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Original Research Article

Role of Ultrasound Characteristics in Predicting Histopathological Diagnosis of Cervical Lymphadenopathy

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Abstract

Background: Cervical lymphadenopathy is a common clinical condition resulting from a variety of benign and malignant disorders. Although histopathological examination remains the gold standard for diagnosis, ultrasonography offers a non-invasive, readily available, and cost-effective modality for evaluating cervical lymph nodes. Assessment of specific sonographic characteristics may aid in differentiating benign from malignant lymphadenopathy and facilitate early clinical decision-making.

Aim: To evaluate the role of ultrasound characteristics in predicting the histopathological diagnosis of cervical lymphadenopathy.

Materials and Methods: This prospective observational cross-sectional study was conducted on 90 patients presenting with cervical lymphadenopathy at a tertiary care teaching hospital over a period of 18 months. All patients underwent high-resolution gray-scale and color Doppler ultrasonography followed by histopathological evaluation through fine-needle aspiration cytology, core needle biopsy, or excisional biopsy. Sonographic parameters assessed included lymph node shape, border characteristics, echogenic hilum, internal necrosis, calcification, and vascular pattern. Histopathological findings were considered the reference standard. Data were analyzed using IBM SPSS Statistics version 27.0, and associations were evaluated using the Chi-square test. A p-value <0.05 was considered statistically significant.

Results: Histopathological examination revealed that 58 (64.4%) lymph nodes were benign and 32 (35.6%) were malignant. Round lymph node shape was significantly associated with malignancy (78.1%), whereas oval shape was predominantly associated with benign lesions (79.3%) (p<0.001). Absence of echogenic hilum showed a strong association with malignant lymphadenopathy (84.4%), while preserved hilum was mainly observed in benign nodes (84.5%) (p<0.001). Irregular nodal borders (75.0%), internal necrosis (59.4%), calcification (25.0%), and peripheral/mixed vascularity (81.2%) were significantly more frequent in malignant lymph nodes compared with benign nodes (p<0.05). Among the evaluated sonographic features, absent echogenic hilum, peripheral/mixed vascularity, irregular borders, and round shape demonstrated the strongest association with malignant histopathological diagnosis.

Conclusion: Ultrasonographic characteristics correlate significantly with the histopathological diagnosis of cervical lymphadenopathy. Round nodal shape, absent echogenic hilum, irregular borders, internal necrosis, calcification, and peripheral/mixed vascularity are important predictors of malignancy. Ultrasonography serves as a valuable non-invasive tool for the initial evaluation of cervical lymphadenopathy; however, histopathological examination remains essential for definitive diagnosis.

Keywords: Cervical lymphadenopathy, Ultrasonography, Color Doppler, Histopathology, Malignant lymph nodes, Cervical lymph nodes.

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Introduction

Cervical lymphadenopathy is a common clinical finding encountered across all age groups and may arise from a wide spectrum of pathological conditions, including reactive inflammatory processes, granulomatous infections, lymphomas, and metastatic malignancies. Accurate differentiation between benign and malignant lymph node enlargement is essential because it directly influences diagnostic workup, treatment planning, and prognosis. Despite careful clinical examination, distinguishing the underlying etiology of cervical lymphadenopathy based solely on

physical findings remains challenging due to overlapping clinical presentations [1].

Histopathological examination remains the gold standard for establishing the definitive diagnosis of cervical lymphadenopathy. However, tissue diagnosis is invasive, time-consuming, and may not always be feasible as an initial diagnostic modality. Consequently, imaging techniques have assumed an increasingly important role in the evaluation of cervical lymph nodes, particularly in guiding decisions regarding biopsy and further management [2].

Ultrasonography (USG) has emerged as the primary imaging modality for the assessment of superficial cervical lymph nodes owing to its wide availability, cost-effectiveness, lack of ionizing radiation, and capability for real-time evaluation. High-resolution ultrasound allows detailed assessment of nodal morphology, including size, shape, border characteristics, echogenic hilum, internal echotexture, calcifications, necrosis, and extranodal extension. In addition, Color Doppler ultrasonography provides valuable information regarding vascular patterns within lymph nodes, thereby enhancing diagnostic accuracy [3].

