lymph nodes (SLNs) identified and the detection rate in early-stage breast cancer (Sugie T. et al., ASCO2011 abstract #1122). This technique allows visualization of the first SLN as a real-time image from outside the body and enables orderly and sequential dissection along the lymphatic flow. This study evaluates the effectiveness of the ICG fluorescence method for identification of SLN metastasis and further axillary status in patients with positive SLNs.

Methods: Ninety-nine patients with early stage breast cancer received subareolar injections of both ICG and indigo carmine. Lymphatic flows were traced with a PDE camera (a charge-coupled device; Hamamatsu Photonics, Hamamatsu, Japan). Real-time image-guided surgery enabled identification of the SLN fluorescence signal. SLNs were classified according to the order in which they were removed and whether they were **ICG**-positive and/or blue dye-positive. In patients with positive SLNs, the status of other axillary lymph nodes was recorded after completion of axillary lymph node dissection (ALND). Identification rate of SLNs were also assessed in terms of age and body mass index (BMI).

Results: The mean age and BMI were 60 (range 29−75) years and 22.3 (range 17.6–32.4) kg/m^2, respectively. The mean number of SLNs removed was 3.4 (range1−10). The ICG fluorescence technique identified 99% (98/99) of SLNs; this identification was independent of age and body mass index. **Involvement of SLNs was found in 20% (**20 of 98) of cases, and the ICG fluorescence technique demonstrated 100% positivity in the first SLN. Six cases were undetected by the blue dye resulting in a false negative rate of 30% (6/20). Metastases to the second or further SLNs were found in 8 patients, all of whom also had the positive first SLN. Sixteen patients underwent completion of ALND and 25% (4 of 16) of whom had metastases in the axilla. These four patients with axillary involvement had multiple positive SLNs in the second or further pier. However, there was no axillary involvement in the eight patients who had the only one nodal involvement localized in the first SLN.

Conclusion: The ICG fluorescence method leads to high rates of SLN detection even in patients with old age and obesity. SLN identified by this method accurately represents the overall axillary status. By orderly and sequential dissection, patients with **isolated involvement of the first SLN can be spared subsequent ALND.**

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Correlation of Computerized Quantitative MR Breast Density Measurements with Standard Qualitative ACR BIRADS Classification

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Purpose: To compare quantitative breast density measurements with MRI using the Dixon sequence with standard qualitative ACR BIRADS categorization, and to provide a range of equivalent values for each of the two methodologies.

Materials and Methods: 33 women were included in this prospective IRB-approved study and breast density was measured with MRI using the Dixon sequence at 3T Tesla (TR/TE 6ms/ 2.45ms/2.67ms, 192 slices, matrix 352 x 352, 1 mm isotropic), which aquires two datasets, one representing fatty and one fibroglandular tissue. The computerized MRI breast density measurement system calculated the percentage of fatty and fibroglandular tissue (%) and the total volume of the breast (cm^3). Two breast radiologists in consensus allocated a BIRADS density category (1- 0−24%; 2- 25−49%, 3−50−74%, 4 >75%) to each mammogram. Descriptive statistics using the 25−75 % percentile were used to define the typical range of MRI density readings corresponding to the four BIRADS categories of breast density.

Results: Computerized MRI breast density measurements ranged from 3.5% to 60% (mean 22.3%). Compared with the BIRADS categories, 25−75% percentile assessment demonstrated an interquartile range of percentage breast density of 4.8–15.4% for BIRADS-1, 9.9−22% for BIRADS-2, 16.8–38.1% for BIRADS-3 and 30–51.2% for BIRADS-4.

Conclusion: Quantitative MRI breast density readings were consistently lower than qualitative BIRADS assessment − often by about 50 %. Equivalent values were found with computerized MRI breast density readings of 0–12.6%, 12.7–19.4%, 19.5−34,1% and >34.2% respectively for each of the four BIRADS categories.

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Breast Cancers as a Secondary Malignancy After Treatment for Hodgkin Lymphoma − Focus on HER2 Status

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Background: Radiotherapy is frequently part of a curative treatment for Hodgkin lymphoma (HL) and BC is most frequent secondary malignancy after HL diagnose.

To the best of our knowledge, it has not been explored whether BC, that could be potentially radiotherapy induced after HL, has different incidence of HER2 over expression, as compared to common BC.

Therefore, the aim of this analysis is to explore HER2 status in BC developed as a secondary malignancy after HL treatment.

Patients and Methods: From January 2000 to January 2011, 13 female patients with BC stage I-III, and previous history of HL were identified.

All have been treated for HL with chemotherapy, and 10/13 also with radiotherapy to the chest wall. HL treatment was conducted in period 1981–2004.

For BC treatment, all patients underwent radical mastectomy, postoperative chemotherapy, and hormonal therapy in 8/13. Median follow up after BC is 4 years (range 1−10).

Pathological specimens for IHC (HerceptTest Dako) were identified for 12/13. All HER2 2+ results were tested with CISH.

Results are presented in the table.

No.	Median age et HL dg (years)	Median interval to BC (months)	Previous radiotherapy to the chest	Median age et BC dg (years)	HER2 positive (3+ CISH+)	NA
13	26.8 (13−53)	185.2 (72–348)	10/13	43.5 (26−69)	0/12	1/13

Conclusion: Ten patients developed BC after previous radiotherapy to the chest wall and three without previous radiotherapy for HL. There were no HER2 over expression in 12/13 samples.

Although this is a small patient subgroup, results are intriguing and suggestive that previous HL and treatment including RT to the chest wall probably does not induce more aggressive forms of BC, defined by HER2 over expression.

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The Potential of Targeting Nanoparticle for Breast Cancer Diagnosis

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Background: Nanotechnology is the exciting field focused on man-made materials in the size range of 1–100 nanometers (nm). Nanoparticles (NPs) are on the scale of many cellular-level processes and hence are attractive for targeting breast cancer (BC). Our group has reported Gold Speckled Silica NPs (GSS) as multimodal contrast agents for fluorescence, magnetic resonance and photoacoustic tomographic (PAT) imaging. The near infrared (NIR) optical absorption property of these particles makes them potentially useful for therapeutic applications such as thermal ablation of tumors. Then we have focused on the increased glucose metabolism of cancer cells, we have recently developed glucose binding NPs as targeting NPs.

Materials and Methods: We hypothesize that glucose conjugated NPs is more incorporated into cancer cells compared to normal NPs. Human breast cancer cells (BT474) were incubated with glucose conjugated NPs (2DOG-NPs) or normal NPs (as control) after 12 hours glucose free preparation. The tumor cell uptake was assessed using flow cytometry and fluorescence microscopy experiments.

Results: Uptake of 2DOG-NPs was significantly higher than uptake of normal NPs after 12 hours glucose free preparation.

Conclusion: Glucose conjugated NPs can be used as suitable targeting NPs for development of imaging agents for early diagnosis of BC. Evolving bio-nanotechnologies such as targeting NPs promise to enhance the early detection and non-invasive treatment of BC.