

ABSTRACT

Background

Breast cancer cell population characteristics are used in common clinical practice for estimation of prognosis of the malignant disease (prognostic factors) and for prediction of reactivity of the tumor to certain therapeutic modality (predictive factors). Also axillary lymph node status is an independent prognostic factor in women with early breast cancer. Therefore, surgical excision and following histopathological examination of the nodes is the obligatory part of primary breast cancer surgery. The extension of axillary surgery varies widely, although sentinel lymph node biopsy is considered to be the standard procedure. However, it must be admitted that this type of procedure need not be optimal for all the breast cancer patients.

Aims of the study

The aim of this study is to verify the hypothesis whether or not the axillary lymph node metastatic affection can be effectively estimated using non-surgical methods – i.e. by evaluation of the combination of prognostic and predictive factors of the primary breast tumor. Statistical model composed on the basis of data of early breast cancer patients is the basic tool for this prediction. Application of this model in everyday practice can enable to adjust the extent of axillary surgery for each individual patient.

Patients and methods

A total of 617 women treated in the leading oncosurgical unit Medicon Praha s.r.o. were involved in this retrospective study. The inclusion criteria were primary surgery procedure and the gain of at least one axillary lymph node. First dataset was produced by imaging techniques and histological evaluation of biopsy specimen (called “preoperative values”), another dataset was available postoperatively – by evaluation of histological specimen harvested during the surgery (so called “postoperative values”). All these variables were entered into the logistic regression equation using the method “enter”.

Results

Postoperative values are considered more accurate as they are based on detailed analysis of complete tumor material. Using these values *postoperative model* has been constructed. Tumor size, lymphovascular space invasion and progesterone receptor status were the only variables that proved statistical significance. Regression model exhibited good predictive characteristics – area under curve ROC was 0,78. The predictive power was higher when all the variables (and not only those statistically significant) were left in the equation. Consequently, preoperative and postoperative values were compared – only histological grading was statistically significantly different and thus it had to be removed from the model; also the lymphovascular invasion has been excluded from the model as it was not reliably available before surgery. Preoperative model exhibited good predictive characteristics when using postoperative values (ROC = 0,77); however, predictive power was only moderate when using preoperative values (ROC = 0,66).

Discussion

Predictive power of our model is fully comparable to similar predictive models published by now in the literature. For clinical practice however, the model is completely inapplicable as the postoperative values are not available at the time of diagnosis. Preoperative values (except for grading) did not significantly differ from postoperative values. Unfortunately application of corrected preoperative regression equation for the preoperative data resulted in the model whose predictive characteristics are hardly applicable for decision making at the time of diagnosis (sensitivity of only 53%, false negativity rate of 48%). The most important reason for this situation is probably the heterogeneity of the tumor that does not allow to accurately evaluate tumor characteristics at the time of diagnosis. We were trying to suggest some modifications of tumor characteristics evaluation in clinical practice that could lead to the improvement of predictive power of our model.

Conclusions

At present, this model cannot identify patients who have sufficient chance of being axillary lymph node positive or negative. Thus, these models cannot be used to substitute for the prognostic information gained by axillary dissection (when nodal status is a critical element in adjuvant therapy decision making).