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Is intraoperative touch imprint cytology indicated in the surgical treatment of early breast cancers?

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Abstract

Introduction: Intraoperative touch imprint cytology (TIC) of the sentinel lymph node(s) (SLN(s)) in the treatment of breast cancer has significantly reduced the number of axillary block dissections (ABD) required during second surgeries. Based on recent studies, ABD was not considered necessary if the presence of tumor cells/micrometastasis was confirmed in the SLN(s) or in the case of macrometastases in a patient group meeting the inclusion criteria for the ACOSOG Z0011 study. Our aim was to determine the sensitivity and usefulness of TIC with regard to these results.

Methods: TICs of the SLN(s) were examined in 1168 patients operated on for breast cancer. The method was also analyzed retrospectively based on the guidelines for the Z0011 study. During TIC, new samples were cut every 250 μm; impression smears were evaluated after being stained with hematoxylin eosin.

Results: TIC confirmed metastasis in 202 cases (202/1168, 17.29%). Metastasis was confirmed in SLN(s) in 149 additional cases during a final histological examination. The sensitivity of TIC was found to be 57.18%, and its specificity was 99.63%. An analysis was then performed except for cases that met the inclusion criteria for the Z0011 study and with metastasis smaller than 2 mm (micrometastasis/isolated tumor cells) considered to be positive during intraoperative cytology. The sensitivity of the method decreased to 34.23%, while its specificity was still high at 99.76%.

Conclusions: Based on the new guidelines for ABD, imprint cytology cannot be considered a beneficial and cost-effective intervention in the surgical treatment of early breast cancer.

Keywords: Axillary block dissection; Breast cancer; Intraoperative imprint cytology; Sentinel lymph node biopsy

Introduction

The introduction of sentinel lymph node biopsy (SLNB) in the treatment of early breast cancer 20 years ago significantly reduced the number of radical surgical interventions and the number of axillary block dissections (ABD).[1,2] Intraoperative analysis of the sentinel lymph node(s) has been used increasingly, as surgeries performed in two sessions can be avoided with this method in most cases.[1,3]

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Intraoperative histological examinations include imprint cytology, frozen section histology and a nucleic acid amplification study. The specificity and sensitivity of these examinations are similar. The sensitivity of the nucleic acid amplification study is 76.9–98.2%, and that of frozen section histology and imprint cytology varies between 68.49 and 98.81%. The specificity of all three methods is considered almost 100%.[4–7]

Surgical treatment of the axilla has changed significantly, particularly with regard to the indication for supplementary ABD. Based on the results of several prospective studies, ABD is not indicated for positive sentinel lymph nodes containing isolated tumor cells (ITC, <0.2 mm) and micrometastases (<2 mm), adjuvant therapy being sufficient.[8–10] The results were also described in several international guidelines.[9,11] Axillary block dissection is not necessarily required for patients with wide excision and sentinel lymph node biopsy for stage T_1 or T_2 breast cancer with sentinel lymph nodes containing no more than 1–2 macrometastases, according to the ACOSOG Z0011 study published in 2011 (neoadjuvant therapy is an exclusion criterion as well), as additional surgical treatment neither increases survival significantly nor reduces the incidence of axillary recurring tumors.[8] In these cases, adjuvant systemic treatment and complete irradiation of the breast are sufficient.[8,11–17] According to the ACOSOG Z0011 study criteria, a consensus conference held in St. Gallen in 2013, the Guidelines of the American Association of Oncology (NCCN) and axillary block dissection may be omitted.[8,13,14]

According to several studies, ABD is an equivalent therapeutic alternative to targeted axillary radiation.[15–17] Knowledge of treatment alternatives and participation in treatment selection represent a growing demand among patients. However, in the case of axillary block dissection performed for positive imprint cytology, patients cannot participate in the therapeutic decision.

In conclusion, the routine use of imprint cytology should be reconsidered. In our study, imprint cytology results were examined and analyzed retrospectively based on new national guidelines on the treatment of the axilla. Moreover, we analyzed the cost and time of breast surgery taking into account the necessity of imprint cytology.

Patients and methods

Between 2008 and 2014, a total of 1673 patients underwent surgery in our institution for invasive breast cancer and other breast malignancies. In this period, 1168 patients who were suffering from consecutive early invasive breast carcinoma and whose preoperative axillary US + FNA did not show axillary lymph node metastasis were examined with imprint cytology of the SLN(s).

Sentinel lymph nodes were removed with the double tracer method published by Albertini in 1996.[18] On the day before the surgery (but at least four hours before the surgery), human colloidal albumin was administered with isotope (99mTc) tracing under ultrasound or X-ray guidance near the lesion. A lymphoscintigraphic (static) examination was then performed to determine the projection of SLN(s) and lymphatic drainage. The patent blue dye was periareolarly. The SLN(s) were identified with a manual gamma camera.

The technique for touch imprint cytology (TIC) was as follows: the cut surface of the fresh sample prepared from a lymph node (250 μm slices) was pressed on a slide, and then an impression smear was prepared. The resulting imprint cut surfaces were fixed in 95% ethanol for 5–6 s, and the samples were evaluated after hematoxylin eosin staining. Every SLN underwent a standard histological examination later.

We allocated the sensitivity and specificity of TIC based on the intraoperative and final histological result. Based on the final histological examination of the sentinel lymph node(s), we selected patients in whose cases performing an ABD is no longer justified according to the new international recommendations (ITC, micro- and macrometastases, which meet the criteria for ACOSOG Z0011) and thus there is no need for intraoperative lymph node analysis either. Based on these data, the imprint cytology results were re-evaluated and compared with non-modified data.

Statistics

We studied the sensitivity and specificity of imprint cytology with the scheme below:

$$\text{sensitivity} = \text{realpositivecases}/\text{realpositivecases} + \text{falsenegativecases}$$

$$\text{specificity} = \text{realnegativecases}/\text{realnegativecases} + \text{falsepositivecases}$$

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