to find out the role of FNAC in their preoperative diagnosis. Histopathological examination of the resected parotid and submandibular gland neoplasm was considered as gold standard to compare FNAC report of this study.

Methods: This was a cross – sectional study which was conducted in the Department of Otolaryngology – Head & Neck Surgery, Dhaka Medical College Hospital, Dhaka from January 2017 to June 2018. Purposive sampling method was used to collect data. Pre-tested structured data sheet was used to record information. After collection, data were edited by meticulous checking and re-checking. Data were analyzed using SPSS for windows version 22.

Results: After histopathological confirmation of the resected specimen, most common benign parotid tumour was pleomorphic adenoma 76.7% followed by warthin's tumour 16.7%. In benign submandibular gland neoplasm, pleomorphic adenoma was the commonest 87.5% followed by haemangioma 12.5%. Commonest malignant tumour of submandibular gland was adenoid cystic carcinoma 50.0%. In our study sensitivity of FNAC was 75.0%, specificity 94.74% and overall accuracy was 90%. Positive predictive value and negative value were 81.82% and 92.31% respectively.

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Conclusion: *It can be concluded that fine needle aspiration cytology is a safe, cheap and useful preoperative diagnostic tool in the diagnosis of malignancy in parotid and submandibular gland, but as fine needle aspiration cytology partly depends on operator skill, it may give false negative and false positive result.*

Keywords: *Salivary gland neoplasm, salivary gland FNAC, parotid gland neoplasm, submandibular gland neoplasm, salivary gland biopsy*

Introduction:

Salivary gland malignancies account 1-3% of all head-neck malignancies and 0.3% of all malignancies of the body¹. Worldwide incidence of salivary gland neoplasm, however, reported to be 0.4-13.5 cases per 100,000². 70% of the salivary gland tumors arise in the parotid gland. The remaining arise in the submandibular gland 8% and minor salivary glands 22%. Although 75% of all parotid neoplasm are benign, about 50% of the submandibular gland neoplasm and 80% of minor salivary gland neoplasm are found to be malignant. Pleomorphic adenoma is the most common benign salivary gland neoplasm, comprising 85% of all the salivary gland neoplasm³. Incidence of malignancy is relatively higher in submandibular, sublingual and minor salivary glands than parotid. One sixth parotid tumors and 40% submandibular gland tumors are malignant⁴. The tumors of sublingual and minor salivary glands are uncommon representing about one tenth of all salivary gland neoplasm⁵. Mucoepidermoid carcinoma is the most common salivary gland malignancy which contributes about 5 to 9% of all salivary gland neoplasm. It commonly occurs in the major salivary glands, mostly in parotid 45 to 70%⁶. Other common malignancies are adenoid cystic carcinoma, acinic cell carcinoma, adenocarcinoma and squamous cell carcinoma. Almost one-third of adenoid cystic carcinoma occurs in the major salivary glands and it is particularly common in the submandibular gland- 43%⁴. Salivary gland lesions present as enlarged neck mass which are usually accessible for FNAC, a simple, inexpensive and well tolerated diagnostic tool. FNAC of suspected salivary gland lesions has an important role in

preoperative diagnosis and further management of the patient. However, diverse morphological patterns and overlapping features make it a challenging job to give a precise diagnosis, at times⁷. FNAC has gained widespread acceptance and popularity among head-neck surgeons in the assessment of thyroid and other neck masses but its use in the evaluation of parotid and submandibular gland tumors has not attained similar enthusiasm. As the sensitivity and specificity of FNAC for parotid tumors is between 57-98% and 86-100% respectively, some authors believe that it is not accurate enough to influence the decision making process⁷.

Regarding frequency of malignancy in parotid and submandibular gland neoplasm and role of FNAC in their preoperative diagnosis, numerous studies have been done in abroad. But very few studies have been accomplished in our country. Realizing the condition, this cross section study has been designed.

