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Value of axillary ultrasound as a pre-operative staging procedure in breast cancer − a pilot study

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Background: The aim of this study was to determine if the re-operation rate for sentinel node positive patients could be reduced by determining lymph node status preoperatively utilising ultrasound and fine needle aspiration.

Materials and Methods: A retrospective chart and database analysis of 119 consecutive, clinically node negative patients who had undergone pre-operative axillary ultrasound assessment was undertaken. The ultrasound finding was categorised as normal, suspicious or malignant. Patients who had nodes which were suspicious or diagnostic of malignancy had an ultrasound guided fine needle aspiration (FNA). Patients with a normal scan or a suspicious scan in whom FNA was reported as C1 or C2 (benign) were offered a sentinel node biopsy. Patients with a positive (malignant, FNA C5) assessment were offered axillary clearance. The sentinel nodes were not analysed intra-operatively.

Results: Eighty-two scans (69%) were reported as normal. Of these, 63 were node negative on pathological assessment (77%) and 19 were node positive (23%). Sixteen (13%) ultrasound scans were radiologically suspicious (but FNA negative C1=5, C2=11) however, 2 were subsequently found to be node positive. In twenty-one scans (18%) nodes imaged as malignant on ultrasound of which 19 had positive nodes on pathology, 2 patients were false positive (90% positive predictive value). In total, 40 of the 119 patients were node positive. In this study, axillary ultrasound, when reported as either normal or malignant, had a specificity of 97% and a sensitivity of 42%. Unit policy determined that all patients with any nodal metastatic disease (including micro metastatic disease) underwent axillary clearance. Twenty one patients had a secondary node procedure, 2 patients had an axillary clearance which was technically not required. However, the use of axillary ultrasound preoperatively resulted in 20 of the 119 patients (17%) avoiding a second axillary procedure.

Conclusions: This study suggests that preoperative axillary ultrasound with FNA (as indicated), in patients who are clinically node negative identifies a group of patients who have lymph node metastasis. This pre-operative assessment prevents a number of patients from having a second axillary procedure with the potential associated morbidity. We suggest that nodal assessment with ultrasound should be routine for all patients undergoing sentinel node surgery.

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Sentinel lymph node dissection before neoadjuvant systemic therapy in breast cancer: our experience

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Background: Neoadjuvant chemotherapy or hormonotherapy in breast cancer patients is a valuable method to determine the efficacy of systemic therapy and potentially downstage the primary tumor, which facilitates breast-conserving therapy. There is no consensus about sentinel lymph node dissection (SLND) in T2 tumors either before or after neoadjuvant systemic therapy (NST). The aim of this study was to evaluate our experience in SLND biopsy before NST since April 2006.

Material and Methods: A prospective study was performed in two centers: Institut Català d'Oncologia-Bellvitge Hospital and Sant Joan de Déu Hospital of Martorell, since April 2006. SLND was performed before NST by using lymphoscintigraphy in 34 patients staged T2N0. Axillary status pre-surgery was studied by ecography and clinical exploration. SLND was performed in ambulatory surgery regimen. Systemic therapy was started within the first week after surgery in all cases. Axillary lymph node dissection was performed after systemic therapy if the sentinel node contained metastases and avoided when negative.

Results: The rate of SLN identification was 100%. The number of sentinel lymph nodes (SLN) obtained from the surgery was ranged between 1 to 5 nodes. Extra-axillary localization of SLN was internal mammary chain in two cases. Ten patients (29%) had a tumor-positive axillary SLND, and only 1 had additional involved nodes in the completion lymph node dissection specimen. The other 24 patients (71%) had a tumor-negative sentinel node and did not undergo axillary lymph node dissection.

We have observed only two minor complications after SLND: 1 hematoma and 1 seroma with spontaneous resolution. Most of patients were postmenopausal. Neoadjuvant chemotherapy was administered in 30 patients and hormonotherapy in 4. Breast conservative surgery was performed in all cases. Neither axillary nor breast recurrences have been observed at the present follow-up.

Conclusions: Performing sentinel node biopsy before neoadjuvant systemic therapy is successful and reliable in patients with T2N0 breast cancer. A high percentage of patients were spared axillary lymph node dissection, decreasing surgery morbidity.

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Sentinel lymph node biopsy after neoadjuvant chemotherapy in locally advanced breast cancer patients: feasibility, accuracy and disease upstaging

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Background: Sentinel lymph node biopsy (SLNB) is an accepted nodal staging technique in early-stage breast cancer to predict axillary status and lower the morbidity associated with axillary lymph node dissection (ALND). Moreover the SLNB allows for a more accurate staging thorough an exhaustive histopathological examination detecting isolated tumor cells (ITC) and micro-metastases. Neoadjuvant chemotherapy (NCT) is currently used in the management of breast cancer patients with locally advanced disease to facilitate surgical treatment. However, SLNB after NCT remains a point of contention since chemotherapy might have possible negative effects of lymphatic scarring or uneven nodal tumour response. This study was performed to evaluate the feasibility and accuracy of SLNB for patients undergoing NCT and to evaluate the number of this patients that are upstaged from detection of ITC and micro-metastases.

