VOLUME-9, ISSUE-4, APRIL -2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper ENT

ACCURACY OF FINE NEEDLE ASPIRATION CYTOLOGY IN THYROID SWELLING

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ABSTRACT **Introduction:** Several studies support the emergence of FNAC as a sensitive and specific test for the diagnosis of thyroid swellings, allowing definitive initial surgery and avoiding unnecessary procedures. The purpose of this study was to evaluate the accuracy of FNAC in thyroid swellings. **Methodology:** All the patients who have thyroid swelling satisfying the inclusion criteria were included in the study, after obtaining informed consent. A total of 50 patients were thus included. This study was conducted in a tertiary care medical college hospital over a period of 18 months. **Statistical Analysis:** Statistical test used to analyse data is Mc Nemar chi-square test **Results:** The overall sensitivity of fine needle aspiration cytology in thyroid swelling in our study was 60%; Specificity was 88.9%; positive predictive of 37.5% and negative predictive value of 95.2%. We conclude that FNAC is a good preoperative diagnostic tool.

KEYWORDS :- : FNAC, thyroid swelling, histopathology

Introduction:

Thyroid swellings are one of the commonly seen conditions in clinical practice with different presentations. The manifestation varies from a simple symptom like swelling to compressive symptoms like dysphagia and dyspnoea. Majority of the swellings are benign, however, up to 5% can be malignant. [1] Recent literature suggests that each patient with thyroid nodule should undergo a complete evaluation that includes a detailed history and examination followed by thyroid function tests, ultrasonography and FNAC.[2] FNAC is the most appropriate investigation to define the nature of a thyroid nodule and decide about the need for surgical intervention.[3] Because of its simplicity and excellent patient acceptance, the fine needle aspiration technique, in many cases, provides a diagnostic short cut and gives results within hours of performance. It also helps the clinician to decide aboutany other additional investigation which may be needed, the type and extent of surgery required for cytologically diagnosed neoplasms.

However, it has to be kept in mind that, cytological study of needle aspirate is not claimed to solve all of the diagnostic problems presented by the thyroid nodules, nor is the method devised as a substitute for histological examination. This study aims at determining the accuracy i.e. sensitivity and specificity of FNAC when compared with final histopathological report.

Materials and methods

A prospective cross-sectional study consisting of group of fifty patients presenting with thyroid swelling was performed at a tertiary care medical college hospital over a period of 18 months. All these patients were subjected to various investigations including thyroid function test, ultrasound of the neck and FNAC following which the treatment was initiated.The main component of this study (FNAC) was performed as per prescribed standard technique.These findings were then correlated with the histopathological diagnosis. Same technician/pathologist conducted FNAC procedure and observed the slides to avoid the chance of inter observer variability. All those patients with thyroid swelling, who visited the hospital for the surgical treatment were included in the study after taking their consent. Patients less than 12 years and those who were not willing to undergo surgery were excluded. Clearance was taken from the institutional ethics committee before starting the study.

The cytological diagnosis was based upon palpation of the mass, degree of resistance at the aspiration biopsy, combined with microscopic examination of the aspirated cells. The final cytological report was described as benign, malignant, suspicious, or unsatisfactory (inadequate) due to insufficient epithelial cells being present. In unsatisfactory reports, the procedure was repeated.All the patients underwent thyroid surgery either hemithyroidectomy or total thyroidectomy. The specimen was sent for Histopathological examination for confirmation of the final diagnosis.

Observations and results:

In the 50 patients selected for our study, the age ranged from 15 years to 67 years with an average of 37.02 +/-10.9 years. The most common age group having thyroid swelling was 31-40 years. The age incidence for the benign lesions ranged from 20 years to 60 years (mean age 37.8 +/- 9.2 years). The age incidence for the malignant lesions ranged from 15 to 67 years (mean age 30 +/- 21.2 years). The female to male sex ratio is 5:1. In females, 92.8% of the thyroid swellings were benign in nature and 7.2% were malignant. In males 75% of thyroid swellings were benign and 25% were malignant. The malignancy rates were slightly higher in males as compared to females. Majority of the patients with benign disease had symptom for 1-5 years. The mean duration was 3.5 years. All the patients with malignancy had symptoms for less than 2 years. 94% of the patients studied had insidious onset of symptoms. Only three of the 50 patients [6%] had sudden onset of the symptoms. All three were females below 22 years. 6% of the rapidly progressing swelling was diagnosed as papillary carcinoma. All the patients with sudden onset and rapidly progressing swelling had malignancy on histopathological examination.

