

Original Research Article

Clinico-cytoradiological correlation with histopathology in the diagnosis of thyroid nodule

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Received: 23 October 2020

Accepted: 03 December 2020

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ABSTRACT

Background: Thyroid nodules are commonly encountered in the surgical practice and accurate preoperative evaluation of thyroid disorder becomes mandatory for proper management of the patient. This study aimed to correlate preoperative FNAC and USG with postoperative histopathological diagnosis.

Methods: 50 patients who underwent surgical intervention for thyroid swelling from May 2016 to May 2017 were recruited. The study design consisted of a prospective correlation of preoperative FNAC and USG with postoperative histopathological diagnosis.

Results: Out of 50 patients 42 were female and 8 males. Overall sensitivity for FNAC was 66.66% and specificity of 97.36% and for USG, Sensitivity was 58.33% and specificity of 94.73%.

Conclusions: FNAC and USG are an essential procedure for preoperative assessment of thyroid swelling, but malignancy can still come as a surprise in postoperative histopathological examination. A combined opinion on the nature of a thyroid swelling should be done but still, the thyroid swelling continues to be an enigma and definitive diagnosis is possible only with excision and postoperative histopathological examination.

Keywords: FNAC, Histopathology, Thyroid nodule, Ultrasonography

INTRODUCTION

Goiter or Thyroid enlargement is an abnormal midline neck swelling due to too much or too little thyroid hormone. The problem in clinical practice is to distinguish reliably the few malignant tumors from the many harmless nodules so that a definitive preoperative tissue diagnosis of the malignancy allows the planning of appropriate surgery and relevant patient counseling. The prevalence of thyroid swelling varies amongst adult and pediatric populations, in adults it ranges from 4-10% and in children from 0.2-1.2%.¹ The majority of clinically diagnosed thyroid swelling is benign; only 5-30% are malignant and require surgical intervention.² In India, thyroid cancer comprises 1% of all head and neck cancers and 5% of all thyroid nodules. Fine-needle aspiration

cytology (FNAC) being simple, readily available, minimally invasive, and cost-effective has been applied routinely as a useful and indispensable method to diagnose thyroid lesions. FNAC has allowed a dramatic decrease in unnecessary surgeries without thyroid nodular disease, enhancing the percentage of malignant operated nodules to over 50%. High resolution ultrasonography (USG) detects nodules in 19-67% of cases, with higher frequencies in women and elderly persons.³ Accurate diagnosis of the thyroid nodules is necessary for appropriate clinical management of these patients. The majority of clinically diagnosed thyroid nodules were benign, and those requiring surgical intervention owing to malignant lesions were 5–20%.⁴ FNAC and USG have found to have their own limitations. Histopathological examination of the excised thyroid specimen is the

ultimate way to determine the pathology and give a definite diagnosis. This study was conducted to study the correlation of preoperative FNAC and USG with postoperative histopathology in the diagnosis of thyroid nodule in terms of sensitivity and specificity.

METHODS

The present study is a prospective study and was conducted on 50 patients in the Department of Otorhinolaryngology and Head and Neck Surgery of L.G General hospital and AMC MET Medical College, Ahmedabad from May 2016 to May 2017. The provisional diagnosis was made on the basis of history, physical examination of the neck, USG for the thyroid gland, thyroid profile, and FNAC. After primary workup, only those patients admitted to indoor and subsequently underwent thyroid surgery were included in this study. All the specimens were sent for histopathological examination and reports were compared with preoperative USG and FNAC reports. In all cases, informed consent was taken prior to surgery.



Figure 1: Clinical photo of thyroid swelling.



Figure 2: Hemithyroidectomy specimen.