Material and Methods: From 2003 to 2009, 204 patients with stage IIB-III A/B breast cancer underwent NCT. Out of these, 50 patients received SLNB at the time of surgery. Peritumoral and/or subdermal injections of blue dye were used for intraoperative lymphatic mapping. All patients were offered back-up ALND. Negative sentinel lymph nodes (SLNs) were examined by step sectioning, stained with H&E and immunohistochemistry to detect micrometastases. Lymph nodes from ALND specimens were examined by standard H&E only.

Results: The SLN was successfully mapped in 46 patients (identification rate 92%). The mean number of SLNs removed was 1.8 (range, 1−4 SLNs). Twenty-nine (63%) patients had positive SLNs, and in 14 of those patients (30%), the SLN was the only positive node. Two patients had false-negative SLNB; that is, the sentinel node was negative, but at least one non-SLN contained metastases. Accuracy of the SLNB was 97.7%. Of the 29 patients with positive SLN, in 12 cases (41%) we found only small tumor infiltrates: five SLN harboured ITC (11%) and 7 SLN were micro-metastatic (15%).

Conclusions: Our study shows feasibility and an acceptable accuracy of the SLNB to provide scrupulous assessment of the axilla in patients who have received NCT. These results are coherent with current literature and seem promising to spare also in selected patients with locally advanced breast cancer the morbility of ALND. Another important advantage of the SLB is that it leads to a more accurate staging that might change the management and the outcome of these patients.

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Significance of non-sentinel lymph node (SLN) removed simultaneously in SLN biopsy for patients with breast cancer

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Background: Sentinel lymph node biopsy (SLNB) for patients with breast cancer has been firmly established as a conserving method in the axillary lymph node dissection (ALND). However, the problem of metastasis to non-SLN while that to SLN is negative, so-called 'false-negative', is not yet solved. Our goal is to review retrospectively the significance of non-SLN removed simultaneously in SLNB (para-SLN).

Material and Methods: We assessed 441 patients with early breast cancer (T1/T2) who underwent SLNB in Kyushu University Hospital

between June, 2001 and March, 2009. We judged it as SLNs, LNs which we could detect the uptake of 99mTc-Phytate colloid radioisotope (RI) or the staining with indigocarmine blue dye. Also, we decided it as para-SLNs (specific non-SLNs), LNs which were no uptake of RI and no staining with blue dye, but swelling or palpable around the SLN. We performed histological examination by frozen section and cytological one by stamp smear as intraoperative examination.

Results: The average age of all patients is 56 years old. Of 441 cases, SLN was able to be detected in 420 cases (94.8%). Nine cases (42.9%) had ALN metastases, of 21 cases whose SLNs were not detected and ALNs were additionally dissected. Of 420 cases that we were able to identify SLN, in 57 cases (13.6%) SLN metastases were diagnosed as positive at intraoperative examination and we performed ALND for those cases. Of 363 cases whose SLN metastases were diagnosed as negative at intraoperative examination, in 154 cases para-SLN was removed and, in seven (4.5%) of 154 cases, para-SLN metastases were diagnosed as positive at intraoperative examination. 15 cases were diagnosed as positive on SLN metastasis by the histopathological exam with permanent sections, and the false-negative rate was 4.8%.

[Conclusions] Mean of observation time is 44 months, no case is found with local recurrence by now. However, it is significant that 7 cases of metastasis-positive para-SLN deserved 37.5% of the false-negative cases. Also, we can not deny the possibility that reliability of SLNB may decrease when metastasis occurred in SLN, because SLN metastasis is present with 50% of the 22 case that we can not detect. Therefore, it is so important that we investigate para-SLN to avoid axillary LN recurrence as much as possible.

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A simple 'pulsing' technique of massage to improve detection rates of Blue Dye sentinel nodes in breast cancer

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Background: Detection rates vary from 70% to 96% after injection and Guiliano's technique of massage in the blue dye alone method of sentinel node in breast cancer. Poor detection rate with blue dye alone has been one of the major limiting factor in its usage over the dual technique. Injection sites for blue dye vary from intradermal, intra or peritumoral to subareolar injections. Massage is normally done, as described by Guiliano, by rotatory movements of the hand over the injection site. Passage of the dye through the lymphatics is by passive movement. Lymphatics start in the interstitium as avalvular plexuses, then form valved precollecting channels. Entry into the avalvular plexus at start of the lymphatic pathway depends on interstitial pressure. Subsequent flow through valved lymphatics is also passive. Rotatory massage may be limited in aiding forward flow. A simple pulsing technique of massage is described which significantly improves detection rates.

