

Original Research

Usefulness of USG in assessing thyroid nodule

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ABSTRACT:

Background: The disease of thyroid form a major share of head and neck surgery. Clinical examination although very accurate in most cases, is inadequate in some areas especially in staging of thyroid malignancies and in detecting the multinodularity of the gland. The present study was conducted to assess usefulness of USG in managing thyroid nodule.

Materials & Methods: 65 patients complaining of swelling in front of neck of both genders were examined locally to determine its location, size, shape, consistency, tenderness, mobility, tracheal position and whether it moves with deglutition, and any thyrotoxicosis symptoms. In all electrocardiography was performed followed by ultrasonography with or without colour doppler. Thyroid function was assessed by estimation of Thyroid stimulating hormone (anterior pituitary hormone), Free Thyroxine (T4) and free triiodothyronine (T3). These radioimmunoassay-based tests are sensitive and gives accurate measurement of biologically active thyroid hormone. Fine needle aspiration cytology (FNAC) was done in all cases.

Results: Out of 65 patients, 26 were males and 39 were females. Symptoms were pain over swelling in 32, respiratory difficulty in 14, difficulty in swallowing in 10 and change in voice in 9 cases. Side was right lobe in 24, right lobe with isthmus in 21 and bilateral in 20 cases. The difference was significant ($P < 0.05$). FNAC and USG had sensitivity of 74% and 67%, specificity of 100% and 93%, PPV of 100% and 75% and NPV of 93% and 89% respectively. The difference was non-significant ($P > 0.05$). **Conclusion:** The USG and FNAC are useful tools in evaluating thyroid nodule along with HPE being taken as the final diagnosis.

Keywords: thyroid, FNAC, USG

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INTRODUCTION

The disease of thyroid form a major share of head and neck surgery. Clinical examination although very accurate in most cases, is inadequate in some areas especially in staging of thyroid malignancies and in detecting the multinodularity of the gland.¹ The advancement in the management of thyroid pathology has been possible, thanks to the development in the field of imaging radiology.²

Three groups of solitary nodules can be distinguished based on their morphology and structure. The most prevalent is adenomatous goitre, which only occurs in one location. The second is a well-encapsulated adenoma that tends to squeeze nearby normal thyroid tissue due to its distinct development pattern.³ The cancerous nodules come in third. Additionally, it can be separated into malignant (Papillary, Follicular, Medullary, and Anaplastic) and benign (Colloid,

Hyperfunctioning nodule) categories.⁴ It is debatable if a nodular goitre is malignant. It has been asserted that a single nodule is more likely to undergo malignant transformation than a multinodular goitre. Since thyroid nodule hypofunction and hyperfunction are common, determining the cause requires a comprehensive evaluation.⁵ Most significantly, the use of ultrasound in preoperative assessment has improved the head and neck surgeon's toolkit.

The most thorough and economical imaging technique for assessing the thyroid gland is ultrasound of the neck, which is also very sensitive in identifying thyroid and cervical lymph node abnormalities.⁶ In India, thyroid disorders are common, particularly multinodular goiter brought on by an iodine deficit. The largest goiter belt in the sub-Himalayan region of the world is found in India. Certain ultrasonologic characteristics that aid in the treatment of thyroid

problems and the differentiation of benign from malignant lesions have been established by ultrasonographers.⁷The present study was conducted to assess usefulness of USG in evaluating thyroid nodule.

MATERIALS & METHODS

The study was carried out on 65 patients complaining of swelling in front of neck of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. The swelling was examined locally to determine its location, size, shape, consistency, tenderness, mobility, tracheal position and whether it moves with deglutition, and any thyrotoxicosis symptoms. A

comprehensive examination of the throat, nose, ears, and systemic was performed. Every patient underwent a blood sugar, kidney, and full blood count test. In each instance, electrocardiography was performed followed by ultrasonography with or without colour doppler. Thyroid function was assessed by estimation of Thyroid stimulating hormone (anterior pituitary hormone), Free Thyroxine (T4) and free triiodothyronine (T3). These radioimmunoassay-based tests are sensitive and gives accurate measurement of biologically active thyroid hormone. Fine needle aspiration cytology (FNAC) was done in all cases to know the underlying thyroid disease. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 65		
Gender	Male	Female
Number	26	39

Table I shows that out of 65 patients, 26 were males and 39 were females.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Symptoms	Pain over swelling	32	0.05
	respiratory difficulty	14	
	difficulty in swallowing	10	
	change in voice	9	
Side	Right lobe	24	0.88
	right lobe with isthmus	21	
	Bilateral	20	

Table II, graph I shows that symptoms were pain over swelling in 32, respiratory difficulty in 14, difficulty in swallowing in 10 and change in voice in 9 cases. Side was right lobe in 24, right lobe with isthmus in 21 and bilateral in 20 cases. The difference was significant (P< 0.05).

