

# The Diagnostic Value of Ultrasound-Guided Cervical Core Needle Biopsy in Diagnosis of Lymphoma in Suspected Patients

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## ABSTRACT

**Background:** Core needle biopsy (CNB) guided by imaging modalities seems to be an acceptable modality for diagnosis of lymphoma due to its safety, good applicability, availability as well as diagnostic accuracy, however; Studies have not reached a consensus on its diagnostic accuracy and factors affecting its performance. The present study aimed to assess the value of ultrasound-guided cervical CNB in the diagnosis of lymphoma in suspected patients.

**Materials and Methods:** This cross-sectional study was performed on 46 consecutive patients (20 to 82 years) with cervical mass or lymphadenopathy suspected of lymphoma and were candidates for diagnostic evaluation. Ultrasound-guided core needle biopsies (UGCNB) were done by a single radiologist under guided ultrasonography. The diagnostic value of UGCNB in the diagnosis and determination of specific lymphoma subtypes was assessed.

**Results:** Using UGCNB led to the diagnosis of lymphoma in 34.8% and non-lymphoma lesions in 43.5%, while the diagnosis remained unclear in other 21.7% with a total UGCNB-based identification rate of 78.3%. No patient with lymphoma was missed. All patients were followed up over a 6-month period. In none of the cases, clinical diagnosis and treatment response were found contrary to the initial pathologic diagnosis. No significant complication such as hematoma or infection was reported.

**Conclusion:** UGCNB has a high diagnostic value for determining the nature of the cervical lesions suspected of lymphoma.

**Keywords:** Lymphoma; Ultrasound-guided core needle biopsies (USGCNB); Lymphadenopathy

## INTRODUCTION

According to a wide variety of clinical features and prognosis in different subtypes of lymphoma, histological classification and thus the early diagnosis of this phenomenon is important for planning the best appropriate treatment schedule<sup>1</sup>. Earlier, the classification of lymphoma and its histological

stratifying was based on only surgical biopsy leading to patients' dissatisfaction, surgery-related complications, needing hospitalization, as well as high medical costs<sup>2,3</sup>. Recently, advanced minimally invasive techniques have been employed to achieve an accurate stratification and grading of different subtypes of lymphoma. Among these techniques,

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core needle biopsy (CNB) guided by imaging modalities has been recognized to diagnose and classify both indolent and aggressive lymphomas<sup>4,5</sup>. This technique is able to provide a good view of lymph nodes architecture aiming to further molecular and phenotypic assessment and remains as a cost-benefit alternative method for tumor-related studies<sup>6</sup>. Moreover, this modality is a real-time non-radiological tool choice for individuals who cannot endure surgery, especially the elderly<sup>7,8</sup>. Thus, this technique is now globally accepted for the definitive diagnosis of lymphoma. Our study aimed to assess the value of ultrasound-guided CNB in the diagnosis of lymphoma.

## MATERIALS AND METHODS

Between February 2018 and January 2019, 46 (21 women and 25 men) patients diagnosed with cervical mass or lymphadenopathy were enrolled in this cross-sectional study. There was a strong clinical and radiographic suspicion for lymphoma in all patients referred to the radiology department for diagnostic evaluation. The sonographic indices for suspicious lymph nodes were as follows: 1) Round: long axis/short axis diameter <2mm, 2) Well-defined hypoechoic, 3) Attenuated echogenic hilum, 4) Both hilar and peripheral vessels, and 5) Intra nodal reticulation. We obtained written consent from all patients and this study was approved by the Ethics Committee of Tehran University of Medical Sciences. Ultrasound-guided core needle biopsy (UGCNB) was done by a single radiologist using a semi-automatic needle No. 16 under the ultrasound-guided technique and after local anesthesia with 1% lidocaine solution. In this regard, 3 samples each time were taken and sent within 10% formalin solution to the pathological assessment. Patients who were definitely diagnosed as lymphoma were followed up for 6 months for assessing the response to treatment and correct diagnosis. Patients with other pathological diagnoses, including malignant, inflammatory, and infectious lesions, underwent 6-month follow-up after appropriate treatment. Moreover, those who were diagnosed as lymphoproliferative or lymphocytic-histiocytic infiltrative disorders with no suspicion for infectious disease underwent surgical excisional biopsy (SEB) by a single surgeon and the pathologic results were compared with the preliminary results by UGCNBs. Finally, the identification rate and diagnostic value of UGCNB in the diagnosis and determination of

specific lymphoma subtypes was assessed. The statistical analysis was performed using *SPSS statistics software* (SPSS version 23.0 for windows, IBM, Armonk, New York).

