

Original Research

Usefulness of Ultrasonography in assessment of thyroid gland diseases

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ABSTRACT:

Background: The present study was conducted to assess thyroid gland diseases with Ultrasonography. **Materials & Methods:** 58 patients with thyroid gland diseases of both genders underwent USG. Parameters such as grading of goiter, echogenicity and type of lesion of thyroid gland were assessed. **Results:** Solitary thyroid nodule was present in 8, diffuse goiter was present in 32 and multinodular goiter in 18 patients. The difference was significant ($P < 0.05$). Echogenicity was normal in 5, mild hypoechogenicity in 13, hypoechogenicity in 28 and total hypoechogenicity in 12 patients. **Conclusion:** USG is very useful in determining lesions of thyroid gland. It has high predictive value.

Key words: Echogenicity, Thyroid, Solitary thyroid nodule.

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INTRODUCTION

Thyroid swelling is a common clinical problem routinely encountered in the outpatient department. Most of the so called thyroid masses are due to diffuse enlargement of thyroid gland (diffuse colloid goiter). Thyroid neoplasms presents in the form of enlarged thyroid mass or thyroid nodule.¹

High-resolution ultrasonography has improved in the past few years and has become a very valuable in diagnosis of the diseases of thyroid and parathyroid glands.² After clinical examination Ultrasonography plays key role in evaluation of thyroid lesions. Nodular thyroid diseases are the most common cause of thyroid enlargement. Colloid multinodular goiter is the most common among all thyroid nodular diseases. Incidence of all thyroid diseases is higher in females than males.³

Ultrasound is a longitudinal sound wave of frequency higher than 20 kHz. For medical purposes, the usually used frequency varies between 2-18 MHz, depending on the examined tissue (for thyroid ultrasound typically 7.5-10 MHz). The source of these waves is a quartz crystal placed in a transducer probe. It generates and receives waves using piezoelectric effect, which is based on rapid deformation of a piezoelectric crystal by an applied electrical charge.⁴ Accordingly, when the piezoelectric crystal absorbs the mechanical energy of ultrasound waves, it produces an electric current. This ability is used for the detection and display of the reflected waves. The wave reflection occurs at the interface of tissues with different acoustic impedance. The greater the difference in impedance of each tissue, the greater the amount of energy reflected back.⁵ The

present study was conducted to assess thyroid gland diseases with Ultrasonography.

MATERIALS & METHODS

The present study was conducted among 58 patients with thyroid gland diseases of both genders reported to MKCG Medical College and Hospital, Brahmapur, Odisha, India. All were informed regarding the study.

General information such as name, age, gender etc. was recorded. All underwent USG. Parameters such as grading of goiter, echogenicity and type of lesion of thyroid gland were assessed. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age groups (years)	Males	Females
25-35	6	7
35-45	7	17
45-55	4	8
>55	3	6
Total	20	38

Table I, graph I shows that age group 25-35 years had 6 males and 7 females, 35-45 years had 7 males and 17 females, 45-55 years had 4 males and 8 females and >55 years had 3 males and 6 females.

