

Title:

New Models for Predicting Non-Sentinel Lymph Node Status when Sentinel Lymph Nodes are Positive

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Technical Report number (Dept. of Statistics, Stanford Univ.):
241

Date:

February 2007

Abstract:

PURPOSE: Current practice is to perform a completion axillary lymph node dissection (ALND) for breast cancer patients with tumor-involved sentinel lymph nodes (SLNs), though fewer than half will have non-sentinel node (NSLN) metastasis. Our goal was to identify SLN-positive patients with negligible risk of NSLN metastasis.

PATIENTS AND METHODS: We constructed three models to predict NSLN status: recursive partitioning with receiver operating characteristic curves (RP-ROC), boosted Classification and Regression Trees (CART), and multivariate logistic regression (MLR) informed by CART. Data were compiled from a multicenter Northern California database of 784 patients who prospectively underwent SLN biopsy and completion ALND. We also applied our data to the Memorial Sloan-Kettering Breast Cancer Nomogram (Nomogram).

RESULTS: 285 patients had positive SLNs, of which 213 had known angiolymphatic invasion status and 171 had complete pathologic data including hormone receptor status. 101 (35.4%) of all SLN-positive patients had tumor-involved NSLNs. Tumor size, angiolymphatic invasion, and SLN metastasis size predict risk in all models. RP-ROC and boosted CART stratify patients into four risk levels. MLR informed by CART is most accurate. Using two composite predictors calculated from three variables, MLR is more accurate than the Nomogram computed using eight predictors: area under ROC curve (AUC) 0.83/0.85 for MLR (n=213/n=171) and 0.77 for Nomogram (n=171).

CONCLUSION: Despite the higher accuracy of our method, we did not identify any subset of SLN-positive patients with low enough risk of NSLN metastasis to recommend a change in clinical practice. Patients with isolated tumor cells had the lowest overall risk.