

RADIO-PATHOLOGICAL CORRELATION OF THYROID MASSES

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*Email id of corresponding author: dkgsudha@yahoo.com*Received: 03/10/2015**Revised: 28/11/2015**Accepted: 08/12/2015***ABSTRACT**

Background: Thyroid gland is afflicted by various pathologies ranging from diffuse enlargement (goitre) to nodular lesions, thyroiditis, and malignancies. USG is the most common and the most useful way to image the thyroid gland and its pathology. The study was conducted with the objective of evaluating the applicability of Doppler-USG in diagnosing Thyroid pathologies, establish its superiority over Clinical palpation, and correlate histo pathologically using FNAC. **Method:** This was a prospective study done on 100 patients that came to the OPD of the department of radio diagnosis of Mahatma Gandhi medical college and hospital, Jaipur, from January 2010 to July 2011. All the patients with thyroid swelling/mass/enlargement were studied under colour Doppler USG and then FNAC was performed. **Results:** Majority of the patients were females in the age group of 41-60 years. USG was found to be more sensitive than clinical palpation. Gross differences were found when the results of USG were correlated with FNAC. **Conclusion:** Ultrasound was found to be more reliable than palpation. The addition of colour flow imaging has added value to the prediction of thyroid, but definitive diagnosis can be reached only with FNAC/Biopsy.

Key words: USG, Colour Doppler, FNAC, Thyroid.**INTRODUCTION**

Thyroid gland is afflicted by various pathologies ranging from diffuse enlargement (goitre) to nodular lesions, thyroiditis, and malignancies. Presently, high resolution ultrasound with colour Doppler is the primary imaging modality of choice in morphological evaluation of the thyroid gland.(1, 2)

Ultrasonography gives good graphic representation of regional anatomy, has high

resolution, small expense, simplicity, and it depicts the internal structure of the thyroid gland and the regional anatomy and pathology without using ionizing radiation or iodine containing contrast medium.(3, 4)

USG the most common and the most useful way to image the thyroid gland and its pathology, as recognized in guidelines for managing thyroid

disorders, published by the American thyroid Association.(5)

It is used to define the nature of the lesion, whether solid or cystic; to differentiate thyroid from extra thyroidal masses, assessment of blood flow pattern in and around lesion, to differentiate between benign and malignant thyroid nodule, invasion in nearby structures and to identify additional nodular lesions or enlarged lymph nodes.(1, 2)

The drawback of ultrasound is that it may reveal thyroid swellings that are not clinically relevant that leads to unnecessary further investigations, but in experienced hands, USG allows more targeted sampling and is highly reliable.(6)

Fine Needle Aspiration Cytology (FNAC) is the investigation of choice in discrete thyroid swellings. FNAC has excellent patient compliance, is simple and quick to perform in the outpatient department and is readily repeated. Ultrasound maybe used to guide the needle for more accurate sampling. The results of FNAC are reported using the terminology given in Table No. 1.(6)

The study was conducted with the objective of evaluating the applicability of Doppler-USG in diagnosing Thyroid pathologies, establish its superiority over Clinical palpation, and correlate histo pathologically using FNAC.

MATERIALS AND METHODS

This was a prospective study done on 100 patients that came to the OPD of the department of radio diagnosis of Mahatma Gandhi medical college and hospital, Jaipur, from January 2010 to July 2011.

Consent was taken from the Ethics committee of the institute and from the patients participating in the study.

Inclusion criteria: Patients with thyroid swelling/ mass or thyroid gland enlargement (diffuse or nodular)

Exclusion criteria: Patients undergoing treatment or recovery after proper diagnosis were not included in the study.

Patients name, age, sex and the presenting complaints were noted.

The investigations were performed using 'Toshiba Nemio' USG machine, with a high frequency probe of 7.5-10.0 MHz's. FNAC was done under all aseptic precautions, using a gauge spinal needle and a 10 mL syringe for proper suction.

