

CORRELATION OF CLINICAL FINDINGS AND ULTRASONOGRAPHIC FINDINGS OF SUBCLINICAL THYROID DISORDERS

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Abstract

Background: Thyroid gland orchestrates an essential role in tissue metabolism and development. Subclinical disorders may remain undiagnosed or non-diagnosed. **Aim:** To correlate clinical findings and ultrasonographic findings of subclinical thyroid disorders. **Materials and Methods:** 50 subjects matching the inclusion and exclusion criteria were evaluated. The demographic data and detailed history, complete physical examination was used recorded in a prestructured chart. A complete routine lab test included - TLC, DLC, Hb, PBF, liver function test, renal function test, ECG, fasting blood glucose, thyroid profile, ultrasonography of thyroid gland and thyroid function test. TSH was done in a fasting state by Enzyme Immunoassay. **Result:** Subclinical thyroid disorders were more common in female. Around 95 % subjects with sub clinical thyroid disorders were in the age range 31 years and above. 88 percent subjects in subclinical hypothyroidism group and 84 percent subjects in subclinical hyperthyroidism group had normal thyroid. **Conclusion:** Thyroid ultrasonic findings were associated with subclinical thyroid disorders. BMI was found to be increased with increase of TSH and decreases with decrease of TSH.

INTRODUCTION

Thyroid gland orchestrates an essential role in tissue metabolism and development. It directly or indirectly affects various organs systems.^[1] Thyroid stimulating hormone (TSH) secreted by anterior pituitary regulates thyroid hormone synthesis and secretion. TSH released exhibits diurnal rhythm, and is highest at night. For assessment of circulating level of TSH, a single measurement is adequate, owing to its relatively long plasma half-life.^[2] T₃, T₄ are synthesized under the effect of TSH. Two major types of thyroid disorders are hyperthyroidism and hypothyroidism.

Subclinical thyroid (SCH) is a condition where a frank clinical symptoms and complications are yet to develop. The condition is diagnosed by screening thyroid tests. The subclinical thyroid is considered as a risk factors for developing hyperthyroidism and hypothyroidism. Globally, the incidence of SCH is reported to varies from 4 to 10%. This incidence varies amongst age, gender, and population.^[4] SCH is more commonly seen in elderly women.^[5]

The high iodine content of thyroid gland makes it more echo-dense compared to adjacent structures, when seen ultrasonographically. It also shows a homogenous ground glass appearance. A doppler imaging is warranted to differentiate echo free zones of thyroid from cystic structures.^[6, 7]

Subclinical disorders are very significant thyroid irregularity, which are usually under diagnosed or non-diagnosed. A major reason for this could be asymptomatic patients who may have very subtle symptoms. Therefore, this study was conducted to correlate clinical findings and ultrasonographic findings of subclinical thyroid disorders.

MATERIALS AND METHODS

This prospective, observational, uni-centric study was conducted at department of Radiology, at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri. The study was conducted over a period of 1 years from November 2021 to October 2022. The study was approved by the institutional research and ethical committee. An informed and written consent

was obtained from the participating subjects before the commencement of the study.

The study sample consisted of 50 subjects (25 cases each of sub clinical hyperthyroidism and hypothyroidism) reported to our OPD. These subjects were divided equally into two groups; subclinical hypothyroidism group and subclinical hyperthyroidism group.

Procedure: The demographic data and detailed history, complete physical examination was used recorded in a prestructured chart. A complete routine lab test included - TLC, DLC, Hb, PBF, liver function test, renal function test, ECG, fasting blood glucose, thyroid profile, ultrasonography of thyroid gland and thyroid function test. TSH was done in a fasting state by Enzyme Immunoassay.

Inclusion Criteria

Patients of Sub Clinical Hyperthyroidism and Sub Clinical Hypothyroidism

Exclusion Criteria

Patients of Overt Hyperthyroidism and / or on Thyrotoxic Drugs. Age less than 20 Years and more than 60 Years. Pregnant women.

