Section: Radiodiagnosis

Original Research Article

A PROSPECTIVE CLINICAL STUDY OF ULTRASOUND IN VARIOUS THYROID DISORDERS

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ABSTRACT

Background: Ultrasonography (USG) is the primary imaging modality for thyroid evaluation due to its accessibility and diagnostic accuracy. **Materials and Methods:** A prospective study was conducted from June 2023 to June 2024, including 62 patients. USG findings were analysed for number, contents, calcifications, and vascularity of nodules, with final diagnosis documented. **Results:** Nodules were present in 56 patients; multiple nodules (69.6%) were more frequent than solitary ones (30.3%). Predominantly solid nodules accounted for 58.3%, and 52.6% showed calcification, with microcalcification being most common. Avascular nodules comprised 31.6%, while 23.7% showed both intrinsic and perinodal vascularity. Thyroiditis (40.3%) was the most common diagnosis, followed by colloid goitre (27.4%) and multinodular goitre (14.5%). Malignancy was detected in 3.2% of cases. **Conclusion:** USG is a reliable tool for characterizing thyroid nodules and differentiating benign from malignant lesions, though small papillary carcinomas remain challenging.

INTRODUCTION

Thyroid disorders are frequently encountered in clinical practice and may present as diffuse enlargement, solitary nodules, or multinodular goitre. Although most nodules are benign, a small proportion represent malignancy, making accurate evaluation essential. High-resolution ultrasonography (USG) has become the first-line imaging tool because it is safe, cost-effective, and capable of assessing key features such as nodule number, echotexture, calcification, and vascularity.

Standardized reporting systems, such as TI-RADS, have improved the ability of USG to stratify malignancy risk and guide fine-needle aspiration cytology (FNAC). Nevertheless, overlap between benign and malignant sonographic features can occasionally limit diagnostic precision.

This study was undertaken to analyse the ultrasonographic features of various thyroid lesions in patients presenting with thyroid disorders, to emphasize their role in early and reliable diagnosis.

Aims and Objectives

To study the ultrasonographic features of various thyroid lesions in patients with thyroid disorders.

MATERIALS AND METHODS

This is a prospective cross-sectional study done in the Radiodiagnosis outpatient department in Sree Rajiv Gandhi Institute of Medical Science, Pondicherry, during June 2023 to June 2024.

Inclusion Criteria

- Age group 10-75 years
- Patients with thyroid disorder with USG showing thyroid lesion
- Patient giving consent

Exclusion Criteria

- Patients with bleeding disorders
- Patient refusal for FNAC

RESULTS & DISCUSSION

Study population

Out of the 320 neonates screened, 310 met eligibility criteria after excluding 10 with incomplete records. The mean gestational age was 38.6 ± 1.2 weeks, the mean birth weight was 2.9 ± 0.5 kg, and the overall mortality was 31.6% (98/310).

Baseline characteristics

Non-survivors had significantly lower birth weight, lower baseline SpO_2, and higher requirement for invasive ventilation. No differences were observed in sex distribution or culture positivity.

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Sonographic Evaluation

Table 1: Distribution of thyroid lesions based on the number of nodules

Number of nodules	Number	Percentage (%)
Single	17	30.36
Multiple	39	69.64
Total	56	100.00

Nodules were found in most of the lesions. Out of 62 patients, 56 patients had nodules in the thyroid gland. In these 56 patients, 17 patients, i.e., 30.36% of thyroid lesions were solitary nodules, and 39 patients, i.e., 69.64% were multiple nodules.

Table 2: Distribution of thyroid lesions based on the contents of the nodule

Contents	Number	Percentage (%)
Predominantly solid	21	58.33
Predominantly Cystic	6	16.67
Comet tail artifact	11	30.56
Total	38	100.00

Based on the contents of the nodule, it is characterized as nodules that are predominantly solid, predominantly cystic, and nodules that have a comet tail artifact. The nodules that were more than 5mm were considered, and the nodules that had contents predominantly solid were 58.33% and the nodules that had contents predominantly cystic were 16.67% and the nodules that had comet tail artifact were around 30.56%.

Table 3: Distribution of thyroid lesions based on calcification within the nodule

Calcification	Number	Percentage (%)
Absent	18	47.37
Rim Calcification	07	18.42
Macrocalcification	05	13.16
Microcalcification	08	21.05
Total	38	100.00

The calcification in the nodule that is more than 5mm is characterized. 18.42% of the nodules had rim calcification, 13.16% had macrocalcification, 21% had microcalcification, and the nodules without calcification were seen in 47.37% of patients.

Table 4: Distribution of thyroid lesions based on vascularity of the nodule

Vascularity	Number	Percentage (%)
Avascular	12	31.58
Intrinsic hypervascular	06	15.79
Perinodal Vascularity	11	28.95
Both intrinsic and perinodal vascularity	09	23.68
Total	38	100.00

Based on the vascularity within the nodule, it is characterized as nodules without any vascularity corresponded to 31.58%, the nodules with intrinsic hypervascularity corresponded to 15.79%, the nodules with perinodal vascularity were around 28.95% and the nodules with both intrinsic and perinodal vascularity were 23.68%.

Table 5: Distribution of thyroid lesions based on ultrasound diagnosis

Ultrasound diagnosis	Number	Percentage (%)
Thyroiditis	25	40.32
Colloid goiter	17	27.42
MNG	09	14.52
Medullary carcinoma	01	1.61
Papillary carcinoma	01	1.61
Adenomatous nodule	06	9.68
MNG with thyroiditis	03	4.84
Total	62	100.00

The most common lesion that was diagnosed with USG was thyroiditis, 40.3% of the patients, followed by colloid goiter in 27.4% of the patients. Multinodular goiter was seen in 14.5% of the patients. The remaining lesions were papillary carcinoma (1.6%), medullary carcinoma (1.6%), adenomatous nodules (9.7%), and MNG with thyroiditis (4%).

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CONCLUSION

- Ultrasound is the best imaging modality that can characterize the number of nodules, contents of the nodule, calcifications, and vascularity of the nodule to arrive at a stable diagnosis.
- Ultrasound is an excellent modality for diagnosing benign conditions such as thyroiditis, Multinodular goitre, and malignant conditions such as medullary carcinoma. With limitations, such as small nodules of papillary carcinoma, it is difficult to differentiate them from small colloid nodules.

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