Ultrasonography of the thyroid gland was performed with the patient in supine position with dorsally extended head. The echo texture of the whole thyroid gland was assessed by subjectively comparing the echo pattern of the lesion with characteristics adjacent neck musculature. Thyroid abnormalities were classified as diffuse or nodular. Vascularity was evaluated using colour Doppler flow imaging.

FNAC/ histopathology findings were noted after pathological correlation.

RESULTS

Out of the 100 patients that were reviewed in our study, 74 were females (74%) and 26 were males (26%).

Maximum patients in our study (35%) were found to be in the age group of 41-60 years. The age distribution of patients is shown in Table No. 2.

Apart from swelling/mass/enlargement, some patients came with the complaints of tremors, weight loss, menorrhagia etc. The frequency of such complaints is shown in Table No. 3.

Out of the 100 patients, palpation and clinical examination demonstrated 11 cases of multiple nodules. The number was found to be 41 when USG was performed. Palpation demonstrated 45 cases of solitary nodules, and the number of the same on USG was found to be 26. The findings of palpation versus USG are shown in Figure No. 1. There is gross difference in the findings of USG and clinical examination.

Histopathological correlation was done using FNAC samples. The results are shown in Table No. 4.

The masses that were detected by USG were categorised further based on their echogenicity and colour flow patterns. The findings are shown in Figures 2 and 3.

DISCUSSION

The thyroid gland is uniformly hyper echoic on ultrasound in comparison to the adjacent strap muscles, and is best seen with the use of high resolution linear array transducers having frequency ranging from 5 to 10 MHz, and having color flow capability and low flow sensitivity. The use of color flow imaging identifies multiple small vessels within and adjacent to the thyroid. (7)

A total of 100 cases were studied, of which 74 were females (74%) and 26 were males (26%), the female: male ratio being 3:1. Most of the patients were more than 20 years of age and less than 60 years of age, maximum in the age group of 41 to 60 years (35%). Ezzat et al, 1994, in a prospective study of 100 subjects in North America, found abnormal ultrasound findings of

the thyroid in 67 patients, with prevalence being greater in women (72%) than in men (41 %), and mean age range being 43 to 50 years.8 Ultrasound screening of thyroid gland in a random adult population of 253 subjects in Finland, where goitre is not endemic, was carried out by Brander et al in 1991. Echo abnormalities were detected in 27.3%. Prevalence showed an increase in the age group of 40 to 50 years. Women showed significantly more lesions (34.6%) than men (19.5%).(9) It can be safely said that women, after 40 years of age, are highly prone to developing thyroid abnormalities.

Our study shows significant differences in the findings of USG and palpation. As opposed to an actual of 67% cases of nodular thyroids, only 56% could be picked up by palpation. Only 11 % of these were appreciated as multiple nodules, in contrast to 44% appreciated by ultrasound. This shows that USG is much more sensitive as compared to clinical palpation, especially multiple small non-palpable nodules. Tan GH et al (1995) showed that clinical palpation is less sensitive than ultrasound in identifying multiple nodules, and that a palpable solitary nodule represents a multinodular gland in 50% patients.(10) In their study of 72 patients in 1992, Brander et al found that only 1/3rd of clinically solitary nodules proved to be solitary by ultrasound. Out of 77 separate nodules, 43 escaped detection on clinical examination. They reported that nodules smaller than 1cm in diameter are impossible to detect clinically, unless they are hard and superficial. These observations clearly demonstrate the clinical superiority of USG over clinical palpation.