Several sonographic characteristics have been reported to correlate with histopathological diagnoses. Malignant lymph nodes frequently demonstrate a rounded configuration, loss of the fatty hilum, irregular margins, intranodal necrosis, calcification, and peripheral or mixed vascularity. In contrast, benign reactive lymph nodes typically maintain an oval shape, preserved echogenic hilum, homogeneous echotexture, and central hilar vascularity [4]. These morphological and vascular features have therefore become important criteria for differentiating benign from malignant cervical lymphadenopathy.

Pattanayak et al. (2018) demonstrated that a combination of B-mode ultrasonographic parameters and Color Doppler findings significantly improved the diagnostic accuracy for characterizing cervical lymph nodes [5]. Their study highlighted the usefulness of sonographic assessment in differentiating reactive from metastatic lymphadenopathy, although histopathological confirmation remained necessary in equivocal cases. Similarly, Abdelgawad et al. (2020)reported that B-mode ultrasound combined with Doppler and elastographic assessment could effectively distinguish benign from malignant cervical lymph nodes, emphasizing the value of multiparametric ultrasonography [6]. More recent studies have further reinforced the diagnostic utility of ultrasound. Cai et al. (2021) developed a multiparametric ultrasound-based logistic regression model and reported improved diagnostic performance in differentiating benign and malignant cervical lymphadenopathy when compared with individual sonographic parameters alone [7]. Basnet and Chhetri (2021) also observed significant correlations between sonographic findings and pathological diagnoses, supporting the role of ultrasound as an effective noninvasive diagnostic tool [8]. Furthermore, Vandana et al. (2021) demonstrated that ultrasonographic evaluation showed good agreement with cytopathological findings and could serve as a reliable first-line investigation in patients presenting with cervical lymph node enlargement [9].

Despite these advances, overlap in sonographic appearances among reactive, tuberculous, lymphomatous, and metastatic lymph nodes continues to present diagnostic challenges. Therefore, continued evaluation of individual ultrasound characteristics and their correlation with histopathological outcomes remains important for improving diagnostic precision and reducing unnecessary invasive procedures [7,8].

Aim & Objectives

Aim: To evaluate the role of ultrasound characteristics in predicting the histopathological diagnosis of cervical lymphadenopathy.

Objectives

- To assess the various ultrasonographic characteristics of cervical lymph nodes, including shape, border characteristics, echogenic hilum, internal necrosis, calcification, and vascular pattern.
- To correlate ultrasonographic findings of cervical lymphadenopathy with histopathological diagnosis.
- To determine the association between individual ultrasound characteristics and benign or malignant cervical lymph node lesions.
- To identify the sonographic features that are most predictive of malignant cervical lymphadenopathy.
- To evaluate the diagnostic utility of ultrasonography as a non-invasive tool for differentiating benign from malignant cervical lymphadenopathy.
- To assess the clinical usefulness of ultrasound in guiding the management and further diagnostic workup of patients presenting with cervical lymphadenopathy.

Materials & Methods

Study Design: This was a hospital-based, prospective observational cross-sectional study conducted to evaluate the role of ultrasound characteristics in predicting the histopathological diagnosis of cervical lymphadenopathy.

Study Place: The study was conducted in the Department of Radiodiagnosis in collaboration with the Departments of Pathology at R.D.J.M Medical College & Hospital, Turki, Muzaffarpur, Bihar, India.

Study Period: The study was carried out over a period of 9 months from March 2021 to November 2021.

Study Population: The study population consisted of patients presenting with clinically detectable cervical lymphadenopathy who were referred for ultrasonographic evaluation and subsequently underwent histopathological examination for definitive diagnosis.

Sample Size: A total of 90 consecutive patients fulfilling the eligibility criteria were enrolled in the study.

Ethical Considerations: Prior approval was obtained from the Institutional Ethics Committee before commencement of the study. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants or their legal guardians prior to enrollment. Confidentiality of patient information was strictly maintained throughout the study.

Inclusion Criteria

Patients fulfilling the following criteria were included:

- Patients of either sex aged ≥18 years.
- Patients presenting with clinically palpable cervical lymphadenopathy.
- Patients referred for ultrasonographic evaluation of cervical lymph nodes.
- Patients willing to undergo histopathological evaluation by fine-needle aspiration cytology (FNAC), core needle biopsy, or excisional biopsy.
- Patients providing written informed consent for participation in the study.

