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Role of Ultrasound in Palpable Neck Lesions

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Aims and Objective

1. To evaluate the reliability and accuracy of ultrasonography as a diagnostic tool for identifying benign and malignant lesions in the neck region.
2. To identify the ultrasonographic features of benign and malignant lesions and assess their vascularity using color doppler.
3. To assess the diagnostic accuracy of high-resolution ultrasound and Doppler in evaluating neck masses.

Materials and Methods

A total of 50 patients (both male and female) with neck swellings, clinically diagnosed as inflammatory lesions, benign cysts and tumours, or malignant conditions, will be selected from the Department of Radiology. This study aims to evaluate the ultrasonographic characteristics of different types of neck swellings and assess the reliability and accuracy of ultrasonography with color Doppler as a diagnostic tool for distinguishing benign and malignant neck lesions.

Result

Among thyroid and lymph node disorders, multinodular goitre and tubercular lymphadenopathy are the most frequently observed conditions. Ultrasound demonstrated a sensitivity of 66.6% and a specificity of 100% in diagnosing papillary thyroid carcinoma. Sonography also exhibited high sensitivity and specificity in identifying submandibular gland calculi and detecting glandular inflammation. Congenital lesions were evaluated according to their anatomical location, with ultrasound showing a sensitivity and specificity of 100% for these conditions.

Conclusion

Our study suggests that ultrasound is an effective tool for evaluating neck masses after a clinical examination, providing detailed information on the location, size, and internal characteristics of the lesion. In addition to being safe, cost-effective, and easily accessible, ultrasound offers the advantage of real-time, precise assessment of

regional anatomy, as well as facilitating the aspiration or biopsy of lesions of interest.

Keywords: Ultrasound, Doppler, Neck masses, malignant conditions.

Introduction

Neck lesions, which include congenital, inflammatory, traumatic, and neoplastic conditions, are commonly seen in outpatient settings but can be difficult to diagnose due to their proximity to vital structures. Early and accurate diagnosis is essential, particularly when a lesion may signal a malignancy. Ultrasound (US) is an effective first-line imaging tool for assessing neck swellings, offering high sensitivity and specificity for various types, including inflammatory, benign, and malignant lesions.[1][2] Studies have shown that US is particularly useful in detecting thyroid malignancies and malignant lymph nodes. Additionally, high-resolution ultrasonography, combined with Doppler imaging, enhances diagnostic accuracy by providing detailed, real-time views of the lesion and blood flow patterns, helping to differentiate benign from malignant conditions. [3] US also play a key role in evaluating anatomical location, size, and internal features of neck masses. Clinical and histopathological diagnoses further confirm ultrasound findings, making it a reliable and efficient tool for diagnosing neck pathologies. This study highlights the value of high-resolution ultrasound and color Doppler in characterizing neck masses, aiding in diagnosis and treatment planning. [4]

Inclusion Criteria

Patients with complaints of neck masses, referred to the department of radiology irrespective of age and sex, and patients willing to take part and give written informed consent after the details of the study were explained to them.

Exclusion Criteria

Subjects with the following lesions were excluded from the study:

A) Lesions of vascular origin. Swellings caused by trauma/fractures.

B) Lesions of the mandible.

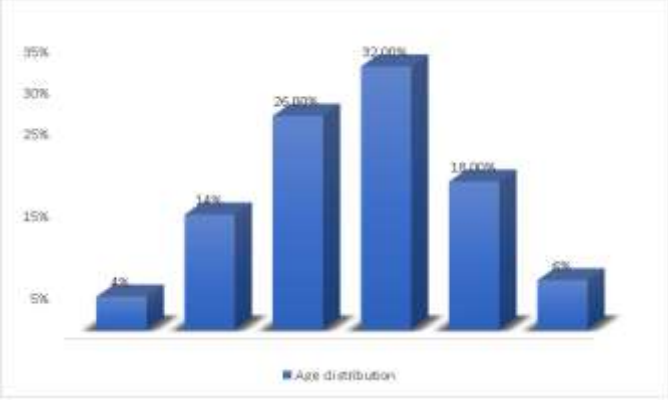
Results

In our study maximum number of cases was between 31 -40-year age group corresponding to study concluded by Garud et al. [5] The study's youngest patient was a 5-year-old boy with congenital neck swelling. The age of patients ranged from 1 year to 60 years

Table 1:

	Frequency	Percentage
<10 years	2	4%
11 – 20 years	7	14%
21 – 30 years	13	26%
31 – 40 years	16	32%
41 – 50 years	9	18%
51 – 60 years	3	6%
Total	50	100%
Mean Age	31.45 ± 12.64	

Out of 50, maximum number of cases had involvement of thyroid and parathyroid glands (n=30) followed by lymph nodes (n=14), rest of the cases (n=8) were salivary gland and congenital lesions.