In our study, all [100%] the patients presented with thyroid swelling, of which 72% did not have any symptoms other than swelling. 24% of the patients complained of pain or discomfort in the neck. Hypothyroid symptoms were present in 4% of the patients. None of the patients showed signs of toxicity. In our study, 90% of the patients were euthyroid. In 6% of the patients TSH values were decreased. All 4% had normal T3 and T4 values. TSH values were increased in only 2% of the patients but with normal T3 & T4 values. Thus, subclinical hyperthyroidism was present in all of them. In majority of the cases where the FNAC was benign it proved to be benign MNG on postoperative histopathological examination. 84% of the thyroid lesions were diagnosed as benign by FNAC and 6% were diagnosed as malignant. All of malignant lesions were papillary carcinoma. 10% of patients were diagnosed as follicular neoplasm (suspicious). Colloid nodular goitre was the most common diagnosis made by FNAC [76%], Follicular neoplasm [10%] was the next common diagnosis, followed by papillary carcinoma (6%). Inconclusive FNAC results were

repeated. Histopathology showed Forty-five [90%] out of 50 patients had benign thyroid lesion. Remaining five [10%] patients had malignancy. MNG was the most common [84%] diagnosis followed by papillary carcinoma [10%]. Table No.1 and 2 show the FNAC and the final histopathology reports of the cases.

Table 1 The result of the fine needle aspiration cytology (n=50)

Diagnosis	Percentage	Number of cases
Colloid nodular goitre[CNG]	76%	38
Haemorrhagic nodule	2%	1
Cystic lesion	6%	3
Papillary carcinoma	6%	3
Follicular neoplasm[suspicious]	10%	5
Hashimoto's thyroiditis	00%	0

Table 2: Histopathology of the lesions (n = 50)

Diagnosis	Number of cases	Percentage
MNG	42	93.4%
Hashimoto's thyroiditis	2	4.3%
Follicular adenoma	1	2.3%
Papillary malignancy	5	10%
Total	45	100%

Discussion:

Accurate diagnosis of cancer in thyroid swelling has been a diagnostic dilemma since long. Thyroid is an important and popular site for fine needle aspiration cytology. FNAC has been proven a very useful tool in diagnosis of various thyroid diseases. Through this study an attempt has been made to study the clinical presentation of thyroid swelling and correlate fine needle aspiration cytology report with postoperative histopathological report and to determine the accuracy of FNAC.

Analysis of the cytological reports in various series confirms the high diagnostic accuracy of fine needle aspiration cytology. In our study, 3 out of total 5 malignant cases were diagnosed by FNAC. Two case of papillary carcinoma was diagnosed as colloid goitre by FNAC, thus giving a false negative report. Five cases of benign lesions were diagnosed as suspicious preoperatively by FNAC, thus giving five false positive report. The overall sensitivity of fine needle aspiration cytology in thyroid swelling in our study was 60.00%, specificity was 88.9%, positive predictive of 37.5%, negative predictive value of 95.2% & diagnostic accuracy of 86%.(Table no.3 and 4) Present study correlates with study done by Edino ST et al, as majority of our patients with malignancy were of younger age group. This may be due to better awareness amongst younger generation about the disease and early seeking of medical attention due to cancer phobia.Edino et al states that 72% of malignant patients are females, and 28% are males.4 Thus our study correlates with these values. According to a study by Khalid et al, the average period before seeking help was 4 years.5 Our study shows similar result.

Analysis of the cytological reports in various series confirms the high diagnostic accuracy of fine needle aspiration cytology. Our values are comparable with other similar studies (Table 5). However, studies have shown that accuracy of FNAC may be improved when it is done under the guidance of USG neck.

Table 3: Correlation between FNAC and histopathology

		HISTOPATHOLOGY		TOTAL
		MALIGNANT	BENIGN	
FNAC	MALIGNANT [Positive]	3[a] True positive	5[b] False positive	8
	BENIGN [Negative]	2[c] False negative	40[d] True negative	42
TOTAL	5	45	50	

Table 4: FNAC and Histopathology analysis results

True positive	3 cases
False positive	5 cases
True negative	40 cases
False negative	2 cases
Sensitivity	60%
Specificity	88.9%
Positive predictive value	37.5%
Negative predictive value	95.2%
Diagnostic accuracy	86%

Table 5: Validity tests by various studies.

Name of study	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Bagga & Mahajan 6	66%	100%	100%	96%
Muhammed Saddique et al 7	75%	95.83%	81.81%	93.81%
Mundasad et Al 8	52.6%	86.6%	38.4%	90.4%
Hadi Al-Mosavi et al 9	80%,	96%	-	-
Ali k 10	89.7%	96.7%	-	-
Cap et al 8	86%	74%	34%	97%
Holleman 8	84%	52%	53%	83%
Newcastle 8	86%	67%	65%	87%
Our study	60%	88.9%	37.5%	86%

Conclusion:

Thyroid swelling is a common condition with a diverse aetiology. A wide range of age groups are affected. It can present in as low as second decade to as high as seventh decade of life. Fine needle aspiration cytology is a simple and least traumatic investigation. It can be easily done in the laboratory or at bedside with high degree of accuracy in trained hands.

FNAC is a valuable adjunct to careful clinical examination and evaluation of the patients with thyroid swelling. Due to its reasonably good accuracy, specificity and sensitivity FNAC may play a significant role in the diagnosis and management planning of thyroid swellings. It enables clinician to obtain diagnosis in high percentages of cases with minimal expenditure of time and money. However, a close cooperation is mandatory between clinician and pathologist. Taking samples from different regions of the nodule can decrease the false negative rate. Performing the test under ultrasound guidance will also help in improving the accuracy.

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