

Original article:

Study to Determine the Diagnosis of Malignancy for Thyroid Nodule by Ultrasound Findings at a Tertiary Care Centre

Mahesh Kumar Singh

Assistant Professor, Department of Radio Diagnosis, Rama Medical College Hospital & Research Centre, Pilkhuwa, Hapur, Uttar Pradesh, India.

Corresponding Author: Dr. Mahesh Kumar Singh, Assistant Professor, Department of Radio Diagnosis, Rama Medical College Hospital & Research Centre, Pilkhuwa, Hapur, Uttar Pradesh, India.

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Abstract

Background: Thyroid malignancy is the most common endocrine cancer and there has been an increase in the global incidence of thyroid cancer over the last few decades. The present study was conducted to determine the diagnosis of malignancy for thyroid nodule by ultrasound findings.

Materials and Methods: Present cross-sectional study was carried out among 240 females reported to Department of Radio Diagnosis, Rama Medical College Hospital & Research Centre, Pilkhuwa, Hapur, Uttar Pradesh, India. A detailed examination of the neck for any cervical lymphadenopathy was carried out by the ultrasound examination of thyroid. The data obtained were tabulated and analyzed using Statistical Package for the Social Sciences, Version 21.0 (SPSS, Chicago, IL). The results were considered significant when $p < 0.05$.

Results: In the present study total 240 females were included in the study. 29.56% were anechoic mixed thyroid nodule, 40.74% were Hyper solid thyroid nodule. 28.33% were Anechoic thyroid nodules. 52.68% were Poorly defined mixed thyroid nodule, 59.25% were poorly defined solid thyroid nodule. 54.16% were Poorly defined thyroid nodule. In 55.91% mixed thyroid nodule halos was present, in 51.85% solid thyroid nodule halos was present. Halos were present in maximum thyroid nodules (55%). In 51.61% mixed thyroid nodule Calcification was present, in 44.44% solid thyroid nodule calcification was present. Calcification was present in 50% thyroid nodules. Radiological finding showed that 79.56% mixed thyroid nodule were benign. 53.70% solid thyroid nodules were benign. 73.75% thyroid nodules were benign. Clinical finding showed that 81.18% mixed thyroid nodule were benign. 61.11% solid thyroid nodules were benign. 76.66% thyroid nodules were benign.

Conclusion: This study concluded that ultrasonographic evidences are reliable enough for the diagnosis of the benign and malignant thyroid tumours.

Key words: Ultrasonography, Thyroid Nodule, Cervical Lymphadenopathy.

INTRODUCTION

Over Thyroid nodules are one of the most common endocrine diseases in the world. They affect approximately 4 to 7% of the population in iodine-sufficient areas, with a markedly increased incidence in iodine-deficient regions.¹ Thyroid nodules have been defined by the American Thyroid Association (ATA) as “discrete lesions within the

thyroid gland, radiologically distinct from surrounding thyroid parenchyma.”² Thyroid nodules are classified as adenomas, carcinomas, or hyperplastic lesions based on their macroscopic and microscopic histological features.^{1,3} Thyroid nodules occur with relatively high frequency in the general population with prevalence of 4%–7% by palpation alone and 13%–67% by sonographic

evaluation.^{4,5} Thyroid nodules are 4 times more common in women than men and their frequency increases with age and low iodine intake.⁶ Imaging modality of choice for the investigation of thyroid nodules is high resolution ultrasound. Ultrasonography is the modality of choice for initial characterization of a thyroid nodule.⁷ Ultrasound is helpful in distinguishing malignant from benign thyroid nodules.⁸ Sonographic features of thyroid nodules that have been extensively evaluated in the literature include solid versus cystic composition, hypoechoic appearance, microcalcifications, rim calcifications, taller-than-wide shape, and internal vascularity.⁹⁻¹² The present study was conducted to determine the diagnosis of malignancy for thyroid nodule by ultrasound findings.

MATERIALS AND METHODS

Present cross-sectional study was carried out among 240 females reported to Department of Radio Diagnosis, Rama Medical College Hospital & Research Centre, Pilkhuwa, Hapur, Uttar

Pradesh, India. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and written informed consent was obtained from every patient. This study includes females with either suspected or confirmed thyroid nodules of more than 1 cm and who underwent ultrasonography. A detailed examination of the neck for any cervical lymphadenopathy was carried out by the ultrasound examination of thyroid since metastatic cervical lymph nodes are commonly seen in thyroid cancers and may have an effect on the surgical management and prognosis of patients. In these patients, high frequency 7.5-10.0 MHz probe was used for Ultrasound examination of a thyroid nodule. It includes diameter, echogenicity, composition, microcalcifications, Borders and Halo. Lew et al. guidelines ultrasound of nodule margins, suggestive of malignancy guidelines was adopted.¹³ The data obtained were tabulated and analyzed using Statistical Package for the Social Sciences, Version 21.0 (SPSS, Chicago, IL). The results were considered significant when $p < 0.05$.