41 cases out of 100 in our study were reported as colloid on USG out of which 39 proved to be

colloid goitre on FNAC. The most common echo patterns seen on ultrasound were Anechoic, with normal vascularity on colour flow imaging. Out of 100 cases, 32 came out to be thyroiditis on USG and the number was confirmed on FNAC. The most common echo pattern seen on ultrasound was heteroechoic. Langer et al (2000) reported that lesion that was lymphocytic thyroiditis on FNAC, appears as solid hyperechoic nodules with ill defined margins on USG.(11) Hiromastu et al (1999) showed that in patients with acute subacute thyroiditis show low echogenicity without increased tissue vascularity in the affected swollen thyroid and in the recovery stage, isoechogenicity with slight increased vascularity.(12) Diffuse hyper echoic thyroid associated with reduced thyroid volume was found in 53 of 55 (96%) patients with atrophic thyroiditis by Vitti et al (1994). These findings correlate with our study that shows the most common echo pattern seen on ultrasound in Thyroiditis was heterogeneous with diffuse vasculature.(13)

Out of 100 thyroid nodules studied, 15 were detected as adenoma on USG (hyperechoic) and 16 were confirmed adenomatous on FNAC. Katz et al (1984) prospectively examined 28 cadaver thyroid glands. The most common echo pattern seen on USG was hypoechogenicity. (14)

CONCLUSION

Ultrasound was found to be more reliable than palpation in differentiating nodular from diffuse gland and especially so for detection of non-palpable nodules. Colloid goitre was the most common presentation on ultrasound & it showed a wide spectrum of appearance, majority being nodular and anechoic. It can reliably differentiate toxic goitre, adenoma or thyroiditis. The addition

of colour flow imaging has added value to the prediction of thyroid, but definitive diagnosis can be reached only with FNAC/Biopsy.

REFERENCES

- 1) Clark KJ, Cronan JJ, Scola FH. Color Doppler sonography: anatomic and physiologic assessment of the thyroid. *J Clin Ultrasound*. 1995; 23:215
- 2) Foley WD. Color Doppler flow imaging. Boston: Andover Medical Publishers. 1991
- 3) Butch RJ, Simeone JF, Mueller PR. Thyroid and parathyroid Ultrasonography. *Radiol Clin North Am*. 1985; 23:57
- 4) Leopold GR. Ultrasonography of superficially located structures. *Radiol Clin North Am*. 1980. 18:161
- 5) Cooper DS, Doherty GM, Haugen BR, Kloos RT, Lee SL, Mandel SJ, Mazzaferri EL, McIver B, Pacini F, Schlumberger M, Sherman SI, Steward DL, Tuttle RM. 2009 Revised American Thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer. *Thyroid*. 2009. 19:1167-214
- 6) Bailey, Love. Short practice of surgery. CRC Press. 26th edition. 2013
- 7) Chaudhary S, Verma AP, Mishra HK. High resolution ultra sound and color Doppler in evaluation of thyroid nodule with fine needle aspiration cytology correlation. *Int J Res Med Sci*. 2016; 4(9): 4113-4118.
- 8) Ezzat S, Sarti DA, Cain DR, Braunstein GD. Thyroid incidentalomas: Prevalence by palpation and ultrasonography. *Arch Intern Med*. 1994. 22; 154(16):1838-40.

9) Brander A. Ultrasound appearances in deQuervain's subacute thyroiditis with long term follow up. J. Intern Med.232 (4): 321-325 (1992).

10) Tan GH, Gharib H., Reading CC. Solitary thyroid nodules comparison between palpation and Ultrasonography. Arch. Intern. Med. 1995. 155(22): 2418-2423

11) Langer J.E, Khan A, Nisenbaum HL, Baloch ZW, Horil SC, Cloeman BG, Mandel SJ. Sonographic Appearance of focal thyroiditis. Am. Journ. Rad. 2001. 176:751-754

12) Hiromatsu Y, Ishibashi M, Myake I, Soyejima E. Color Doppler sonography in patients with subacute thyroiditis: Thyroid. 1991. 9(12) 1189-1193

13) Vitti P, Lampis M, Piga M, Loviselli A, Brogioni S, Rago T, Pinchera A, Martino E. Diagnostic usefulness of thyroid Ultrasonography in atrophic thyroiditis. J. Clini. Ultrasound 1994. 22 (6): 375-379