Methods: 2 ml of 2.5% Patent Blue dye is injected in the subareolar free space. Massage is done by the surgeon, prior to scrubbing, for at least 2 minutes by intermittent vertical pulsing movement of the flat of the fingers of one hand on the nipple areolar complex. The axilla is approached in the standard surgical way usually about 10 minutes from the time of injection.

Results: A total of 242 consecutive sentinel node procedures were performed between September 2007 and October 2009. Blue nodes were retrieved in all but 3 cases (239/242) giving a detection rate of 98.7%. Of the 3 cases that failed to show a blue node 1 was in a very large lady which made surgery technically difficult. One had previous lumpectomy and axillary sample and one other failed to show a blue node (it was thought not enough time was given between injection and surgery).

Conclusion: A new and simple technique is described that significantly improves detection rates in blue dye method of sentinel node retrieval. The technique of vertical pulsing massage may be increasing the interstitial pressure better than the horizontal and rotatory technique thus improving uptake of the dye through the avalvular plexus into the precollecting channels. It would also seem plausible that the intermittent pulsing movement helps the forward fluid movement of the dye through the valved lymphatics thus enhancing detection rates.

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Three-dimensional multidetector-row computed tomographic lymphography for sentinel lymph node biopsy in breast cancer

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Background: Three-dimensional multidetector-row computed tomographic lymphography (3D MDCT-LG) is useful for visualizing lymph flow and detecting a sentinel lymph node (SLN). In this study, we evaluated the usefulness of 3D MDCT-LG for SLN biopsy in patients with breast cancer.

Methods: From July 2007 to February 2008, forty patients with breast cancer (N0) underwent 3D MDCT-LG one minute after injection of iohexol under the periareolar skin on the day before surgery. The location of the SLN was marked on the skin using the laser light navigator system of the CT. During the operation, SLN biopsy was performed through a skin incision on the marked place after periareolar injection of patent blue, followed by resection of the primary tumor and backup axillary dissection. The SLN was tagged separately from other nodes. All removed nodes were pathologically examined.

Results: SLNs were clearly visualized by 3D MDCT-LG in 30 (75%) patients and faintly in 10 (25%). The patients with faintly visualized SLNs were significantly older than those with clearly visualized SLNs (72 ± 13 vs. 56 ± 11, $P < 0.01$). SLNs were identified in 37 of 40 patients (92.5%). The accuracy was 94.4% (35/37), and the false negative rate was 15.4% (2 of 13). Metastases were histologically confirmed in SLNs of 14 (35%) patients who did not have metastases in the axillay region preoperatively.

Conclusions: Preoperative 3D MDCT-LG was as useful for SLN biopsy as the radiocolloid method. Combination of preoperative 3D MDCT-LG and blue dye technique facilitates quick and accurate identification of SLNs.

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Feasibility of primary systemic therapy to save axillary lymph node dissection in patients with initial axillary lymph node metastasis

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Background: Primary systemic therapy (PST) downstages up to 40% of initial documented axillary lymph node (ALN) metastasis. The present surgical treatment strategy after PST may neglect the fact that patients with complete tumor response in metastatic axillary lymph node (ALN) could have the chance of being spared from axillary lymph node dissection (ALND). The aim of this study was To evaluate the feasibility and accuracy of sentinel lymph node biopsy (SLNB) after PST among the group of patients with documented ALN metastasis at presentation. And, we compared the difference of SLNB accuracy according to clinical tumor response after PST.

Material and Methods: We analyzed 66 patients with documented ALN metastasis who underwent SLNB and concomitant ALND after PST. Axillary ultrasound (USG) was used to evaluate the clinical response of initial documented ALN metastasis after PST. Intraoperative lymphatic mapping was performed using blue dye with or without radioisotope.

Results: After PST, pathologic complete response rate in patients with metastatic ALN was 31.8%. The overall success rate of SLNB after PST was 87.9%, and the mean number of identified sentinel lymph node was 2.8 (1−8). There was no significant difference in success rate of SLNB according to age, clinical tumor size, type of PST, and clinical tumor response. Six patients with negative sentinel nodes had positive non-sentinel nodes after the final pathologic examination (false-negative rate: 15.4%). According to clinical tumor response in axillary metastases after PST, false-negative rate was 0% in clinical complete response group and 19.4% in residual axillary metastases group.

Conclusion: Our findings suggest that SLNB is feasible in patients with initial documented ALN metastasis that had clinically complete response for metastatic ALN after PST. Further investigation in a prospective setting should be also designed to confirm our results.

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Optimization of the intraoperative sentinel node procedure in breast cancer with one-step nucleic acid amplification (OSNA) method

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Background: Recently, a new procedure has been developed for the evaluation of sentinel node in breast cancer. It is based in amplification of mRNA of 19 Cytokeratin by a loop mediated amplification reaction (RT-LAMP) otherwise known as one-step nucleic acid amplification (OSNA).

The amplification reaction time takes only 16min, but the transportation of the node from the operating room, the dissection of the node from the