Table 1: Ultrasound features of thyroid nodules

Features	Mixed n (%)	Solid n (%)	Total n (%)
Echogenicity			
Hypo	54(22.5%)	7(12.96%)	61(25.41%)
Iso	34(18.27%)	12(22.22%)	46(19.16%)
Hyper	43(23.11%)	22(40.74%)	65(27.08%)
Anechoic	55(29.56%)	13(24.07%)	68(28.33%)
Total	186(77.5%)	54(22.5%)	240(100%)
Margins			
Well defined	88(47.31%)	22(40.74%)	110(45.83%)
Poorly defined	98(52.68%)	32(59.25%)	130(54.16%)
Total	186(77.5%)	54(22.5%)	240(100%)
Halos			
Absent	82(44.08%)	26(48.14%)	108(45%)
Present	104(55.91%)	28(51.85%)	132(55%)
Total	186(77.5%)	54(22.5%)	240(100%)
Calcification			
Absent	90(48.38%)	30(55.55%)	120(50%)
Present	96(51.61%)	24(44.44%)	120(50%)
Total	186(77.5%)	54(22.5%)	240(100%)

Table 2: Radiological findings

Radiological diagnosis	Mixed n (%)	Solid n (%)	Total n (%)
Benign	148(79.56%)	29(53.70%)	177(73.75%)
Malignant	38(20.43%)	25(46.29%)	63(26.25%)
Total	186(77.5%)	54(22.5%)	240(100%)

Table 3: Clinical findings

Clinical diagnosis	Mixed n (%)	Solid n (%)	Total n (%)
Benign	151(81.18%)	33(61.11%)	184(76.66%)
Malignant	35(18.81%)	21(38.88%)	56(23.33%)
Total	186(77.5%)	54(22.5%)	240(100%)

RESULTS

In the present study total 240 females were included in the study. 29.56% were anechoic mixed thyroid nodule, 40.74% were Hyper solid thyroid nodule. 28.33% were Anechoic thyroid nodules. 52.68% were Poorly defined mixed thyroid nodule, 59.25% were poorly defined solid thyroid nodule. 54.16% were Poorly defined thyroid nodule. In 55.91% mixed thyroid nodule halos was present, in 51.85% solid thyroid nodule halos was present. Halos were present in maximum thyroid nodules (55%). In 51.61% mixed thyroid nodule Calcification was present, in 44.44% solid thyroid nodule calcification was present. Calcification was present in 50% thyroid nodules. Radiological finding showed that 79.56% mixed thyroid nodule were benign. 53.70% solid thyroid nodules were benign. 73.75% thyroid nodules were benign. Clinical finding showed that 81.18% mixed thyroid nodule were benign. 61.11% solid thyroid nodules were benign. 76.66% thyroid nodules were benign.

DISCUSSION

Ultrasonography is the imaging study of choice for thyroid nodules. It can identify nodules too small to be palpated, the presence of multiple nodules, central, or lateral neck lymphadenopathy, and provides accurate measurements of nodule diameter for interval monitoring. Additionally, it allows characterization of nodules by sonographic

features which suggest malignancy. Solid appearance (or hypoechogenicity), increased vascularity, microcalcifications, irregular margins, and the absence of a halo are features that have been consistently associated with malignancy.^{14,15}

In the present study total 240 females were included in the study. 29.56% were anechoic mixed thyroid nodule, 40.74% were Hyper solid thyroid nodule. 28.33% were Anechoic thyroid nodules. 52.68% were Poorly defined mixed thyroid nodule, 59.25% were poorly defined solid thyroid nodule. 54.16% were Poorly defined thyroid nodule. In 55.91% mixed thyroid nodule halos was present, in 51.85% solid thyroid nodule halos was present. Halos were present in maximum thyroid nodules (55%). In 51.61% mixed thyroid nodule Calcification was present, in 44.44% solid thyroid nodule calcification was present. Calcification was present in 50% thyroid nodules. Radiological finding showed that 79.56% mixed thyroid nodule were benign. 53.70% solid thyroid nodules were benign. 73.75% thyroid nodules were benign. Clinical finding showed that 81.18% mixed thyroid nodule were benign. 61.11% solid thyroid nodules were benign. 76.66% thyroid nodules were benign.

Poorly defined margins may also be demonstrated in 15%–59% of benign nodules.^{9,16}

Leenhardt L et al as they observed that a nodule with hypoechogenicity has a moderate positive predictive

value (up to 63%) for malignancy with 75% sensitivity and 83% specificity.¹⁷

Hypoechoogenicity in solid thyroid nodules was considered a finding suggestive of malignancies such as carcinomas and lymphomas. However, 55% of benign nodules are also solid and hypoechoic.^{4,18} Papini et al. found no benign nodule with thick incomplete halo.¹⁸ The presence of microcalcifications within a nodule is associated

with thyroid cancer was shown in the studies of Cappelli et al.¹⁹ and Lyshchik et al.²⁰ that intrinsic microcalcification is the strongest criterion predicting malignancy.

CONCLUSION

This study concluded that ultrasonographic evidences are reliable enough for the diagnosis of the benign and malignant thyroid tumours.

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