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Fine Needle Aspiration Biopsy (FNAB) of masses from Thyroid and Salivary Glands:A Profile Of 648 Cases.

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Abstract

Six hundred forty eight cases of Fine Needle Aspiration (FNA) biopsies from glandular masses of thyroid and salivary glands were performed from February 1997 to December 2000 in the private chamber of the authors. Both FNAB and histopathological diagnosis of 517 cases were correlated in order to establish the efficiency, sensitivity and specificity of FNAB technique. Remaining 131 cases having inflammatory lesions were under clinical observation without surgical intervention. Total diagnostic efficiency was 97.87% and the sensitivity, specificity, positive predictive value and negative predictive value were 97.16%, 98.24%, 96.61%, 98.53% respectively. In this study FNAB technique of related gland masses considered as an efficient, safe, cost-effective, rapid and convenient method of diagnostic investigation.

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Introduction

Masses in the neck postulate a great problem for the surgeon. They often advocate a careful search for primary malignancy by biopsy before any surgical intervention is contemplated. The reasons for avoiding ill-advised early biopsy have been well described that initiates seeding of tumor cells into a vascular plane making them resistant to curative radiotherapy and chemotherapy.[1,2]. FNAB, the modern and popular technique now a days, is widely employed in different countries has proven effective in lung, retroperitoneal, breast and thyroid disease.[3, 4,5,6,7] Although it has high diagnostic accuracy but the results vary in different literature. This study was designed to determine its consistency with the results published in other literature and to justify its application for the treatment of neck masses.

Materials and Method

648 cases from both genders of all ages with neck mass referred by Physicians and Surgeons for FNAB extending from Feb' 97 to Dec' 2000 were included. The aspirates were drawn by the authors themselves using standard FNA technique[8]. A 5ml disposable syringe with 22 gauge needles were used to obtain the samples and direct smears were prepared and was fixed in 95% ethyl alcohol immediately that was stained with Papanicolaou method. Histological material was routinely embedded in paraffin and stained with Haemtoxylene & Eosin (H&E) method. All the aspiration reports after examination were categorized as malignant, non-malignant, suspicious and unsatisfactory. FNA materials of all tumors, suspicious and unsatisfactory smears were examined for histopathological confirmation by biopsy.

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Reports of inflammatory diseases were not histopathologically correlated with parameters used in the study and those were (1). Cyto-histologic correlation (2). Sensitivity, specificity, positive predictive value (PV+), negative predictive value (PV-) and overall efficiency of the technique. These were analyzed according to the standard method used in published article.9 In this cross sectional study the cytological reports were compared with histological features.

Results

Out of 648 FNAs of neck masses 517 cases were subjected to histopathological correlation. Remaining 131 cases were excluded having in flammatory lesions. Among 517 specimen 460 (70.99%) were reported as negative for malignancy and 188 (29.01%) were positive for malignancy (Table-III). 12 (1.85%) cases were suspicious and histopathological reports were 09 malignant and 03 follicular adenoma of the thyroid gland (Table-1). Among the 06-(0.93) unsatisfactory aspirates 03 were malignant, 01 was follicular adenoma and 02 were multinodular goitre (Table-I). 478 cytological correlation for 517 cases with histological examination was detailed in Table-I & II and accuracy of the result range from 75-100%. Among 177 cases FNAB positive malignancy, 171 (96.6%) were confirmed histologically. Of the rest 06, 04 were follicular adenoma and 02 were pleomorphic adenoma (Table I & II).