The data was tabulated into a Microsoft excel spread sheet and subjected to statistical analysis using SPSS Software.

RESULTS

The present study evaluated 25 cases each of sub clinical hyperthyroidism and hypothyroidism. A total of 50 cases were enrolled, there was no drop out, all 50 subjects co-operated till the end of study, giving a response rate of 100 %.

Gender wise distribution as shown in Fig-1, it was observed that subclinical thyroid disorders were more common in female (n=35). This gender difference was highly significant statistically. (p value 0.029).

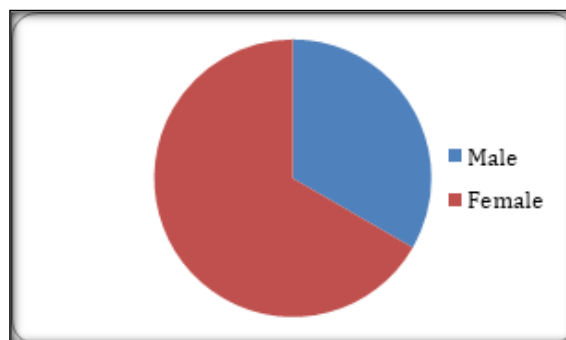


Figure 1 Distribution of subjects according to Gender

The distribution of subjects according to age range is shown in Table 1. It was also observed that more around 95 % subjects with sub clinical thyroid disorders were in the age range 31 years and above. The majority of subclinical hypothyroidism subjects were in age range 41-50 years (n=10) followed by age range 51-60 years (n=7) and age range 31-40 years (n=6) and were least in age range 21-30 years (n=2). For the subclinical hypothyroidism group, the majority of subjects were in age range 41-50 years (n=14), followed by age range 51-60 years (n=6) and age range 31-40 years (n=4) and were least in age range 21-30 years (n=1).

Table 1: Age Distribution in Subclinical Thyroid Disorders (n=50)

Age range	Subclinical hypothyroidism (n=25)		Subclinical hyperthyroidism (n=25)	
	Number	Percentage	Number	Percentage
21-30	02	8	01	4
31-40	06	24	04	16
41-50	10	40	14	56
51-60	07	28	06	24
Total	25	100	25	100

The assessment of thyroid gland size in sub clinical thyroid gland disorders is shown in Table-2. It was observed that overall 86 percent subjects had normal thyroid. The category wise distribution showed 88 percent subjects in subclinical hypothyroidism group and 84 percent subjects in subclinical hyperthyroidism group had normal thyroid. The number of subjects with increased thyroid was found to be 3 and 4 for the subclinical hypothyroidism group and subclinical hyperthyroidism group respectively.

Table 2: Age Distribution in Subclinical Thyroid Disorders (n=50)

Age range	Subclinical hypothyroidism (n=25)		Subclinical hyperthyroidism (n=25)	
	Number	Percentage	Number	Percentage
Normal	22	88	21	84
Increased	3	12	4	16
Total	25	100	25	100

The echotexture characteristics of thyroid gland is shown in Table 3. It was seen that overall 72 percent subjects had homogenous appearance of their thyroid gland. In the Subclinical hypothyroidism group homogenous echogenicity was observed in 17 subjects and while the echogenicity was decreased in 8 subjects. On the other hand in the Subclinical hyperthyroidism group homogenous echogenicity was observed in 19 subjects and while the echogenicity was increased in 6 subjects. This difference was highly statistically significant (p value < 0.001).

Table 3: Assessment of Echotexture in sub clinical thyroid disorders. (n=50)

Age range	Subclinical hypothyroidism (n=25)		Subclinical hyperthyroidism (n=25)	
	Number	Percentage	Number	Percentage
Decreased	8	32	0	0
Homogenous	17	68	19	76
Increased	0	0	6	24
Total	25	100	25	100

While observing the BMI data, it was seen that, BMI was normal in 46 percent cases, was increased in 30 percent subjects of subclinical hypothyroidism and was decreased in 24 percent cases of hyperthyroid disorders. This difference in BMI was highly statistically significant. (p value 0.001). [Figure 2 and Table 4].