Graph 1:

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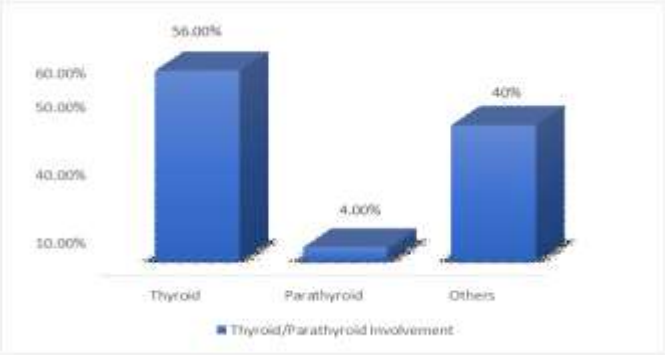
Table 2: Thyroid/Parathyroid involvement

	Frequency	Percentage
Thyroid	28	56%
Parathyroid	2	4%
Others	20	40%
Total	50	100%



Graph 2:

Table 3: Diagnostic accuracy of Ultrasound in diagnosing neck masses

	Sensitivity	Specificity	PPV	NPV
Brachial cleft Cyst	100.00%	100.00%	100.00%	100.00%
Lymphangioma	100.00%	100.00%	100.00%	100.00%
Thyroglossal cyst	50%	100.00%	100.00%	97.9%
Submandibular glandsialolithiasis	100.00%	100.00%	100.00%	100.00%
Submandibular gland sialadenitis with abscess	100.00%	100.00%	100.00%	100.00%
Parotid adenoma	100.00%	100.00%	100.00%	100.00%
Parotitis	100.00%	100.00%	100.00%	100.00%
Thyroiditis	66.6%	97.8%	66.6%	97.8%
Benign adenoma	100.00%	100.00%	100.00%	100.00%
Hashimotos thyroiditis	75%	100.00%	100.00%	97.8%
Thyroid malignancy	66.6%	100.00%	100.00%	97.9%
Multinodular goitre,Cystic degeneration	100.00%	100.00%	100.00%	100.00%
Multinodular goitre	87.5%	100.00%	100.00%	97.6%
Nodular colloid goitre	100.00%	100.00%	100.00%	100%
Reactive Lymphadenitis	85.7%	100.00%	100.00%	97.7%
Tubercular lymphadenitis	66.6%	97.8%	66.6%	97.8%
Metastatic lymphadenopathy	100.00%	100.00%	100.00%	100.00%
Parathyroid adenoma	100.00%	100.00%	100.00%	100.00%

Discussion

This study examines the role of ultrasound (US) in diagnosing neck lesions, with a focus on thyroid, parathyroid, salivary gland, lymph node, and congenital pathologies. The thyroid was the most commonly affected site, with 93% of cases in females. Ultrasound demonstrated 100% sensitivity and specificity in diagnosing multinodular goiter, while the comet tail artifact was noted as an indicator of colloid cysts. For thyroiditis, including Hashimoto's thyroiditis, US showed a sensitivity of 66.6% and specificity of 97.8%. Features like hypoechogenicity, spiculated edges, and

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microcalcifications were indicative of papillary thyroid cancer, with ultrasound sensitivity of 66.6% and specificity of 100%.

Parathyroid adenomas were accurately diagnosed with 100% sensitivity and specificity. In salivary gland pathologies, US diagnosed sialolithiasis, sialadenitis, and abscesses with 100% accuracy. Lymph node enlargement due to tuberculosis and metastatic cancer was also assessed. Tubercular lymphadenitis showed a sensitivity of 66.6% and specificity of 97.8%, while metastatic lymph nodes had 100% sensitivity and specificity. Finally, congenital lesions, including thyroglossal cysts and lymphangioma, were accurately identified, with specificity reaching 100%. The study highlights ultrasound's high diagnostic accuracy in assessing various neck lesions.

