IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 22, Issue 11 Ser.4 (November. 2023), PP 34-37
www.iosrjournals.org

Evaluation Of Thyroid Nodules By High Resolution Ultrasonography With Histopathological Correlation

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Abstract
Aims and objectives*: To identify morphologic patterns on High Resolution Sonography (HRS) those are predictive of benign and malignant nodules and to evaluate the efficacy of histopathology and HRS in differentiating benign and malignant nodules.*
Materials and methods*: Over a period of 15months, 50 patients referred for USG neck to Alluri Sitaramaraju Academy of Medical Sciences, Eluru. who were diagnosed clinically with solitary thyroid nodule. Thyroid sonographic findings relevant to benign or malignant nodules were recorded and these findings were compared with histopathological reports.*
Results: Out of 50 cases OF SOLITARY THYROID NODULES, 36(72%) CASES WERE BENIGN AND 14(28%) were malignant. Among benign lesions, adenomas were the most COMMONEST GROUP COMPRISING 42%, FOLLOWED BY NODULAR GOITER 25%. Among malignant, papillary carcinomas weRE THE MOST COMMONEST GROUP 85.7%, followED BY FOLLICULAR CARCINOMA 14.2%. Majority of the patients are in the age group of 31-40 years. Among malignant lesions, papillary carcinoma was the most common and medullary was the least common type. FollicuLAR CARCINOMA WAS SEEN IN 2(14.2%) cases among malignant lesions. Out of 50 cases of solitary thyrOID NODULES EVALUATED AT USG, 31 weRE DIAGNOSED TO BE BENIGN, 19 were malignant, after HISTOPATHOLOGICAL EVALUATION, 33 out of 50 caseS WERE FOUND TO BE BENIGN AND 17 were malignant. Ultrasound is a safe, fairly accurate investigation to differentiate benign from malignant etiology with senSITIVITY OF 90.91 % AND SPECIFICITY OF 94.12 %. USG proved to be a more sensitive modality to differentiate benign from malignant lesions.
Conclusion: Thyroid nodules were common in the females of age group 31-45 years. Ultrasound is a safe, fairly accurate investigation to differentiate benign from malignant etiology with sensitivity of 90.91 % AND SPECIFICITY OF 94.12 %. Ultrasound features of thyroid nodules are useful to distinguish patients with clinically significant thyroid nodules from those within nocuous nodules despite the overlap of findings
Keywords:*Solitary thyroid nodule; High resolution sonography; Histopathology; Sensitivity; Specificity*

Date of Submission: 11-11-2023 Date of Acceptance: 20-11-2023

I. Introduction

Thyroid nodules are a common clinical condition. Increasing with patient age, thyroid nodules are found in up to 20% of adults by palpation and in up to 70% on sonographic studies; the malignancy rate is 7-15% [1].Non-palpable thyroid nodules may be found in about 50% of patients with a clinically palpable solitary nodule, but they are also incidentally detected by imaging studies performed for various reasons [2].Sonography is a choice of investigation in evaluation of thyroid nodules. The high resolution of ultrasound has resulted in discovery of large number of thyroid nodules which are obscure clinically. Many ultrasound features have been described to differentiate benign and malignant nature of the lesion [3].Color and/or power Doppler ultrasound are useful to evaluate vascularity of the thyroid gland and focal masses [4]. Although sonographic guidelines have been established by society of Radiologists in ultrasound, the American thyroid association and European thyroid association, there is no specific ultrasound features in differentiating benign and malignant lesions

[3].Sonographic features that increase the likelihood that a nodule is malignant include size, interval growth, marked hypoechogenicity, and irregular margins and the presence of Microcalcifications, lymphadenopathy, and local invasion of adjacent structures.Prediction of malignancy using ultrasound remains difficult. Since there is overlap of sonographic features between benign and malignant thyroid nodules, ultrasound features are usually corroborated with FNAC/Histopathology results in differentiating various thyroid nodules [5].Fine needle aspiration biopsy is considered the most reliable diagnostic test for evaluation of thyroid nodules and has a low rate of complications, especially when ultrasound guidance is usedRecognition of specific morphologic patterns is an accurate method of identifying benign thyroid nodules that may substantially decrease the number of unnecessary biopsy procedures [5].The goal in evaluating a thyroid nodule is to determine whether it is benign or malignant so that patients with thyroid cancer can receive a diagnosis and undergo treatment at an earlier stage to reduce possible morbidity and mortality due to the disease, while avoiding unnecessary tests and surgery in patients with benign nodulesThe purpose of this study is to evaluate accuracy of sonographic morphologic feature oriented approach in identification of benign and malignant thyroid nodule [3].Current study designed to identify morphologic patterns on High Resolution Sonography (HRS) those are predictive of benign and malignant nodules and to evaluate the efficacy of histopathology and HRS in differentiating benign and malignant nodules.

II. Materials and Methods

The study was conducted at Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhrapradesh. All the patients who were diagnosed clinically with solitary thyroid nodule referred for USG neck for a period of 15 months were includedHigh resolution ultrasonography of neck performed by using PHILIPS AFFINITY 50G & ESAOTE with 5-10 MHz transducers.Thyroid sonographic findings relevant to benign or malignant nodules were recorded.The sonographic findings were compared with histopathology reports of the thyroidectomy specimen.

