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**Title:** Validation of a Chinese nomogram with a Dutch breast cancer population: Excellent prediction of the probability of axillary lymph node metastasis

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**Body:** Background: In the era of precision medicine, the surgical management of axillary lymph nodes (ALN) should be patient-tailored. Omission of sentinel lymph node biopsy (SLNB) is possible in patients with early breast cancer and very low or very high probability of ALN metastasis. Recently, we developed a nomogram to predict the probability of ALN metastasis in breast cancer patients based on clinicopathological parameters including ultrasound using a Chinese patient dataset<sup>1</sup>. In this study the nomogram performance was validated in an independent Dutch population from one hospital.

Methods: Data of 170 Dutch patients with a successful SLNB or axillary lymph node dissection were collected. A lymph node containing either micro- or macrometastatic disease was considered as a positive lymph node. Performance of the nomogram was assessed by calculating the area under the receiver-operator characteristic (ROC) curve (AUC). False-negative rates (FNRs) and false-positive rates (FPRs) at several different predictive cut-off points were calculated.

Results: There were 69 (40.6%) patients having a positive ALN. The AUC for the nomogram was 0.84 (95% confidence interval 0.78-0.90) compared with 0.86 in the Chinese validation population, showing excellent discrimination of the model. The FNR and FPR of the model were 10.2% and 0% for the predicted probability cut-off points of 14.5% and 90%, respectively.

Table 1 False-negative rates (FNRs) and false-positive rates (FPRs) of the nomogram at different predictive cut-off points

Predicted risk	Patient number and percentage (%)	Number of patients with positive ALN	FNR (%)
< 14.5%	59 (34.7)	6	10.2
< 20%	79 (46.5)	11	13.9
		Number of patients with negative ALN	FPR (%)
> 70%	27 (15.9)	1	3.7
> 90%	18 (10.6)	0	0

ALN: axillary lymph node

This means that omission of SLNB is possible for patients with a predictive probability of less than 14.5% or higher than 90%, which accounts for 45.3% of all patients in this study.

Conclusions and future perspectives: In this study, the Chinese nomogram showed excellent performance in predicting the probability of ALN metastasis in an independent Dutch population. A multicentre validation of this nomogram in large Dutch patient population (>2500 patients) is ongoing.

Reference

1. Qiu S-Q, Zeng H-C, Zhang F, et al. A nomogram to predict the probability of axillary lymph node metastasis in early breast cancer patients with positive axillary ultrasound. *Sci Rep* 2016; 6: 21196.