RESULTS

Out of 50 thyroid swellings, patients were grouped in age groups of 11-20; 21-30; 31-40; 41-50; 51-60 and 61-70 years and patients in each age group were 1 (2%); 12 (24%); 17 (34%); 9 (18%); 5 (10%) and 6 (12%) respectively. Most numbers of the patients were between the age group of 31-40 years, the youngest being 19 years and the oldest was 70 years female. Female were higher in frequency (n=42; 84%) than male (n=8; 16%). All patients presented with a progressive increase of swelling in the midline neck with 10% cases presenting with pressure symptoms such as discomfort in swallowing while the rest were operated for cosmetic reasons and for confirmation of follicular lesions. The maximum number of patients were suffering from goitre for the last 6–12 months. 17 patients had swelling of the thyroid for <6 months while there were 13 patients who had goitre for >60 months duration. Based on clinical examination 24 patients were solitary thyroid nodule and 6 patients were multinodule. A routine thyroid function test was done in all patients, and all were found to be in the euthyroid state.

Table 1: Distribution of various conditions by ultrasonography findings.

USG diagnosis	No. of cases
Benign thyroid nodule	7
Colloid cyst	33
Multinodular goiter	5
Hashimoto thyroiditis	1
Thyroid malignancy	4
Total	50

USG findings showed 33 cases of colloid goitre, 12 cases showed benign thyroid nodule and 4 cases showed thyroid malignancy followed by thyroiditis in 1 case (Table 1). On FNAC, 32 patients had colloid nodule, 4 patients were follicular neoplasm, 8 patients were adenomatous hyperplasia and 1 had lymphocytic thyroiditis (Table 2). Five patients had malignant lesions which included 3 with papillary carcinoma and 2 with medullary carcinoma thyroid.

Table 2: Distribution of various conditions by FNAC findings.

Cytological reporting	No. of cases
Colloid goiter	32
Follicular neoplasm	4
Adenomatous hyperplasia	8
Lymphocytic thyroiditis	1
Papillary carcinoma	3
Medullary carcinoma	2
Total	50

Among patients, 36 patients underwent hemithyroidectomy and 14 underwent total

thyroidectomy. Out of 14 total thyroidectomy patients, 5 patients having proven preoperative malignancy cases; 4 having follicular neoplasm in which primarily hemithyroidectomy was performed and tissue sent for frozen section, 3 cases turnout malignant and total thyroidectomy was performed. Neck dissection was performed in 2 papillary and 2 medullary carcinoma patients and later 2 patients were referred for postoperative radiotherapy. 4 patients with multinodular goitre which involved both the lobes of the thyroid and 1 with Hashimoto's thyroiditis underwent total thyroidectomy. 1 patient with medullary carcinoma thyroid had unilateral temporary recurrent laryngeal nerve palsy which was recovered successfully after 1 month.

On final diagnosis as per histopathological evaluation (HPE), 38 patients out of a total of 50 patients had benign lesions which included 28 patients of colloid goitre, 9 with follicular adenoma, and 1 with lymphocytic thyroiditis. 12 out of a total of 50 patients had malignant lesions (Table 3).

Table 3: Correlation of cytoradiological findings with histopathology.

Cytoradiological findings	FNAC	USG	HPR
Colloid goitre	32	33	28
Follicular neoplasm/multinodular goiter	4	5	3
Follicular adenoma/benign thyroid nodule	8	7	9
Thyroid malignancy	5	4	9
Hashimoto's thyroiditis	1	1	1

Sensitivity shows the portion of the patients having malignant thyroid disease and positive diagnosis. Specificity shows the portion of the patients with non-malignant thyroid disease and positive diagnosis. Accuracy is the portion of the correct results, true positive and true negative concerning all cases studied. Sensitivity, specificity and accuracy for FNAC and USG was 66.66%, 97.36%, 90%; 58.33%, 94.73%, 86% respectively (Table 4).

Table 4: Comparison of sensitivity specificity and accuracy of USG and FNAC.

	FNAC (%)	USG (%)
Sensitivity	66.66	58.33
Specificity	97.36	94.73
Accuracy	90	86

DISCUSSION

Nodular thyroid disease is relatively common and is detected in 3-7% of the adult population worldwide. They are common in females with a ratio of 5:1 and the

prevalence mainly depend on age, sex, iodine intake, diet (goitrogens), and therapeutic and environmental exposure.