III. Results

The present study deals with HRS of the thyroid that are diagnosed clinically with solitary thyroid nodule and determination of diagnostic accuracy of HRS with histopathology findings.Benign lesIONS OF STN WERE MORE COMMON (72%) when COMPARED TO malignant lesions (28%).The commonest age group with thyroid pathology is between 31- 40 years (40%).Out of 50 cases, 38(76%) cases were females and 12(24%) cases were males.The female group showed occurrence of malignancy almost in all from 3rd to 6th decade with maximum occurrence in 4th decade.Out of 12 male patients 5 were benign nodules and 7 were malignant nodules. In males malignant lesions were more common in 3rd and 5th decade.Out of 50 CASES, HISTOPATHOLOGY REVEALED 36(72%) WERE BENIGN AND 14(28%) were malignant.The most common lesion WAS BENIGN FOLLICULAR ADENOMA 15 cases among benign leSIONS AND PAPILLARY CARCINOMA 12 cases among malignant lesions.

IV. Discussion

The number of males in the present study was 38(76%) CASES WERE FEMALES AND 12(24%) CASES WERE MALES. Sex distribution was similar when compared to Tsegaye et al. [9]. The higher incidence of single nodules in females is more or less constant for all age groups.The incidence of STN is more common in females than males.The highest age incidence in the present study as well as other studies was between 21-50 years, the maximum being 31-40 years.A solitary thyroid nodule presenting after 50 years of age primarily neoplastic. The carcinoma in younger patients is more often of a lower grade than in older patients who tend to have a more aggressive form of malignancy.Watters et al. (1992) 41 found that four specific morphologic features are predictive of benign thyroid nodules were identified which had 100% specificity for benignity.Watter et al. interpreted an USG report as suggestive of benign, if the nodule was suggesting benign includes purely cystic/cystic with thin septa, isoechogenicity, hyperechogenicity, well defined margins, peripheral complete thin halo, comet tail artifact, egg shell/coarse calcifications, peripheral vascularityUSG report as suggestive of malignancy includes Hypoechogenicity, Poorly defined margins, Taller than wide shape, Incomplete peripheral halo, Microcalcifications, Intranodular vascularity

High resolution real-time USG is far better than clinical examination in detecting thyroid nodularity.

Walker et al. have shown that the prevalence of multi nodularity in clinically solitary thyroid nodules is between 20% and 40%, and it has been observed that for a thyroid nodule to be detected by palpation, it must be atleast 1 cm in diameter, while USG detects nodules as small as 3 mm in diameter.

Table 1:Age incidence of stn lesions.

Age (yrs)	No. of cases	Percentage %
21-30	10	20%

31-40	20	40%
41-50	10	20%
51-60	8	16%
61 and above	2	4%
total	50	100%

Table 2: Age and sex ratio of benign and malignant lesions

age	female		total	male		total
				Benign	malignant	
21-30	6	2	8	1	1	2
31-40	12	2	14	1	5	6
41-50	6	2	8	2	0	2
51-60	6	1	7	1	0	1
61 & above	1	0	1	0	1	1

Table 3: Distribution of lesions on usg.

Category	lesion	No. of cases
benign	cystic	6
	Hyperechoic	20
	isoechoic	10
malignant	Hypoechoic	11
	mixed	3

Table 4: Types of benign lesions.

Benign	No. of cases	Percentage%
Follicular adenoma	15	42%
Nodular goiter	9	25%
Multinodular goiter	7	19%
Colloid nodule	5	14%

Table 5: Types of malignant lesions.

Malignant	No. of cases	Percentage%
papillary carcinoma	12	85.7%
follicular carcinoma	12	14.2%
medullary carcinoma	0	0

Table 6: Benign: comparision of usg with histopathology.

	Histopathology			
		+	-	total
USG	+	30	1	31
	-	3	16	19
TOTAL		33	17	50

Table 7: Malignant: comparision of usg with histopathology.

	Histopathology			
		+	-	total
USG	+	12	8	20
	-	1	29	30
TOTAL		13	37	50

Table 8: Comparison of usg results.

Series	Sensitivity	Specificity
Waters et al	74%	83%
Jones et al	75%	61%
Present study	92.3%	78.3%

V. Conclusion:

Solitary thyroid nodule is one of the commonest thyroid disorders. Commonest presenting complaint is swelling in the anterior neck. Solitary thyroid nodules commonly occur between 21-59 yrs age group, the maximum being 31-40 yrs. Benign lesions are more common than malignant lesions. Among benign, adenomas are the most common lesions and among malignant, papillary carcinomas are the most common lesions. Ultrasound features of thyroid nodules are useful to distinguish patients with clinically significant thyroid nodules from those with innocuous nodules despite the overlap of findings. Sonographic findings can be useful when used alongside cytological results, especially in nodules with cytological results that are benign or suspicious for malignancy. Recognition of specific morphologic patterns is an accurate method of identifying benign thyroid nodules that may substantially decrease the number of unnecessary biopsy procedures.

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