## RESULTS

Forty-six patients (range: 20 to 82 years, mean age: 49 years old) with cervical mass or lymphadenopathy who were suspected of having lymphomas were assessed. Of whom, 16 patients (35.0%) were definitely diagnosed as having lymphoma with different subtypes and then underwent further follow-up after treatment. In this regard, 20 patients (43.0%) were found to have other pathological diagnoses as other malignant lesions in 11 patients (including squamous cell carcinoma, melanoma, oncocytic carcinoma, etc.) and in 9 patients, inflammatory or infectious lesions (reactive lymph node, tuberculosis, or other granulomatous disorders) were the final diagnosis. These patients underwent follow-up (reactive lymph nodes) or treatment and follow-up for six months. Moreover, 10 patients (22.0%) were finally diagnosed with lymphoproliferative or lymphocytic-histiocytic infiltrative disorders, of whom, one patient with suspicion of infectious disease was treated with antibiotics and showed complete treatment response after follow up. Others underwent excisional biopsy leading to the diagnosis of lymphoma in 4 cases and non-lymphoma pathologies in 5 other cases (Table 1). Overall, using UGCNB led to the diagnosis of lymphoma in 34.8% and non-lymphoma lesions in 43.5%, while the diagnosis remained unclear in other 21.7% with a total UGCNB-based identification rate of 78.3%. All patients were followed up over a 6-month period. In none of the cases, clinical diagnosis and treatment response were found contrary to the initial pathologic diagnosis. No significant complication such as hematoma or infection was reported after diagnostic interventions. Because UGCNB was performed in the outpatient setting using local anesthesia and as no hospitalization or further surgery was required, the financial costs were significantly lower compared to excision biopsy.

**Table 1:** Comparing the findings of CNB and excisional biopsy in patients suspected to lymphoma

Modality		Excisional biopsy	
		Lymphoma	Other pathologies
CNB pathology results			
Other pathology	20 (43.0%)	0	20
Lymphoma	16 (35.0%)	16	0
lymphoproliferative or lymphocytic-histiocytic infiltrative lesions	10 (22.0%)	4	6
Total	46	20	26

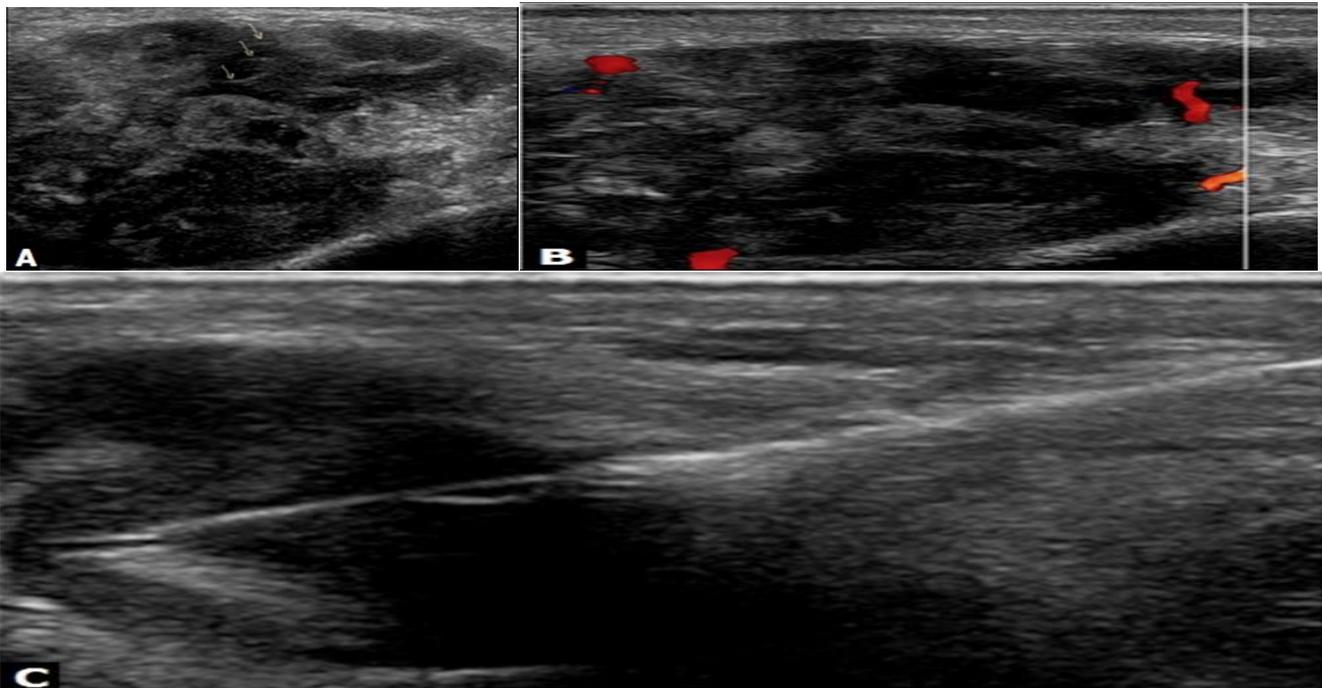


Figure 1: A suspicious LAP of a 29-year-old woman for assessment of lymphoma: A. Nodal reticulation (arrows), B. Central (short arrows) and peripheral (long arrows) vascularity and C. View of ultrasound-guided core needle biopsy of the suspicious LAP