Materials and Methods:

This is a Cross Sectional Study conducted in the Department of Otolaryngology – Head & Neck Surgery, Dhaka Medical College Hospital, Dhaka, from January 2017 to June 2018, among the patients with parotid and submandibular gland neoplasm admitted in the department for operative management. Total 50 subjects were included in this study. All FNAC proved neoplastic swelling, involving parotid and submandibular gland of all age and sex included in the study, but inflammatory, autoimmune and granulomatous lesions and Neoplasm of sublingual and minor salivary glands were excluded.

Results:

Results of study is shown in following tables.

Table I :
Age distribution of the patients with different neoplasm (n=50)

Age groups (years)	Benign(n=39)		Malignant (n=11)	
	n	%	n	%
11-20	5	12.82	0	0.00
21-30	4	10.26	1	9.09
31-40	5	12.82	3	27.27
41-50	17	43.59	3	27.27
51-60	6	15.38	2	18.18
61-70	1	2.56	1	9.09
71-80	1	2.56	1	9.09
Total	39	100.00	11	100.0
Mean±SD	41.11±7.35		47.25±6.85	

Table II :
Distribution of benign and malignant neoplasm in parotid and submandibular gland (n=50)

Gland involved	Benign(n=39)		Malignant (n=11)		Total (n=50)		p-value
	N	%	N	%	n	%	
Parotid	31	86.1	05	13.9	36	100.0	0.026 ^s
Submandibular gland	08	57.1	06	42.9	14	100.0	
Total	39	78.0	11	22.0	50	100.0	

Chi-squared Test (χ^2) was done to analyze the data.

s = significant

Table III :
Distribution of different types of benign neoplasm in parotid gland & submandibular gland (After FNAC) (n=39)

Different types of neoplasm	Parotid (n=31)		Submandibular (n=8)		Total (n=39)	
	N	%	n	%	N	%
Pleomorphic adenoma	24	77.4	07	87.5	31	79.5
Warthin's tumour	05	16.1	0	0.0	05	12.8
Oncocytoma	01	3.2	0	0.0	01	2.6
Haemangioma	01	3.2	01	12.5	02	5.1
Total	31	100	8	100	39	100

Table IV :
Distribution of different malignant neoplasm in parotid and submandibular gland (after FNAC) (n=11)

Different types of neoplasm	Parotid (n=05)		Submandibular (n=06)		Total (n=11)	
	N	%	n	%	n	%
Mucoepidermoid carcinoma	03	60.0	02	33.3	05	45.5
Adenoid cystic carcinoma	01	20.0	03	50.0	04	36.4
Adenocarcinoma	01	20.0	-	-	01	9.1
Squamous cell carcinoma	-	-	01	16.7	01	9.1
Total	05	100.0	06	100.0	11	100.0

Table V :
Distribution of different types of benign neoplasm in parotid and submandibular gland (Histopathologically confirmed) (n=38)

Different types of neoplasm	Parotid (n=30)		Submandibular (n=8)		Total (n=38)	
	n	%	n	%	n	%
Pleomorphic adenoma	23	76.7	07	87.5	30	78.9
Warthin's tumour	05	16.7	0	0	05	13.2
Oncocytoma	01	3.3	0	0	01	2.6
Haemangioma	01	3.3	01	12.5	02	5.3
Total	30	100.0	8	100.0	38	100.0

Table VI :
Distribution of different malignant neoplasm in parotid and submandibular gland (after histopathology) (n=12)

Different types of neoplasm	Parotid (n=06)		Submandibular (n=06)		Total (n=12)	
	n	%	n	%	n	%
Mucoepidermoid carcinoma	03	50.0	01	16.7	04	33.3
Adenoid cystic carcinoma	02	33.3	03	50.0	05	41.7
Adenocarcinoma	01	16.7	01	16.7	02	16.7
Squamous cell carcinoma	-	-	01	16.7	01	8.3
Total	06	100.0	06	100.0	12	100.0

Discussion:

In present study the mean age in benign cases was 41.11 years with SD \pm 7.35 and in malignant cases was 47.25 years with SD \pm 6.85. This result corresponded with a study

where mean age for benign and malignant tumour was 41.3 years and 47 years respectively⁸. Chattarjee and Panda showed in their study, for benign neoplasm mean age was 35.5 years and for malignant neoplasm, mean age was 47.5 years⁹.