Among 340 FNAB negative malignancy, 36 (98.8% were confirmed histologically (Table-IV). Of the rest 04, 01 was metastatic carcinoma, 02 were muco-epidermoid carcinoma and 01 was adeno-carcinoma Table-II). Total 05 false negative and 06 false positive (Table-IV). 100% correlation for specific diagnosis was (1) Thyroid gland squamous cell carcinoma, metastatic carcinoma of thyroid, Hurthele cell adenoma, and nodular goitre. (Table-1). (2) Salivary gland: Warthim tumor, oncocytoma, ductal papilloma, adenocarcinoma, adeno-cystic carcinoma, malignant mixed tumor, squamous cell carcinoma and lymphoma (Table-II). Histological correlation for specific diagnosis of the rest of the cases varies from 70-98.8% (Table-I & II). Statistical analyses (Table-V) of the results expressing sensitivity, specificity, positive predictive value, negative predictive value and efficiency of FNAB method were 97.16%, 98.24%, 96.61%, 98.53% respectively. Comparisons of reliability of current test series with other studies were presented in table VI. No complications of the procedure were observed and patients' discomforts were uniformly minimal and transient.

Table-1: Cyto-histological diagnostic correlation of 318 cases of thyroid masses

Fine needle aspiration	Number	Histopathology	Number	Agreement(%)
Malignant Neoplasia N-117				
Papillary carcinoma	83	Papillary carcinoma Follicular	82 10	98.8
Follicular carcinoma	16	Follicular carcinoma Follicular adenoma	13 03*	81.25
Medullary carcinoma	07	Medullary carcinoma Follicular	06 01*	85.7
Squamous cell carcinoma	03	Squamous cell carcinoma	03	100
Metastatic carcinoma	08	Metastatic carcinoma	08	100
Benign Neoplasia N-16				
Follicular adenoma	11	Follicular adenoma Follicular carcinoma	10 01**	
Hurthele cell adenoma	05	Hurthele cell adenoma	05	
Suspicious	12	Malignant Follicular adenoma	09 03	
Unsatisfactory	06	Malignant Follicular adenoma Multinodular goitre	03 01 02	
Non-Neoplasia N-185 cases	158	Nodular goitre	158	100
Cyst	09	Cyst Metastatic adeno-carcinoma	08 01**	88.9
Inflammation ◆	18	Histology not done	-	-

◆ 18 cases were inflammatory thyroid diseases (Hashimotos' thyroiditis-14, lymphocytic thyroiditis-02, acute thyroiditis002) not correlated histologically. * False positive-04, ** False negative-02

Table-II: Cyto-histological diagnostic correlation of 199 cases of Salivary gland

Disease	Parotid	Submandibular	Sublingual	Cyto-histologic Agreement (%)
Benign Tumor				
Pleomorphic adenoma	105(3)*	13	02	97.14
Warthim's tumor	12	02	00	100
Oncocytoma	02	01	00	100
Duct papilloma	01	01	00	100
Malignant tumor				
Muco-epidermoid carcinoma	26(2)**	06	03	88.5
Adenocarcinoma	10	02	01	100
Acinic cell tumor	02	00	00	100
Adenocystic carcinoma	01	00	00	100
Malignant mixed tumor	02	00	00	100
Squamous cell carcinoma	04	02	00	100
Lymphoma	01	00	00	100
Total (199)	166	27	06	

** False positive-02: *False negative-03. Two cases cytologically diagnosed as muco-epidermoid carcinoma, but histologically it was pleomorphic adenoma.

** Cytological diagnosis of 3 cases were pleomorphic adenoma but histologically it was muco-epidermoid carcinoma (2 cases), adeno carcinoma (1 case).

113 cases of inflammatory disease of salivary glands were not correlated histologically.

Table-III: Cytological diagnosis of 648 Thyroid & salivary glands masses

Parameter	Number of cases	Total
Total aspiration	648	648
Unsatisfactory aspirates	06 (0.93)	648, 99.93
Satisfactory aspiration	642 (99)	
Negative for malignancy	460, 70.99	648, 100
Positive diagnosis	(188) 29.01	
Suspicious	(12) 1.85	12, 1.85
Cyto-histological correlation	517, 79.8	517, 79.8

* Malignant-09; Follicular adenoma-03

131 inflammatory cases were not correlated histologically.

