

# Construction of a Prediction Model for Axillary Lymph Node Metastasis in Breast Cancer Patients Based on Ultrasound Features and Clinical Data

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## Abstract

*Objective:* To comprehensively analyze the clinical data of breast cancer patients, ultrasound signs of axillary lymph nodes, and explore the value of a prediction model based on ultrasound features combined with clinical data for the evaluation of axillary lymph node metastasis (ALN) in patients with early breast cancer. *Methods:* The ultrasound features and clinical data of 200 patients diagnosed with unilateral invasive breast cancer were retrospectively analyzed. First, the data were divided into a training set and a validation set at a ratio of 3:1. The occurrence of axillary lymph node metastasis was determined according to the pathological results of the patients, and the patients were divided into a metastasis group and a non-metastasis group. First, univariate analysis was performed on the various indicators of the training set patients, and then multivariate logistic regression analysis was performed. A prediction model for axillary lymph node metastasis in breast cancer was established based on the results of binary logistic regression analysis. The receiver operating characteristic curve (ROC) and area under the curve (AUC) were used to evaluate the prediction performance of the model, and the validation set was used to test the repeatability of the model. *Results:* Tumor diameter  $\geq 3$  cm, blurred tumor margins, blood flow in the mass, lymph node aspect ratio  $< 2$ , lymph node cortical thickness  $\geq 1/2$  of the maximum diameter of the lymph node hilum, and low differentiation were all risk factors for ALN metastasis in patients with early breast cancer ( $P < 0.05$ ). The results of ROC curve analysis showed that the area under the curve of the model was xx, and the optimal critical value of its prediction according to the Youden index was 0.981, with a sensitivity of 89% and a specificity of 95%. The prediction model was verified by the validation set. *Conclusion:* Color Doppler ultrasound examination can better evaluate the status of axillary lymph nodes in patients with breast cancer. The prediction model for axillary lymph node metastasis of breast cancer can make a more accurate assessment of whether axillary lymph nodes in patients with breast cancer have metastasis, and has certain clinical application value.

## Keywords

Breast Cancer, Axillary Lymph Nodes, Metastasis, Ultrasound