14) Katz JF, Kane RA, Reyes J, Clarke MY, Hill TC. Thyroid Nodules: Sonographic and pathological coorelation. Radiology 1984. 151:741-745

TABLE 1: Classification of FNAC reports

Thy 1	Non-diagnostic
Thy 1c	Non-diagnostic cystic
Thy 2	Non-neoplastic
Thy 3	Follicular
Thy 4	Suspicious of malignancy
Thy 5	Malignant

TABLE 2: Age distribution

Age	No. of patients	Percentage
00-20 years	09	09%
21-30 years	23	23%
31-40 years	25	25%
41-60 years	36	36%
61+ years	07	07%
	100	100%

TABLE NO. 3: Clinical Presentations

Clinical Presentation	No. Of Patients	Percentge
Tremors	3	3%
Difficulty In Breathing	1	1 %
Difficulty In Swallowing	6	6%
Weight Gain/Menorrhagia	6	6%
Weight Loss	3	3%
Voice Change	1	1%

TABLE NO. 4: USG versus FNAC

Pathology	USG	FNAC
Follicular Adenoma	15	16
Thyroiditis	32	32
Hyperplastic Nodule	3	1
Colloid Goitre	41	39
Carcinoma	9	4
Inflammatory Cells	-	1
RBS'c Only	-	7
Total	100	100

Figure No. 1: Palpation versus USG

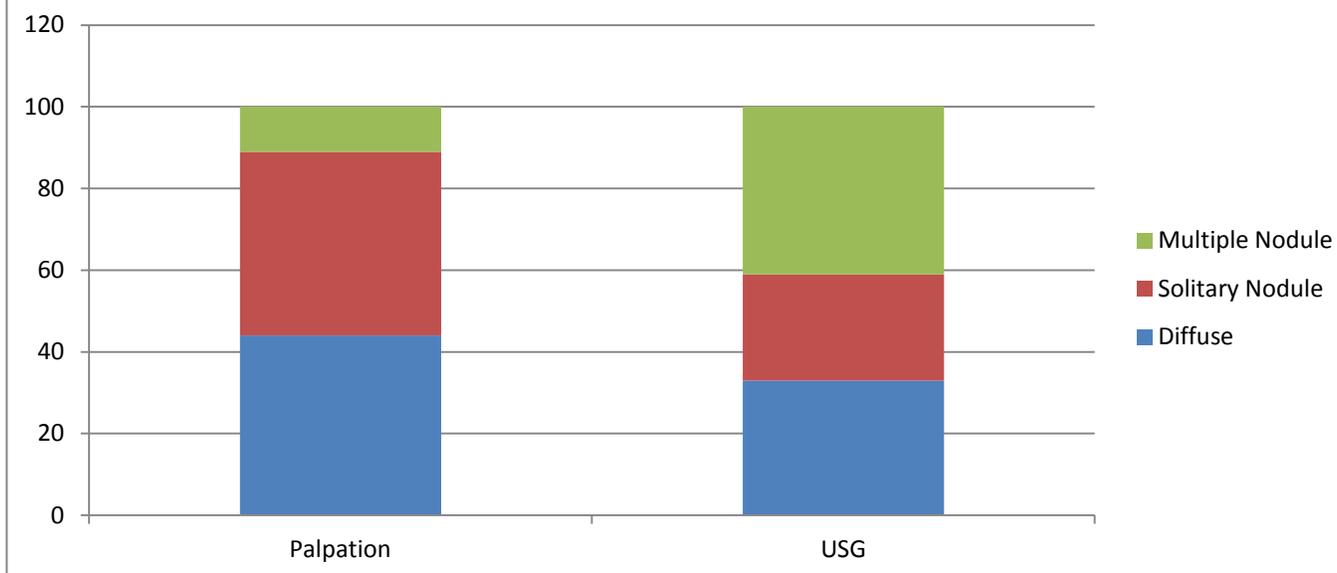


Figure No. 2: Echotexture of thyroid masses