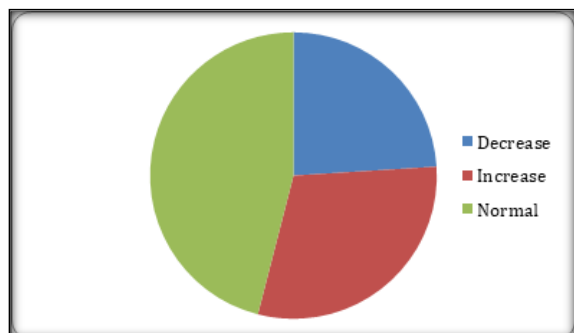


Figure 2

Table 4: Assessment of Echotexture in sub clinical thyroid disorders. (n=50)

	BMI						P value
	Decreased		Normal		Increased		
TSH	Mean	SD	Mean	SD	Mean	SD	0.001
	0.09	0.10	3.49	4.81	10.79	7.61	

DISCUSSION

Subclinical disorders are very significant thyroid irregularity, which are usually under diagnosed or non-diagnosed. A major reason for this could be asymptomatic patients who may have very subtle symptoms. Ultrasonography is proven to have a very significant role in such situation. The ultrasonographic findings may be of help in treating such cases, which will also prevent progression of the condition to overt thyroid disorders

The present study correlated the sign/symptoms and lab tests data with ultrasonographic findings in subclinical thyroid disorders.

Till date, very few studies have correlated ultrasonography of subclinical thyroid disorders with clinical feature and lab data. In the current study 25 subjects each of subclinical hypothyroidism and subclinical hyperthyroid disorders were evaluated. The subjects were accordingly divided into two groups.

The reports from previous study data conclude the incidence of subclinical thyroid disorders to range from 4 to 10%.^[4] In our study, around 95 % cases of subclinical thyroid disorders were in the age group 30 years and above. Group wise 92 % subjects in sub clinical hypothyroidism and 96 % subjects in subclinical hyperthyroidism were in the age group 30 years and above.

The prevalence of subclinical thyroid disorders is more in females compared to males. The prevalence of subclinical thyroid disorders in females is

reported to be as high as 20 % in elderly above 60 years of age.^[5] A similar result was observed in our study with 70 % females and 30 % males having subclinical thyroid disorders. Amongst females, 57 % subjects were of subclinical hypothyroidism while 43 % subjects were of subclinical hyperthyroidism. In contrast, in males 34 % subjects were of subclinical hypothyroidism while 66 % subjects were of subclinical hyperthyroidism. This difference was highly statistically significant.

On ultrasonography of thyroid, it was observed that overall 86 percent subjects had normal thyroid size. The thyroid size was found to be increased in 12 percent subjects with subclinical hypothyroidism and in 16 percent subjects with subclinical hyperthyroidism. The previous study data also fall in the same range.

The current study also assessed the echotexture of thyroid gland. Overall, 72 percent subjects had homogenous appearance of their thyroid gland. In the Subclinical hypothyroidism group homogenous echogenicity was observed in 17 subjects and while the echogenicity was decreased in 8 subjects. On the other hand in the Subclinical hyperthyroidism group homogenous echogenicity was observed in 19 subjects and while the echogenicity was increased in 6 subjects. This difference was highly statistically significant (p value < 0.001). The echotexture characteristics of thyroid gland is shown in Table 3. The irregular pattern of echo either hypo echogenicity or not, was another possible indicator of thyroid failure. This indicates the use of thyroid

ultrasonography in detecting early and sub clinical thyroid disorders. 8 A greater percentage of subjects with subclinical hypothyroidism and with subclinical hyperthyroidism had marked color flow Doppler sonography pattern.^[9,10]

CONCLUSION

Thyroid ultrasonic findings were associated with subclinical thyroid disorders. BMI was found to be increased with increase of TSH and decreases with decrease of TSH.

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