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Preliminary communication

Diagnostic value of intraoperative histopathological examination of the sentinel nodes in breast cancer and skin melanoma—Preliminary results of single centre retrospective study

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ABSTRACT

Objective: Intraoperative histopatological examination of the sentinel nodes enables selection of patients who need dissection of the regional lymphatic system during the same operation. The aim of this study is to evaluate the diagnostic value of intraoperative histopathological examination of the sentinel nodes in breast cancer and skin melanoma. Intraoperative histopathology of the sentinel nodes as a diagnostic method is used in patients with melanoma and breast cancer. Recent studies have proved it to be an effective method for evaluating the nodes in the final histopathology. Intraoperative histopathological examination of the sentinel nodes is not performed routinely and there is no clear position on this issue. In this paper we try to prove that intraoperative test gives patients the simultaneous benefits of removal of regional lymph nodes metastases and earlier initiation of adjuvant therapy.

Methods: The study comprises 137 patients with breast cancer and 35 patients with malignant skin melanoma. Sentinel nodes were intraoperatively sectioned and examined by means of the imprint method and frozen section evaluation. The patients with positive sentinel nodes underwent immediate dissection of regional lymph nodes. Those with negative sentinel nodes diagnosed in the intraoperative examination, but positive in final pathologic results, underwent subsequent dissection of regional lymph nodes.

Results: 60 sentinel lymph nodes were found in 35 patients with skin melanoma. In 3 patients, 3 sentinel lymph nodes were false negative in the intraoperative histopathological examination. No false positive sentinel lymph nodes were found. 249 sentinel lymph nodes were found in the intraoperative histopathological examination in 137 patients with breast cancer. There were no false positive sentinel nodes, but there were 7 false negative sentinel nodes. In this study, only 5 (3.6%) patients with breast cancer and 3 (8.5%) patients with skin melanoma required another regional operation.

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Conclusion: The method of intraoperative histopathological evaluation of the sentinel nodes enables identification of metastases in these lymph nodes and gives a possibility to carry out a one-step regional lymphadenectomy and start the adjuvant therapy earlier.

1. Background

The knowledge of the state of lymph nodes is necessary to evaluate the clinical progression of malignant tumours resulting in metastases through the lymphatic tract. Clinical examination is a basic evaluation method. Fine needle aspiration biopsy is applied in the case of enlarged lymph nodes and then specimens are sent for cytological examination. In the case of diagnostic doubt, open surgical biopsy should be carried out. If regional lymph nodes are clinically unchanged, the best method to assess their state is to carry out biopsy of the sentinel node with its cytological evaluation.[1,2]

By definition, the sentinel nodes (SNs) are the first lymph nodes on the way of the lymph flow from the area invaded by malignant cancer. The current state of knowledge requires an evaluation of sentinel nodes in solid neoplasms such as skin melanoma and breast cancer. When the sentinel nodes is free from metastases, the risk that another node in the lymph flow is invaded is almost none and there is no need to carry out total lymphadenectomy. The sentinel nodes may be examined intraoperatively. Intraoperative examination of the sentinel nodes gives a possibility to reduce the time before beginning the adjuvant therapy and to carry out a one-step regional lymphadenectomy if metastases have been diagnosed. This can be done by means of frozen section procedures and imprint techniques, immunohistochemical methods and tests on automatic platforms.[2–9] When it is impossible to make an intraoperative histopathological evaluation of the sentinel nodes and the results of the final examination prove a metastasis to the sentinel nodes, the patient needs to undergo another surgery and have regional lymph nodes resected. This exposes patients to additional stress related with the surgery and extends the time before beginning an adjuvant therapy. Lymph nodes involvement could be treated by surgical regional dissection of lymph nodes or radiotherapy, but distant metastases need to be treated by systemic chemotherapy.

There are new methods to examine the sentinel node. Indygocarmine green (ICG) visible in infrared light is one of them.[10]

The aim of this study is to assess preliminary results of the diagnostic value of intraoperative cytological examination of the sentinel nodes in breast cancer and skin melanoma.

2. Material and methodology

Between January 2009 and December 2009, 137 patients with breast cancer and between July 2009 and December 2009, 35 patients with malignant skin melanoma underwent the procedure of sentinel node biopsy with intraoperative histopathological examination. The patients were hospitalised at the 1st Department of Oncological and General Surgery, Greater Poland Cancer Centre, Poznań.

In the case of breast cancer primary tumour was diagnosed in the following number of patients: Tis – 33 patients, T1a – 10 patients, T1b – 26 patients, T1c – 62 patients, T2 – 6 patients. The criteria for exclusion from the study group were changes in clinical or radiological examinations of regional lymph nodes. Patients with T3 and T4 tumours in our group showed such changes.

The melanoma tumour was located on the back – 18 patients, neck – 1 patient, upper limb – 8 patients, lower limb – 4 patients, torso – 4 patients. The results of the histopathological examination of the tumour according to the Breslow scale were as follows: Breslow $\leq$1 mm – 4 patients, Breslow $\leq$2 mm – 11 patients, Breslow $\leq$3 mm – 7 patients, Breslow $\leq$4 mm – 7 patients, Breslow >4 mm – 6 patients.

The preoperative diagnostics of the state of the lymph nodes in the patients suffering from breast cancer and malignant skin melanoma comprised a clinical examination and ultrasonography. If no atypical lymph nodes were diagnosed, the patient underwent the procedure of sentinel node identification.

The sentinel nodes biopsy was carried out according to the following scheme. One day before the surgery, breast cancer patients received a sulphide colloid marked with a radioactive isotope 99 Tc – 1 ml (1 mCi) to the site above the tumour. On the following day, immediately before the surgery, lymphoscintigraphy was carried out.

In the case of malignant melanoma, one day before the surgery the patients received a sulphide colloid marked with a radioactive isotope 99 Tc – 2 ml (1.2 mCi) to the site surrounding the scar after the resected lesion through 4 punctures. After 2 h, lymphoscintigraphy was carried out. 10 min before the planned surgery the patients with malignant melanoma additionally received methylene blue 2.5% to the site surrounding the scar/tumour and they were massaged for 2 min (4 intradermal and subcutaneous injections – 2 ml).

The intraoperative evaluation consisted in sending the collected sentinel node to the histopathological laboratory, where the node was carefully dissected along the long axis, including the hilum and marginal sinuses. One half was used to make an imprint and it was stained with haematoxylin and eosin. The other half of the sentinel node was used to make frozen sections perpendicularly to the dissection plane and one of them was stained with H + E and the other one with thionine. The intraoperative evaluation result was sent to the operating surgeon with diagnosis of the presence or absence of metastases in the sentinel nodes. Then the specimens were sent for the final histopathological examination. The specimens were fixed in a 10% formalin solution for 24 h and embedded into paraffin blocks. Three sections were made and stained with H + E. In the case of the absence of metastases in the