FNAC contributes significantly to the preoperative investigation in patients with thyroid swelling but despite its well-recognized value, there are limitations to the technique. The reported pitfalls are those related to specimen adequacy sampling techniques, the skill of the aspirator performing the aspirations, the experience of the cytopathologist interpreting the aspirate, and overlapping cytological features between benign and malignant follicular neoplasms and inadequate and indeterminate FNA. One major limitation of thyroid cytology is its inability to distinguish between follicular adenoma from follicular carcinoma for this diagnosis one requires detailed histological examination for vascular or capsular invasion and cannot be reliably made on routine FNAC specimens.⁵

The basic use of sonography in the nodular thyroid is to determine the location of the palpable neck mass, characterize the nodule as benign or malignant, know about the extent of thyroid malignancy, and guide fine-needle aspiration of the thyroid nodule or cervical lymph node.⁶ The categorization of thyroid nodules into benign and malignant nodules by USG is very important as it helps in the further management of the patients with nodular thyroid disease. Ultrasound has become the first-line imaging modality for the evaluation of the thyroid gland due to the excellent visualization of the thyroid parenchyma. It is highly sensitive in detecting small nodules, calcification, septations, and cysts as well as in guiding fine-needle aspiration biopsies. USG of thyroid also revealed hypoechoic nodules, taller than wide pattern, central vascularity and ill-defined margins which also aid in suspecting of malignant nodule.⁷

In the present study, the age of the patients ranged from 19 to 70 years whereas, in the study of Singh et al. 2000, of 108 cases, the age range was 12-80 years.⁸ 17 patients had swelling of the thyroid for <6 months while there were 13 patients who had goitre for >60 months duration. Handa et al studied the thyroid swelling and the maximum number of patients 62.2% had thyroid lesions with symptoms >1 year.⁹ Female were higher in frequency (n=42; 84%) than male (n=8; 16%) and female: male ratio was 5.25:1.

Ultrasound suggested 33 cases of colloid goitre/thyroid nodule, 12 cases of a benign thyroid nodule, and 4 cases showed thyroid malignancy followed by thyroiditis in 1 case. Walker et al. showed 20-40% prevalence of multinodularity in clinically examined solitary nodules.¹⁰

On FNAC, 32 patients had colloid nodule, 4 patients were follicular neoplasm, 8 patients were adenomatous hyperplasia and 1 had lymphocytic thyroiditis. Five patients had malignant lesions which included 3 papillary carcinoma and 2 medullary carcinomas. The study

reported by Md. Shafiqul Islam showed 78% non-neoplastic and 22% neoplastic. (papillary carcinoma 15.56%, and follicular lesion 3.3%)¹¹

In the present study, 12 nodules, which were given as follicular lesions on FNAC, out of which 3 were diagnosed as follicular carcinoma and 9 were follicular adenomas at histopathology. 4 patients with colloid goiter on FNAC turn out to be papillary carcinoma on final HPE. All the malignant nodules on FNAC were found to be papillary carcinoma and medullary carcinoma thyroid. On USG, 12 nodules were benign thyroid/follicular nodule, out of which 3 turn out to be malignant and 9 were benign nodules. 5 out of 33 colloid goiters turned malignant on HPE.

In our study we found sensitivity, specificity and accuracy for FNAC and USG was 66.66%, 97.36%, 90%; 58.33%, 94.73%, 86% respectively. Several international studies have documented the sensitivity of FNAC in thyroid nodules to range from 52-98%.⁵ Similarly, the international normal range is for specificity is 72 to 100%.⁵ Overall sensitivity and specificity of USG is comparable with study conducted by Gyawali et al.⁷

CONCLUSION

Thyroid disorders are a common endocrinological disorder which may present as single or multiple nodules. FNAC and USG are essential procedure for pre-operative assessment of thyroid swelling and both have their limitations. Malignancy can still come as a surprise in postoperative histopathological examination. Hence preoperative cytoradiological investigations should be done but thyroid swelling still continues to be an enigma and definitive diagnosis is possible only with excision and postoperative histopathological examination.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kansara AA, Kansara AH. Clinico-cytoradiological correlation with histopathology in the diagnosis of thyroid nodule. *Int J Otorhinolaryngol Head Neck Surg* 2021;7:79-82.