Exclusion Criteria

Patients meeting any of the following criteria were excluded:

- Patients with previously diagnosed and treated cervical lymphadenopathy.
- Patients who had received chemotherapy, radiotherapy, or anti-tubercular therapy before ultrasound evaluation.
- Patients with inadequate or inconclusive histopathological reports.
- Patients with recurrent cervical lymphadenopathy following previous treatment.
- Patients unwilling to participate in the study.
- Patients with incomplete clinical, radiological, or pathological records.

Methodology

All eligible patients underwent detailed clinical evaluation including history taking and physical examination. Demographic information, duration of symptoms, associated clinical manifestations, and relevant medical history were recorded in a predesigned data collection proforma.

Ultrasonographic examination of cervical lymph nodes was performed using a high-resolution ultrasound machine equipped with a linear-array transducer operating at frequencies ranging from 7.5 to 12 MHz. Gray-scale and color Doppler imaging were performed for all patients.

The following ultrasonographic parameters were assessed:

- Lymph node shape (oval or round)
- Border characteristics (regular or irregular)
- Presence or absence of echogenic hilum
- Presence or absence of internal necrosis
- Presence or absence of calcification
- Vascular pattern (hilar/central or peripheral/mixed)

All examinations were performed by experienced radiologists who were blinded to the histopathological findings.

Following ultrasonographic evaluation, tissue diagnosis was obtained through FNAC, core needle biopsy, or excisional biopsy as deemed appropriate by the treating clinician. Histopathological examination served as the reference standard for final diagnosis. Based on histopathological findings, lymph nodes were categorized as benign or malignant.

Tissue Sampling Procedure: Patients requiring tissue diagnosis underwent ultrasound-guided FNAC, core needle biopsy, or excisional lymph node biopsy according to standard institutional protocols.

For excisional biopsy, the procedure was performed under local or general anesthesia depending on the size and location of the lymph node. The excised specimen was immediately preserved in 10% buffered formalin and sent to the pathology laboratory for histopathological evaluation.

Histopathological examination was performed by experienced pathologists who were blinded to the ultrasound findings.

Investigations

The following investigations were performed:

- Complete blood count (CBC)
- Erythrocyte sedimentation rate (ESR)
- Liver function tests (LFT)
- Renal function tests (RFT)

- Chest radiography (where indicated)
- Contrast-enhanced computed tomography (CT) or magnetic resonance imaging (MRI) when clinically warranted
- Ultrasonography with Color Doppler evaluation
- Fine-needle aspiration cytology (FNAC)
- Histopathological examination (gold standard)

Outcome Measures

Primary Outcome Measures

- Correlation between ultrasound characteristics and histopathological diagnosis of cervical lymphadenopathy.
- Identification of ultrasound features predictive of malignant lymphadenopathy.

Secondary Outcome Measures

- Frequency distribution of benign and malignant cervical lymphadenopathy.
- Association of individual sonographic parameters with histopathological findings.
- Diagnostic performance of ultrasonographic features in differentiating benign and malignant lymph nodes.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. The association between ultrasonographic characteristics and histopathological diagnosis was evaluated using the Chi-square test or Fisher's exact test wherever appropriate. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to estimate the strength of association between sonographic features and malignant lymphadenopathy.

Diagnostic performance parameters including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall diagnostic accuracy were calculated for individual ultrasound characteristics using histopathological diagnosis as the reference standard. A p-value of less than 0.05 was considered statistically significant, and a p-value of less than 0.001 was considered highly significant. The results were presented in the form of tables, charts, and descriptive statistical summaries to facilitate interpretation and comparison of findings.

Results

A total of 90 patients with cervical lymphadenopathy were included in the study.

Table 1: Distribution of Patients According to Histopathological Diagnosis (n=90)

Histopathological Diagnosis	Frequency (n)	Percentage (%)
Benign	58	64.4
Malignant	32	35.6
Total	90	100.0

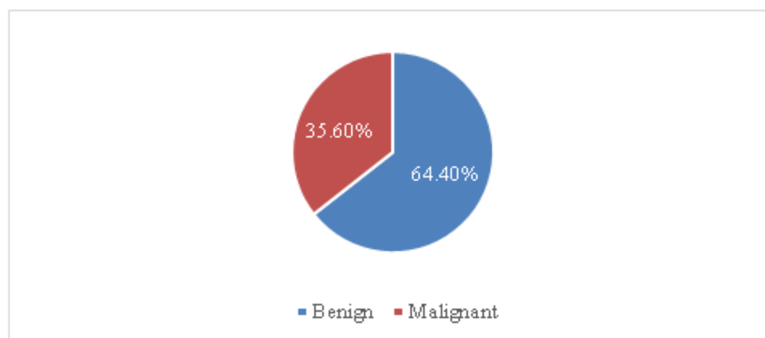

Figure 1: Distribution of Patients According to Histopathological Diagnosis

Table 1 and figure I, show that a total of 90 patients with cervical lymphadenopathy were included in the study. Histopathological examination revealed that 58 (64.4%) cases were benign, while 32 (35.6%) cases were malignant (Table 1).