Graph I Distribution of patients

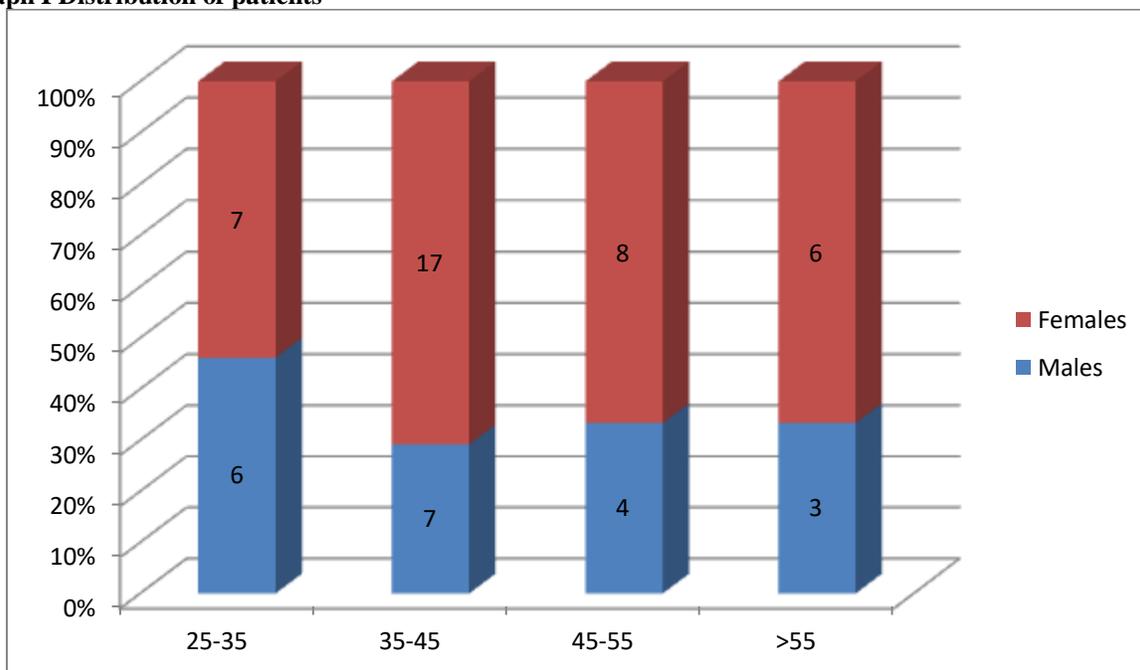


Table II Type of lesions

Thyroid lesions	Number	P value
Solitary thyroid nodule	8	0.01
Diffuse goiter	32	
Multinodular goiter	18	

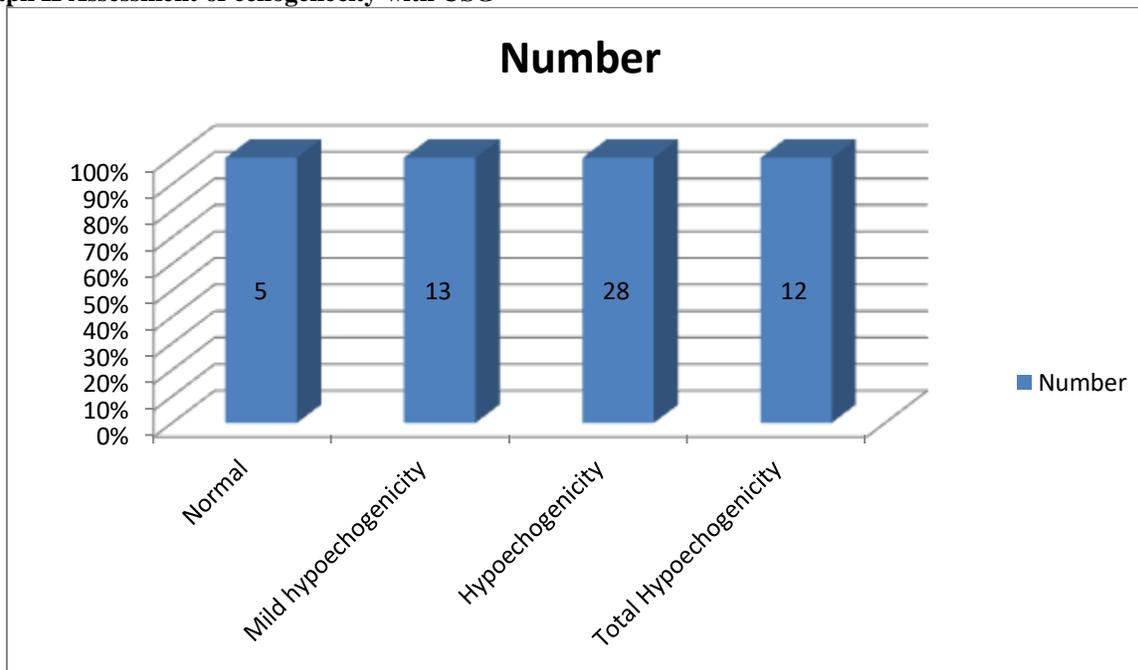
Table II shows solitary thyroid nodule in 8, diffuse goiter was present in 32 and multinodular goiter in 18 patients. The difference was significant (P< 0.05).