Table-IV: Diagnostic accuracy of FNA in 517 histologically controlled patients having neck masses

Test Results	Diagnosis		Total
	Malignancy	Non malignancy	
Positive	171	06	177
Negative	05	335	340
Total	176	341	517

* Malignancy-FNA-177; Histopathology-171. (False +ve=06)

** No malignancy-FNA-340; Histopathology-335. (False-ve=05)

Table-V: Statistical analysis

Sensitivity	$\frac{TP}{(TP+FN)}$	%	i.e. 171/ (171+5) X100	97.16%
Specificity	$\frac{TN}{(TN+FP)}$	%	335/ (335+6) X100	98.24%
Positive predictive value	$\frac{TP}{(TP+FP)}$	%	171/ (171+6) X100	96.61%
Negative predictive value	$\frac{TN}{(TN+FN)}$	%	335/ (335+5) X100	98.53%
Efficiency	$\frac{TN+TP}{(TP+TN+FP+FN)}$	%	$\frac{(335+171)}{(171+3356+5)}$ X 100	97.87%

Table-VI: Comparing the findings' reliability of present cases with other studies.

Site	Author	Number	Sensitivity (%)	Specificity (%)	Efficiency (%)
Thyroid	Colacchio et al[10]	300	82.6	98.6	97.3
	Einhorn & Frazen[11]	177	95.2	92.3	94.4
	Gershengorn[12]	32	90.0	77.3	81.3
Salivary Gland	Mavee et al[13]	475	56.5	98.9	87.8
	Young et al[14]	475	56.5	98.9	87.8
	Bono et al[15]	79	100	85.7	80.4
	Kamrul Hassan Tarafder et al[16]	40	76.92	78.57	77.50
	Present series	517	96.6	98.8	98.0

Discussion

The validity of a diagnostic test measures its accuracy and consists of two components; sensitivity and specificity. Sensitivity is the ability of a test to give a positive finding when the person screened has the disease under investigation and specificity is defined as the ability of the test to give negative finding when the person does not have the disease.

To make an easy diagnosis of palpable neck masses, FNAB should be the first approach then the excision biopsy. The results from present series of patients confirm that FNA biopsy of neck masses is an accurate, specific and highly sensitive method of diagnostic procedure. The results of the presented study are coherently similar with other studies (Table VI) [10-16] It has already been established that fine needle aspiration biopsy of the neck mass is feasible diagnostic method of determining the nature of the neck mass. Advantages of FNAB are very simple procedure, easy to perform, less time-consuming, cost effective, patient-friendly and without complication.[17] The extent to which it is clinically useful depends on expertise available in any given Institution. Many investigators have reported their results using FNAB of neck masses but most of these studies were performed in a large teaching Institute and were based on the observations made by few expert cytopathologist.[18, 19] The result were correlated with histological examination (Table I & II) as well as with some of the published studies (Table-VI) [10-16]. The present study was mostly consistent with previous published studies (Table-VI). Among 648 cases 517 had histological correlation and unsatisfactory specimen were 0.93%. The incidence of unsatisfactory aspirates in the literature varies from 1.0% to 3.8% of all the neck masses.[9, 20] Some of the contributory factors for unsatisfactory specimens are intrinsic properties of particular tissue mass (sclerosis, fibrosis, highly vascularisation, too small mass etc), different aspiration technique and lack of needle guidance in small lesion.[21] In present study, 06(0.93%) unsatisfactory specimens had subsequent biopsies and 03 (three) cases were found to be malignant (Table-I). Twelve cases

were suspected for malignancy, among them nine were malignant tumor. False positive and false negative results in the present study were comparatively low (Table-IV). Sensitivity, specificity, positive predictive value, negative predictive value and efficiency of FNAB results are compatible with other literature (Table-VI). This study described the experience of FNAB for the diagnosis of neck mass in an area lacking of diagnostic facilities. The results are favourably compatible with those in the literature. FNAB is an effective diagnostic test for palpable and as well as visible neck mass. Specimen obtained from suspicious cases and lack of precision, cases should be confirmed by biopsy and histopathological technique after excision of the mass. Based on the results of this present study about diagnostic values, the authors came to a conclusion that FNA biopsy is an efficient tool for diagnosis of neck mass when performed by a proficient cytopathologist.

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