Table 2: Association Between Lymph Node Shape and Histopathological Diagnosis (n=90)

Shape	Benign n (%)	Malignant n (%)	Total	p-value
Oval	46 (79.3)	7 (21.9)	53	<0.001
Round	12 (20.7)	25 (78.1)	37	
Total	58	32	90	

Chi-square test, $p < 0.001$

As shown in Table 2, lymph node shape demonstrated a significant association with histopathological diagnosis. Among the 53 lymph nodes with an oval shape, 46 (79.3%) were benign and only 7 (21.9%) were malignant. In contrast, among the 37 lymph nodes with a round shape, 25 (78.1%) were malignant and 12 (20.7%) were benign. The association between lymph node shape and histopathological diagnosis was found to be statistically significant (χ^2 test, $p<0.001$), indicating that round-shaped lymph nodes were more frequently associated with malignancy.

Table 3: Association Between Echogenic Hilum and Histopathological Diagnosis (n=90)

Echogenic Hilum	Benign n (%)	Malignant n (%)	Total	p-value
Preserved	49 (84.5)	5 (15.6)	54	<0.001
Absent	9 (15.5)	27 (84.4)	36	
Total	58	32	90	

Chi-square test, p < 0.001

Table 3 depicts the relationship between the presence of an echogenic hilum and histopathological diagnosis. Of the 54 lymph nodes with a preserved echogenic hilum, 49 (84.5%) were benign and only 5 (15.6%) were malignant. Conversely, among the 36 lymph nodes with an absent echogenic hilum, 27 (84.4%) were malignant and 9 (15.5%) were benign. This association was statistically highly significant ($p<0.001$), suggesting that loss of the echogenic hilum is a strong predictor of malignant cervical lymphadenopathy.

Table 4: Association Between Nodal Borders and Histopathological Diagnosis (n=90)

Border Characteristics	Benign n (%)	Malignant n (%)	Total	p-value
Regular	50 (86.2)	8 (25.0)	58	<0.001
Irregular	8 (13.8)	24 (75.0)	32	
Total	58	32	90	

Chi-square test, p < 0.001

The association between nodal border characteristics and histopathological findings is presented in Table 4. Regular borders were observed in 58 lymph nodes, of which 50 (86.2%) were benign and 8 (25.0%) were malignant. Irregular borders were identified in 32 lymph nodes, among which 24 (75.0%) were malignant and only 8 (13.8%) were benign. The difference was statistically significant ($p<0.001$), indicating that irregular nodal margins are significantly associated with malignant pathology.

Table 5: Association Between Internal Necrosis and Histopathological Diagnosis (n=90)

Internal Necrosis	Benign n (%)	Malignant n (%)	Total	p-value
Absent	53 (91.4)	13 (40.6)	66	<0.001
Present	5 (8.6)	19 (59.4)	24	
Total	58	32	90	

Chi-square test, p < 0.001

Table 5 demonstrates the correlation between internal necrosis and histopathological diagnosis. Among the 66 lymph nodes without internal necrosis, 53 (91.4%) were benign and 13 (40.6%) were malignant. In contrast, of the 24 lymph nodes exhibiting internal necrosis, 19 (59.4%) were malignant and only 5 (8.6%) were benign. The association between internal necrosis and malignancy was statistically significant ($p<0.001$), highlighting necrosis as an important ultrasonographic feature suggestive of malignant involvement.

Table 6: Association Between Calcification and Histopathological Diagnosis (n=90)

Calcification	Benign n (%)	Malignant n (%)	Total	p-value
Absent	56 (96.6)	24 (75.0)	80	0.003
Present	2 (3.4)	8 (25.0)	10	
Total	58	32	90	

Chi-square test, p = 0.003

The relationship between nodal calcification and histopathological diagnosis is shown in Table 6. Calcification was absent in 80 lymph nodes, of which 56 (96.6%) were benign and 24 (75.0%) were malignant. Calcification was present in 10 lymph nodes, among which 8 (25.0%) were

malignant and 2 (3.4%) were benign. This association was statistically significant (p=0.003), indicating that the presence of calcification is more commonly observed in malignant lymph nodes.

