

Non-sentinel lymph node metastases in breast cancer patients with a positive sentinel lymph node: validation of five nomograms and development of a new predictive model

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ABSTRACT

Aims and background. Discordance of intraoperative analysis with definitive histology of the sentinel lymph node in breast cancer leads to completion axillary lymph node dissection, which only in 35-50% shows additional nodal metastases. The aim of the study was to identify individual patient risk for non-sentinel lymph node metastases by validating several statistical methods present in the recent literature and by developing a new tool with the final goal of avoiding unnecessary completion axillary lymph node dissection.

Methods. We retrospectively evaluated 593 primary breast cancer patients. Completion axillary lymph node dissection was performed in 139 with a positive sentinel lymph node. The predictive accuracy of five published nomograms (MSKCC, Tenon, Cambridge, Stanford and Gur) was measured by the area under the receiver operating characteristic curve. We then developed a new logistic regression model to compare performance. Our model was validated by the leave-one-out cross-validation method.

Results. In 53 cases (38%), we found at least one metastatic non-sentinel lymph node. All the selected nomograms showed values greater than the 0.70 threshold, and our model reported a value of 0.77 (confidence interval = 0.69-0.86 and error rate = 0.28) and 0.72 (confidence interval = 0.63-0.81, error rate = 0.28) after the validation. With a 5% cutoff value, sensitivity was 98% and specificity 9%, for a cutoff of 10%, 96% and 2%, respectively.

Conclusions. All the nomograms were good discriminators, but the alternative developed model showed the best predictive accuracy in this Italian breast cancer sample. We still confirm that these models, very accurate in the institution of origin, require a new validation if used on other populations of patients.

Key words: breast cancer, nomogram, non-sentinel lymph node, sentinel lymph node.

Conflict of interest statement: None of the authors of the submitted manuscript "Non-sentinel-lymph-nodes metastases in breast cancer patients with positive sentinel lymph node: validation of five nomograms and development of a new predictive model" has any financial or personal relationship with other people or organizations to disclose that could inappropriately influence (bias) their work. These potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

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Received April 7, 2011;
accepted June 26, 2011