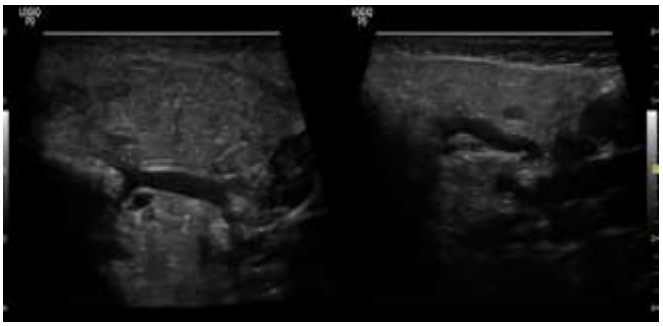


Figure 1: Enlarged right submandibular gland with reduced echotexture and increased vascularity…right submandibular gland sialadinitis.

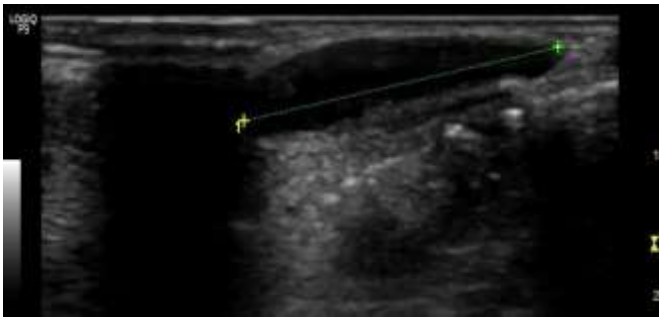


Figure 2: Cystic lesion noted involving suprahyoid midline neck, not taking vascularity…thyroglossal cyst.

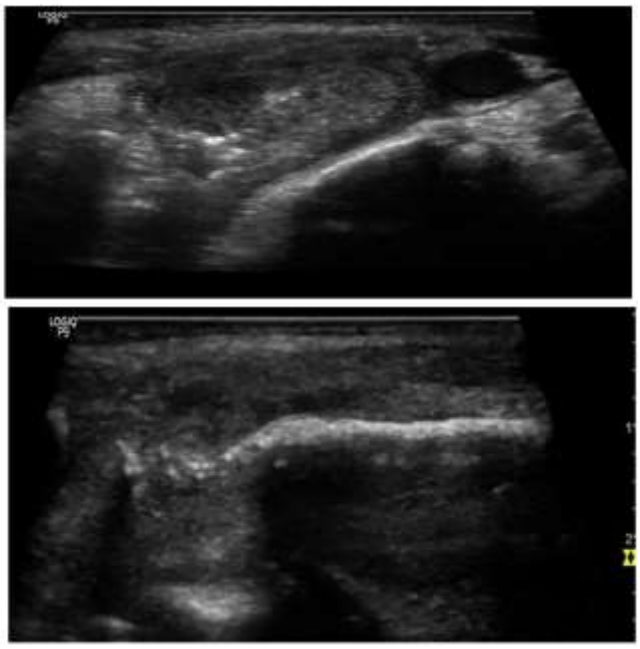
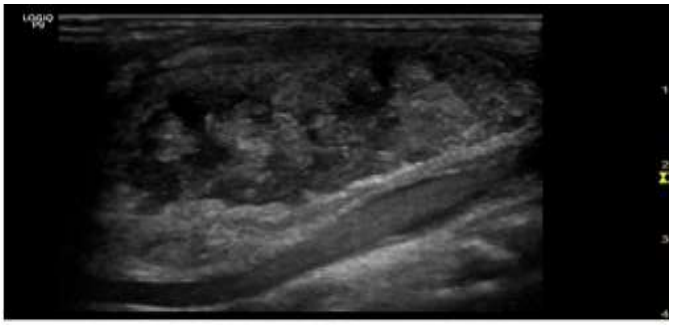


Figure 3: Illdefined highly vascular lesion noted sourounding thyroid cartilage, with errosion of thyroid carliage and is seen to extending in the larynx…laryngeal carcinoma.



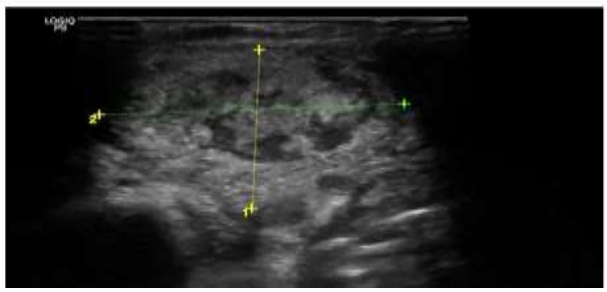


Figure 4: Large heterogenous echotecture solid cystic lesion noted involving left lobe of thyroid with minimal vascularity…malignant thyroid lesion, Histology report: papillary thyroid carcinoma.

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