Table 7: Association Between Vascular Pattern and Histopathological Diagnosis (n=90)

Vascular Pattern	Benign n (%)	Malignant n (%)	Total	p-value
Hilar/Central	48 (82.8)	6 (18.8)	54	<0.001
Peripheral/Mixed	10 (17.2)	26 (81.2)	36	
Total	58	32	90	

Chi-square test, p < 0.001

Table 7 illustrates the association between vascular pattern and histopathological diagnosis. Hilar or central vascularity was observed in 54 lymph nodes, of which 48 (82.8%) were benign and only 6 (18.8%) were malignant. In contrast, peripheral or mixed vascularity was seen in 36 lymph nodes, among which 26 (81.2%) were malignant and 10 (17.2%) were benign. The association between vascular pattern and histopathological diagnosis was highly significant (p<0.001), suggesting that peripheral or mixed vascularity is strongly predictive of malignant cervical lymphadenopathy.

Discussion

The present study evaluated the role of ultrasonographic characteristics in predicting the histopathological diagnosis of cervical lymphadenopathy in 90 patients.

In the present study, benign lymphadenopathy constituted 64.4% of cases, whereas malignant lymphadenopathy accounted for 35.6%. The predominance of benign lesions may be attributed to the high prevalence of reactive and infective causes of cervical lymph node enlargement in the general population. Similar findings were reported by Vineela et al. (2022), who observed that benign lymph nodes were more common than malignant lymph nodes among patients undergoing sonographic evaluation of cervical lymphadenopathy [10]. Likewise, Rüger et al. (2020) reported a greater proportion of benign lesions compared with metastatic lymph nodes in their prospective evaluation of cervical lymphadenopathy[11]. These observations support the present findings and indicate that although malignant cervical lymphadenopathy remains clinically important, benign etiologies continue to represent the majority of cases encountered in routine practice.

The present study demonstrated a highly significant association between nodal shape and histopathological diagnosis (p<0.001). Oval-shaped lymph nodes were predominantly benign (79.3%), whereas round lymph nodes were predominantly malignant (78.1%).The shape of a lymph node is one of the most widely accepted sonographic indicators of malignancy. Benign lymph nodes generally maintain an elongated or oval configuration, whereas malignant infiltration results in cortical expansion and progressive loss of the normal oval architecture, leading to a round appearance. These findings are consistent with those reported by Rahman et al. (2009) (3), who identified nodal shape as a reliable criterion for differentiating benign and malignant cervical lymph nodes. Similarly, Tan et al. (2021) found that a reduced long-axis to short-axis ratio and rounded morphology were significantly associated with malignant lymphadenopathy [13]. The findings of the present study therefore reinforce the importance of nodal shape as an initial sonographic marker of malignancy.

A highly significant association was observed between the presence of an echogenic hilum and histopathological diagnosis (p<0.001). Preserved echogenic hilum was predominantly observed in benign lymph nodes (84.5%), whereas absent hilum was strongly associated with malignancy (84.4%).

The echogenic hilum represents normal nodal architecture containing blood vessels, connective tissue, and fat. Progressive malignant infiltration often replaces hilar structures, resulting in disappearance of the echogenic hilum. The present findings are comparable to those reported by Tan et al. (2021), who identified absence of the fatty hilum as one of the strongest predictors of malignant lymphadenopathy [13]. Furthermore, Ni et al. (2022) demonstrated that metastatic cervical lymph nodes frequently exhibited absent hilar architecture when compared with benign nodes [14]. Similar observations were reported in the multimodal ultrasound study conducted by Rüger et al. (2020) [11]. These findings collectively suggest that loss of the echogenic hilum remains one of the most reliable sonographic indicators of malignant cervical lymph node involvement.

The present study revealed a statistically significant relationship between nodal border characteristics and histopathological diagnosis (p<0.001). Regular borders were predominantly associated with benign lesions, whereas irregular borders were significantly more frequent in malignant lymph nodes.

