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Axillary Evaluation with Targeted Axillary Dissection Using Ultrasound-Visible Clips after Neoadjuvant Chemotherapy for Patients with Node-Positive Breast Cancer

Authors : Naomi Sakamoto, Eisuke Fukuma, Mika Nashimoto, Yoshitomo Koshida

Abstract : Background: Selective localization of the metastatic lymph node with clip and removal of clipped nodes with sentinel lymph node (SLN), known as targeted axillary dissection (TAD), reduced false-negative rates (FNR) of SLN biopsy (SLNB) after neoadjuvant chemotherapy (NAC). For the patients who achieved nodal pathologic complete response (pCR), accurate staging of axilla by TAD lead to omit axillary lymph node dissection (ALND), decreasing postoperative arm morbidity without a negative effect on overall survival. This study aimed to investigate the ultrasound (US) identification rate and success removal rate of two kinds of ultrasound-visible clips placed in metastatic lymph nodes during TAD procedure. Methods: This prospective study was conducted using patients with clinically T1-3, N1, 2, M0 breast cancer undergoing NAC followed by surgery. A US-visible clip was placed in the suspicious lymph node under US guidance before neoadjuvant chemotherapy. Before surgery, US examination was performed to evaluate the detection rate of clipped node. During the surgery, the clipped node was removed using several localization techniques, including hook-wire localization, dye-injection, or fluorescence technique, followed by a dual-technique SLNB and resection of palpable nodes if present. For the fluorescence technique, after injection of 0.1-0.2 mL of indocyanine green dye (ICG) into the clipped node, ICG fluorescent imaging was performed using the Photodynamic Eye infrared camera (Hamamatsu Photonics k. k., Shizuoka, Japan). For the dye injection method, 0.1-0.2 mL of pyoktanin blue dye was injected into the clipped node. Results: A total of 29 patients were enrolled. Hydromark™ breast biopsy site markers (Hydromark, T3 shape; Devicor Medical Japan, Tokyo, Japan) was used in 15patients, whereas a UltraCor™ Twirl™ breast marker (Twirl; C.R. Bard, Inc, NJ, USA) was placed in 14 patients. US identified the clipped node marked with the UltraCore Twirl in 100% (14/14) and with the Hydromark in 93.3% (14/15, p = ns). Success removal of clipped node marked with the UltraCore Twirl was achieved in 100% (14/14), whereas the node marked with the Hydromark was removed in 80% (12/15) (p = ns). Conclusions: The ultrasound identification rate differed between the two types of ultrasound-visible clips, which also affected the success removal rate of clipped nodes. Labelling the positive node with a US-highly-visible clip allowed successful TAD.

Keywords : breast cancer, neoadjuvant chemotherapy, targeted axillary dissection, breast tissue marker, clip
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