A COMPARATIVE STUDY OF ULTRASOUND (USG), FINE NEEDLE ASPIRATION CYTOLOGY (FNAC) AND HISTOPATHOLOGICAL EXAMINATION (HPE) OF THYROID SWELLINGS

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ABSTRACT: AIM: To compare the diagnostic accuracy of preoperative Fine Needle Aspiration Cytology (FNAC) and ultrasound (USG) of thyroid swellings with post-operative Histopathological Examination (HPE) results.

METHODOLOGY: A retrospective study of 60 consecutive patients was conducted from January 2013 to February 2014 in ENT department of our hospital. Ultrasound and Aspiration of thyroid swellings were taken after detailed clinical history, physical examination and thyroid function test. Ultrasound and FNAC reports were compared. 20 patients who underwent surgery, these patients FNAC were compared with final histopathological diagnosis.

RESULTS: The sensitivity, specificity, PPV and accuracy of the FNAC when compared with HPE were 75%, 100%, 93% and 100% which was compared with other studies.

CONCLUSION: Fine Needle Aspiration Cytology (FNAC) is considered gold standard cost effective diagnostic test for diagnosis of thyroid swellings than ultrasound. Based on the cytologic findings patients can be treated accordingly thus avoiding unnecessary surgery.

KEYWORDS: Thyroid Swellings, Ultrasound, FNAC, Histopathology.

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INTRODUCTION: Diseases of the thyroid gland is a common clinical presentation in general population where the incidence being higher in endemic areas.¹ The disorders of thyroid gland can be due to inflammatory and neoplastic causes.² A multitude of non-invasive and invasive diagnostic tests like ultrasound, thyroid nuclear scan and Fine Needle Aspiration Cytology (FNAC) is available to the clinician for the evaluation of thyroid swellings. Hence there arises the need for a final diagnostic test that is histopathological examination (HPE).

The head and neck region encompasses a wide range of lesions of thyroid, lymph node and salivary gland with a variety of differential diagnosis ranging from inflammatory to malignancy. This study is undertaken with the objective of comparing the findings of USG, FNAC and HPE of thyroid swellings and to determine the accuracy of each test.

MATERIALS AND METHODS: The present study was carried out from January 2013 to February 2014 in ENT department of AJ Institute of medical science, Mangalore, in patients with clinical evidence of thyroid swelling. Ultrasound and Aspiration of thyroid swellings were done after getting informed consent from them and after getting detailed clinical history, physical examination and thyroid function test. Ultrasound and FNAC reports were done in 60 cases out of which 20 patients agreed for surgical intervention and their results were compared with final histopathological diagnosis.

RESULTS: In this study benign lesions found were Multi Nodular Goiter (MNG), Hashimoto's Thyroiditis and Follicular adenoma (FA); Follicular Neoplasm (FN) were considered suspicious and malignant lesions were papillary carcinoma (PC).

DISCUSSION: Ultrasound (USG) of thyroid gland is a simple cost effective noninvasive diagnostic tool for evaluation of thyroid swellings. USG can differentiate solid from cystic lesion and can identify cysts as small as 2mm. It is performed using a 12MHz transducer that is optimal for high resolution imaging. Color flow Doppler is useful in assessing vascularity. USG is safe inexpensive procedure with quick result and an excellent patient compliance.

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FNAC is a method first published by Martin and Ellis in 1930.³ FNAC was performed by 22-23 gauge needles with 10ml disposable syringe.^{4,5,6}

The specimen was expelled on 2 glass slides according to the material and smeared, wet fixed or air dried followed by Papanicolaus staining. Similarly post thyroidectomy specimens were fixed with 10% formalin. Sections were taken from different parts of the specimen and processed. The section so obtained were stained with haematoxylin and Eosin (HE) staining.^{7,8,9} In our study of 20 cases, 1 case of papillary carcinoma diagnosed by FNAC was confirmed by histopathological examination. It is to be stressed that all malignant cases on FNAC need to surgically treated.

CONCLUSION: American Thyroid Association and National Comprehensive Cancer network states that FNAC should be used as the initial diagnostic test because of its superior diagnostic reliability and cost effectiveness before USG.¹⁴ FNAC has limitations related to specimen adequacy, sampling technique, skill of performing the aspiration, interpretation of the aspirate and overlapping cytological features between benign and malignant follicular neoplasm.^{15,16} Our study is in par with other studies.

The sensitivity, specificity, PPV and accuracy of the test were 75%, 100%, 93% and 100%. FNAC is considered gold standard cost effective diagnostic test for diagnosis of thyroid swellings than ultrasound.¹⁴ Based on the cytologic findings patients can be treated accordingly thus avoiding unnecessary surgery. So this simple test is easily applicable for early diagnosis and for better future management.

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AGE GROUP	NUMBER OF PATIENTS	PERCENTAGE
10-20Yrs	5	8.3
21-30Yrs	19	31.7
31-40Yrs	25	41.7
41-50Yrs	9	15
51-60Yrs	2	3.3
TOTAL	60	100%
Table 1: Age Distribution

Figure. 1: Represents the sex distribution in the study

In our study FNAC findings revealed that Multinodular Goitre (75%), Hashimoto's Thyroiditis (5%), Follicular Adenomas (16.7%) and Papillary Carcinoma (1.7%). 3.3% showed inadequate sample. Figure 2 depicting the comparison of FNAC and HPE in our study.

	FNAC	HPE
MultinodularGoitre	45	14
Hashimoto's Thyroiditis	3	3
Follicular Adenoma	10	2
Papillary Carcinoma	1	1
TOTAL	59	20

Table 2: Correlation of FNAC and HPE of Thyroid Swellings

	USG (%)	FNAC (%)
BENIGN	58(96.7%)	58(96.7%)
MALIGNANT	0	1(1.7%)
INDETERMINANT	2(3.3%)	1(1.7%)
TOTAL	60(100%)	60(100%)

Table 3: Relationship of USG and FNAC Findings

Ultrasound findings revealed 58 were benign and 2 were showing features suspicious of malignancy to which FNAC correlation was advised.

Figure 2: Relationship of FNAC and HPE Findings

STUDY/YEAR	NO. OF PATIENTS	SENSITIVITY	SPECIFICIY	ACCURACY	NEGATIVE PREDICTIVE VALUE	POSITIVE PREDICTIVE VALUE
Alfrose et al/2002	170	61.9%	99.3%	94.5%	94.7%	92.8%
Kessler et al/2005	170		98.5%	87%	76.6%	98.7%
Manoj gupta et al/2006	75	80%	86.6%	84%	86.6%	80%
S S Guli/2010	140	100%	90%	92.3%	90.5%	100%
Our study/2014	2014	75%	100%	100%		93%

Table 4: Comparison of our Study of FNAC with other Studies.^{10,11,12,13}