## DISCUSSION

The current study was performed with the goal of assessing the value and feasibility of cervical CNB aided by ultrasonography in the definitive diagnosis of lymphoma or its ruling-out. The results could show that UGCNB is an accurate, safe, and fast minimally invasive modality for the diagnosis of lymphoma or non-lymphoma pathologies with a final identification rate of 78.3%. The identification rate obtained in our study was close to the rates previously obtained by

ultrasound-guided or CT-guided CNB in the average range of 71.5% to 97.9%<sup>9-12</sup>.

A definitive diagnosis of lymphoma was confirmed in 20 patients, of those 80% were directly diagnosed by UGCNB. The remaining (20%) were primarily diagnosed as lymphoproliferative or lymphocytic-histiocytic infiltrative disorders by UGCNB and finally were diagnosed as lymphoma by excisional biopsy. Therefore, no patient with lymphoma was missed which was confirmed at the 6 - month follow - up.

It has been previously shown that UGCNB can diagnose and differentiate benign from malignant lymphatic lesions and, regarding the time of procedure and its expenses, it is more preferred than surgical diagnostic procedures<sup>13</sup>.

In a study by He et al in 2015<sup>14</sup>, there were no statistical differences between the CNB group and the surgical group in the diagnostic accuracy rate of lymphoma, as well as its subtypes in superficial and deep masses. In a study by Li et al in 2005<sup>15</sup>, a definite diagnosis and accurate histological subtype of different types of lymphomas were obtained in 61 out of 80 patients with a success rate of 76.2%. However, they also showed that the success rate of CT-guided CNB varied with the histopathology subtypes, ranging from 28.5% in Hodgkin's disease to 90.0% in peripheral T-cell non-Hodgkin's lymphoma. Lachar et al. in 2007<sup>16</sup> also showed that compared with an open biopsy; there is a diagnostic accuracy of 78% and a cost savings of greater than 75%. In another study by Wilczynski et al. in 2019<sup>17</sup>, the sensitivity, specificity, and diagnostic accuracy of UGCNB for diagnosis of lymphoma was 94.4%, 97.8%, and 95.0%, respectively, but the diagnostic values were slightly different in various subtypes of lymphoma. Furthermore, in a study by Han et al in 2017<sup>18</sup>, the overall accuracy of UGCNB for differentiating benign from malignant lesions was 91.70 % and the success or failure of UGCNB for the diagnosis of lymphadenopathy was significantly correlated with node size, nature (malignant vs. benign), and location as well as penetration depth. Summarizing the study findings finally indicates that the UGCNB is an accurate application as well as a safe diagnostic procedure for the diagnosis and stratification of lymphoma.

The impact of needle size on results is discussed controversially. A study by Hu et al. in 2013<sup>19</sup> suggested that the size of the needle is an important factor that potentially affects the diagnostic accuracy of core needle biopsy in the diagnosis of lymphoma. In another study by Groneck et al. in 2016<sup>20</sup>, their data suggested a slightly better yet not significant outcome with the 14 - *gauge needles* compared to 16 G and 18 G needles. Moreover, some authors<sup>12,21,22</sup> concluded that multiple core biopsies should be obtained from different areas of a lymph

node. In Han's study<sup>18</sup>, success or failure of UGCNB for the diagnosis of lymphadenopathy was not significantly correlated with needle size or the number of core tissues obtained. In our study, all biopsies were performed with semi-automatic 16 G core needles. Three samples were obtained each time from different non-necrotic parts of a cervical node or multiple suspicious nodes of a patient. Finally, no diagnostic problems were reported due to insufficient tissue samples.

More important (as well shown in our study), we expected minimal post-procedural complications following UGCNB which was also mentioned in similar studies<sup>16-18</sup>. Therefore, this procedure can be used with the highest effectiveness and safety for the assessment of lesions suspected of lymphoma. However, this diagnostic value may be influenced by the lesion-related characteristics or subtypes of the lymphoma, and thus for determining the final indications for using UGCNB, determining all lesion-related parameters affecting its performance should be considered in further studies.

## CONCLUSION

Compared to surgical biopsy as the gold standard diagnostic method, UGCNB has a high value and identification rate for determining the nature of the cervical lesions suspected to be lymphoma. No significant complication was visible.

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