Table III Assessment of echogenicity with USG

Echogenicity	Number	P value
Normal	5	0.02
Mild hypoechogenicity	13	
Hypoechogenicity	28	
Total Hypoechogenicity	12	

Table III shows that echogenicity was normal in 5, mild hypoechogenicity in 13, hypoechogenicity in 28 and total hypoechogenicity in 12 patients. The difference was significant ($P < 0.05$).

Graph II Assessment of echogenicity with USG



DISCUSSION

Tissues with frequent interfaces such as normal thyroid gland display as hyperechogenic area; in contrast, structures with no interfaces such as cysts full of liquid are anechogenic. Two-dimensional map of the layout of echogenicity is called B-mode and it is used as the basic display mode in thyroid sonography. Another mode used for displaying the vascularisation of tissue is the Doppler mode. It is based on Doppler’s effect: the shift in frequency and wavelength of reflecting waves caused by reflection from moving objects (red blood cells circulating in vessels). This frequency shift displays as a colour-coded overlay on top of a B-mode image.⁶ The present study was conducted to assess thyroid gland diseases with Ultrasonography.

In present study, thyroid nodules are less common among children than in adults, but are more likely to be malignant in children referred for the evaluation of nodular thyroid disease (22%-26% in children versus approximately 5% in adults).⁷ Estimates from US and postmortem examinations suggest that 1%-1.5% of children, and up to 13% of older adolescents or young

adults, have thyroid nodules. With each 1-year increase in age, the incidence of thyroid abnormalities increases by 9% in children.⁸ Thyroid cancer accounts for less than 7% cases. Multinodular goitre (MNG) is the commonest cause of diffuse asymmetric enlargement of the thyroid gland. Females between 35-50 years of age are most commonly affected. Histologically, colloid or adenomatous form of MNG is common. The ultrasound diagnosis rests on the finding of multiple nodules within a diffusely enlarged gland.⁹ The present study was conducted to determine disease of thyroid gland using Ultrasonography (USG).

In this study, age group 25-35 years had 6 males and 7 females, 35-45 years had 7 males and 17 females, 45-55 years had 4 males and 8 females and >55 years had 3 males and 6 females. Watters et al¹⁰ in their study 120 patients undergoing thyroid surgery for thyroid nodules or goiter were examined by preoperative ultrasound and fine needle aspiration (FNA) cytology. In the determination of whether a lesion was malignant, FNA had sensitivity, specificity, and positive predictive values of 86%, 85%, and 58%, respectively. Ultrasound

had sensitivity, specificity, and positive predictive values of 74%, 83%, and 51%, respectively. The different types of thyroid pathology showed different ultrasonic features in most cases, although no single feature was pathognomonic. Malignant lesions tended to be solid and hypoechoic without a halo, but there was a cystic element in 26% of the lesions and calcification in 37%. Ultrasound was superior to FNA in diagnosing nodular goiter with sensitivity, specificity, and positive predictive values of 70%, 93%, and 92%, respectively, compared with 55%, 86%, and 83%, respectively.

We found that solitary thyroid nodule in 8, diffuse goiter was present in 32 and multinodular goiter in 18 patients. Echogenicity was normal in 5, mild hypoechoic in 13, hypoechoic in 28 and total hypoechoic in 12 patients. Ultrasound also enables an accurate aspiration to be done under direct vision.¹¹ When a thyroid nodule is small and virtually impalpable, ultrasound-guided aspiration is the best way of obtaining cells for cytology. A recent patient in our ward presented with an enlarged cervical lymph node that was shown to be a papillary carcinoma by FNA. The thyroid primary carcinoma was detected on ultrasound and confirmed by ultrasound-guided FNA.¹² FNA may sometimes result in a thyroid hematoma, which will make specific ultrasonographic features within the original nodule difficult to recognize.

CONCLUSION

Authors found USG is very useful in determining lesions of thyroid gland. It has high predictive value.

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