In our study, 72% neoplasms were involved the parotid gland and 28% involved the submandibular gland. This result consistent with a study where they found 74% parotid gland involvement and 26% submandibular gland involvement^{9,10}. In present study, out of 14 submandibular glands tumours, 08 (57.1%) were benign and 06 (42.9%) were malignant. Benign tumours are more common in parotid gland 31(86.1%) and malignant tumours are relatively more common in submandibular gland 42.9%. Statistically malignant neoplasm was significantly common in submandibular gland. Nagarkar et al. showed that 80% salivary gland tumours were of parotid gland and 15% submandibular gland of which 80% of parotid tumours and 50% of submandibular tumours were benign^{11,12}. Tsai et al. showed that 85% major salivary tumours are benign and 12% malignant¹³. Similarly in Huq et al. reported 85.1% of parotid tumours were benign and 14.9% tumour malignant².

After doing fine needle aspiration cytology of the swelling, pleomorphic adenoma was the commonest benign neoplasm involving both parotid and submandibular glands 79.5%. In case of malignant neoplasm mucoepidermoid carcinoma was the commonest variety 45.5%.

In our study, after histopathological confirmation of the resected specimen, most common benign parotid neoplasm was pleomorphic adenoma 76.7%, followed by Warthin's tumour 16.7% and most common malignant parotid tumour was mucoepidermoid carcinoma 50.0% followed by adenoid cystic carcinoma 33.3%. In one series most frequent malignant neoplasm of parotid gland was mucoepidermoid carcinoma⁶. This is similar to our study.

In case of benign submandibular gland neoplasm, after histopathological confirmation, pleomorphic adenoma was the

commonest benign tumour 87.5% followed by haemangioma 12.5%. Commonest malignant tumour of submandibular gland was adenoid cystic carcinoma 50.0%. In one study, commonest benign submandibular neoplasm was pleomorphic adenoma and adenoid cystic carcinoma was the commonest malignant neoplasm¹⁰. So, our study strongly correlates with that series. But doesn't correlate with another, where lymphoma was the most common malignant submandibular neoplasm¹¹.

Histopathological examination of the surgically resected specimen was taken as gold standard, to compare the fine needle aspiration cytology report in our series. Here fine needle aspiration cytology findings of all 50 cases were compared with post-operative histopathological examination report. Out of 50 cases, 45 (90.0%) were accurately diagnosed pre-operatively by FNAC. In 5 cases fine needle aspiration cytology findings didn't matched with post operative histopathological report.

In this series, out of 50 cases 39 cases were diagnosed as benign and 11 cases were diagnosed as malignant by fine needle aspiration cytology. Among 39 benign neoplasm reported on fine needle aspiration cytology, 36(72%) cases were confirmed as benign on final histopathological examination. So there were 3 cases 6% of false negative. Out of 11 cases reported as malignant lesion by FNAC, 9 were confirmed as malignant by histopathology. So there were 2 false positive results 4%. In accordance with present study Correiasa et al. reported when comparing FNAC and histological evaluation of the surgical specimen, an overall concordance of 78% (51/65) was established, 71% with malignant and 82% with benign cases on break up¹⁴. The overall diagnostic accuracy of their series was 87.5%, the sensitivity was 90.3% and specificity was 80%.

Conclusion:

Malignancy is more frequent in the submandibular gland neoplasm than in the parotid gland neoplasm and FNAC is a useful preoperative diagnostic tool. As FNAC partly depends on operator's skill, it may give false negative and false positive result. So, every surgically resected specimen of parotid and submandibular gland neoplasm should be confirmed by histopathological examination.

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