Graph I Assessment of parameters

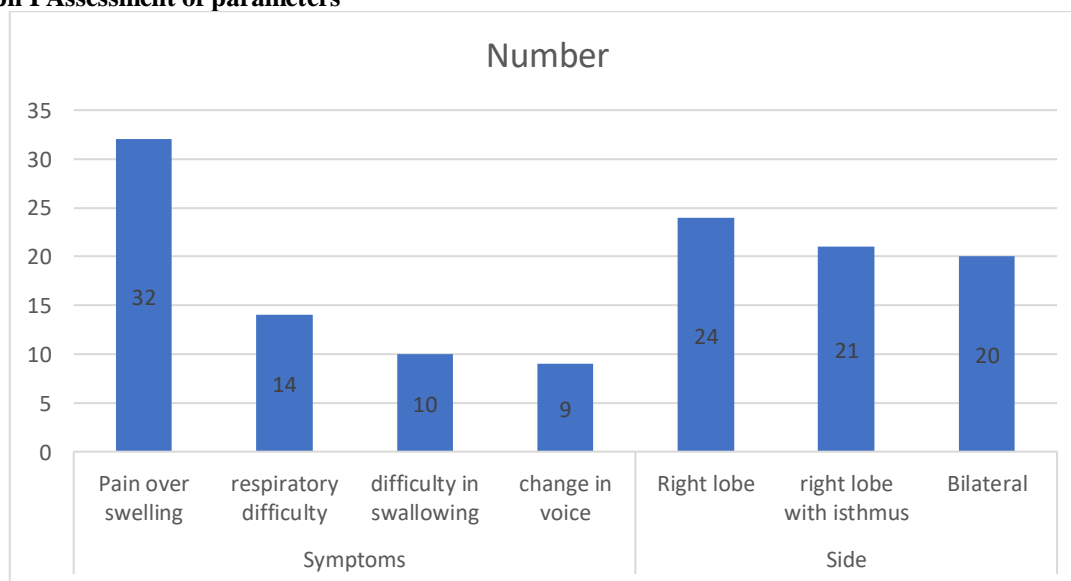


Table III Comparison of FNAC, USG and histopathology

Efficacy (%)	FNAC	USG	P value
Sensitivity	74%	67%	0.83

Specificity	100%	93%	
PPV	100%	75%	
NPV	93%	89%	

Table III shows that FNAC and USG had sensitivity of 74% and 67%, specificity of 100% and 93%, PPV of 100% and 75% and NPV of 93% and 89% respectively. The difference was non-significant ($P > 0.05$).

DISCUSSION

Thyroid nodules are common. The prevalence of palpable thyroid nodules is around 3.2–4.2%. Palpation is the most frequently-used screening method for detection of thyroid nodules.⁸ Development in technology has increased the accuracy and sensitivity of many imaging modalities, resulting in the diagnosis of subclinical nodules in the adrenal, pituitary, and thyroid glands.⁹ The present study was conducted to assess usefulness of USG in evaluating thyroid nodule.

We found that out of 65 patients, 26 were males and 39 were females. Won-Jin Moon et al¹⁰ evaluated the diagnostic accuracy of ultrasonographic (US) criteria for the depiction of benign and malignant thyroid nodules by using tissue diagnosis as the reference standard. A total of 831 patients (716 women, 115 men; mean age, 49.5 years \pm 13.8 [standard deviation]) with 849 nodules (360 malignant, 489 benign) that were diagnosed at surgery or biopsy were included in this study. Three radiologists retrospectively evaluated the following characteristics on US images: nodule size, presence of spongiform appearance, shape, margin, echotexture, echogenicity, and presence of microcalcification, macrocalcification, or rim calcification. Statistically significant ($P < .05$) findings of malignancy were a taller-than-wide shape (sensitivity, 40.0%; specificity, 91.4%), a spiculated margin (sensitivity, 48.3%; specificity, 91.8%), marked hypoechoogenicity (sensitivity, 41.4%; specificity, 92.2%), microcalcification (sensitivity, 44.2%; specificity, 90.8%), and macrocalcification (sensitivity, 9.7%; specificity, 96.1%). The US findings for benign nodules were isoechoogenicity (sensitivity, 56.6%; specificity, 88.1%; $P < .001$) and a spongiform appearance (sensitivity, 10.4%; specificity, 99.7%; $P < .001$). The presence of at least one malignant US finding had a sensitivity of 83.3%, a specificity of 74.0%, and a diagnostic accuracy of 78.0%. For thyroid nodules with a diameter of 1 cm or less, the sensitivity of microcalcifications was lower than that in larger nodules (36.6% vs 51.4%, $P < .05$).

We found that symptoms were pain over swelling in 32, respiratory difficulty in 14, difficulty in swallowing in 10 and change in voice in 9 cases. Side was right lobe in 24, right lobe with isthmus in 21 and bilateral in 20 cases. Shereen Ezzat et al¹¹ examined the prevalence of thyroid nodules in asymptomatic North American subjects, with palpation findings compared with findings on high-resolution ultrasonography. Palpable nodules were identified in 21 (21%) of 100 subjects, with nine solitary nodules (9%) and 12 multiple nodules (12%). In comparison,

only 33 subjects were found to be free of any nodules by ultrasonography. Of the 67 subjects with abnormal ultrasound findings, 22 had solitary nodules (22%) and 45 had multiple nodules (45%). The prevalence of nodules was greater in women (72%) than in men (41%) ($P < .02$). A concordance rate of 49% was noted between ultrasound and findings by palpation.

We found that FNAC and USG had sensitivity of 74% and 67%, specificity of 100% and 93%, PPV of 100% and 75% and NPV of 93% and 89% respectively. Taheri MS et al¹² determined the prevalence of incidental thyroid nodules in four hundred and ten consecutive patients who attended for color Doppler ultrasound of carotid or other sites of the neck—other than the thyroid gland. They found one or more nodules in 210 (51.2%) of our patients. The mean (\pm SD) age of patients with incidental thyroid nodules was 62.9 \pm 13.1 (range: 14–100) years. The nodules were unilateral in 56.5% and bilateral in 43.5% of the patients. Incidental thyroid nodules were detected in 46.9% of men and 58.8% of women ($P=0.017$). Among patients, 61% had only one nodule. The mean (\pm SD) largest diameter of nodules among those with only one nodule was 10.67.9 mm while it was 14.211 mm among those with more than one nodule ($P=0.03$).

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that the USG and FNAC are useful tools in evaluating thyroid nodule along with HPE being taken as the final diagnosis.

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