Irregular margins may result from extracapsular tumor spread, infiltration of surrounding tissues, and distortion of normal nodal architecture. Such

pathological alterations contribute to the irregular appearance frequently observed in metastatic lymphadenopathy. Similar findings were reported by Rüger et al. (2020), who observed that ill-defined or irregular nodal margins were significantly associated with malignant lymph nodes [10]. Vineela et al. (2022) also demonstrated that malignant nodes frequently exhibited irregular margins compared with benign lesions [11]. Therefore, nodal border assessment remains an important component of ultrasonographic evaluation.

Internal necrosis demonstrated a highly significant association with malignancy in the present study (p<0.001). Among lymph nodes showing necrosis, 59.4% were malignant, whereas the majority of nodes without necrosis were benign. Necrosis develops when rapidly proliferating malignant cells outgrow their vascular supply, resulting in central ischemia and tissue breakdown. On ultrasound, this appears as cystic or heterogeneous hypoechoic areas within the lymph node. These observations are supported by the findings of Tan et al. (2021) (4), who reported that intranodal necrosis significantly increased the probability of malignancy [13]. Similarly, Ni et al. (2022) identified cystic degeneration and necrotic changes as important sonographic features of metastatic cervical lymph nodes [14]. The present results therefore support the established role of internal necrosis as a marker of malignant nodal involvement.

Calcification demonstrated a statistically significant association with histopathological diagnosis (p=0.003). Although calcification was present in only a small proportion of lymph nodes, it was observed more frequently in malignant lesions than in benign lesions. Calcification within cervical lymph nodes is particularly suggestive of metastatic disease, especially from thyroid malignancies. The presence of microcalcifications often reflects psammoma body formation and chronic dystrophic calcification associated with malignant processes. The present findings are in agreement with those reported by Ni et al. (2022), who found calcifications to be an important sonographic feature in metastatic cervical lymph nodes [14]. Similar conclusions have been drawn in several ultrasound-based diagnostic models, where calcification significantly improved the prediction of malignant lymphadenopathy [13]. Therefore, although relatively uncommon, nodal calcification should raise suspicion for malignant pathology.

The vascular pattern demonstrated one of the strongest associations with histopathological diagnosis in the present study (p<0.001). Hilar or central vascularity was predominantly associated with benign lymph nodes (82.8%), whereas peripheral or mixed vascularity was strongly associated with malignant lesions (81.2%).

Normal lymph nodes typically exhibit hilar vascularity because blood vessels enter through the hilum and branch centrally. In malignant lymph nodes, tumor-induced angiogenesis results in abnormal peripheral neovascularization, producing peripheral or mixed vascular patterns on Doppler imaging. These findings are consistent with those reported by Vineela et al. (2022), who found peripheral vascularity to be highly suggestive of malignant lymphadenopathy [10].

Likewise, Tan et al. (2021) reported that vascular distribution patterns significantly improved the differentiation of benign and malignant lymph nodes [13]. The strong association observed in the present study confirms the diagnostic value of Doppler vascular assessment in routine ultrasonographic evaluation.

Limitations of the Study

- The study was conducted on a relatively small sample size of 90 patients, which may limit the generalizability of the findings to larger populations.
- Being a single-center study, the results may not fully represent the demographic and pathological variations seen in different geographical regions and healthcare settings.
- Ultrasound examination is operator-dependent, and variations in image acquisition and interpretation may influence the assessment of lymph node characteristics.
- Advanced ultrasonographic techniques such as elastography and contrast-enhanced ultrasonography were not included in the study, which might have improved diagnostic accuracy.
- Histopathological subtypes of malignant and benign lymphadenopathy were not analyzed separately, limiting the evaluation of ultrasound features specific to individual pathological entities.
- The cross-sectional design of the study precluded longitudinal assessment of lymph node changes over time and their response to treatment.

Conclusion

Authors found that ultrasonographic characteristics showed a significant correlation with the histopathological diagnosis of cervical lymphadenopathy. Round nodal shape, absent echogenic hilum, irregular borders, internal necrosis, calcification, and peripheral/mixed vascularity were significantly associated with malignant lymph nodes, whereas oval shape, preserved hilum, regular borders, absence of necrosis and calcification, and hilar/central

vascularity were predominantly associated with benign lesions. Among these features, absent echogenic hilum, peripheral/mixed vascularity, irregular margins, and round shape emerged as the strongest predictors of malignancy. Ultrasonography is a valuable, non-invasive, and readily available tool for the initial assessment of cervical lymphadenopathy; however, histopathological examination remains the gold standard for definitive diagnosis.

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