

compared: tantalum > titanium ( $p < 0.0001$ ), medium > small ( $p < 0.0001$ ), and lower outer > other quadrants ( $p = 0.004$ ). For floor mounted kV imaging, 98.4% MTa, 91.1% STa, 53.1% MTi, and 10.4% STi clips were clearly visible. For isocentric kV imaging, 99.0% MTa, 93.8% STa, 88.9% MTi, and 61.8% STi clips were clearly visible. For isocentric MV imaging, 94.8% MTa, 36.1% STa, 0% MTi, and 0% STi clips were clearly visible. The mean volume ( $\text{cm}^3$ ) of artifact generated by MTa, STa, MTi, and STi clips was 0.81, 0.23, 0.07, and 0.01, respectively.

**Conclusions:** MTa clips were visualised best, but their CT artifact was unacceptable. STi clips were poorly visualised. Both MTi and STa clips proved suitable as fiducial markers for isocentric kV imaging, although MTi clips generate less CT artifact. STa clips were best visualised for floor mounted kV imaging.

## 2052

## POSTER

### Incidence of chemotherapy induced amenorrhea and the role of hormone therapy on ovarian function in hormone sensitive breast cancer

E. Garcia Garre<sup>1</sup>, S. Rosello-Keranén<sup>1</sup>, E. Jorda<sup>1</sup>, A. Perez-Fidalgo<sup>1</sup>, P. Martin<sup>1</sup>, B. Bermejo<sup>1</sup>, I. Chirivella<sup>1</sup>, A. Magro<sup>1</sup>, A. Insa<sup>1</sup>, A. Lluch<sup>1</sup>.

<sup>1</sup>Hospital Clínico Universitario, oncología, Valencia, Spain

**Background:** The incidence of chemotherapy-induced amenorrhea (CIA) and the importance of ovarian function (OF) in hormone sensitive breast cancer is not well defined. The aim of this study is to define the risk factors of permanent amenorrhea after chemotherapy in premenopausal patients, and the impact hormonal therapy has in OF.

**Material and Methods:** 323 premenopausal patients from our center, diagnosed with hormone sensitive (ER and/or PR positive) invasive breast carcinoma between January 1998 and June 2005 were selected. All received adjuvant or neoadjuvant anthracycline based chemotherapy, with or without taxanes, or high dose chemotherapy followed by autologous bone marrow transplantation (ABMT). The kind of hormone treatment received was also taken into consideration. The data was obtained from the medical records. The two main questions were the incidence of CIA among our patients according to the patient's age and chemotherapy schedule, and the restart of the OF during hormonal treatment.

**Results:** 255 pts with CIA, and 68 with no amenorrhea, were analyzed. The age distribution among patients with CIA was as follows: 45 yrs or older: 140 patients (95.2%), 40–45 yrs: 66 patients (71.74%), 35–40 yrs, 41 patients (61.1%), 35 yrs or younger: 8 patients (36.3%),  $p < 0.0001$ . A significant difference in CIA was found between the two groups ( $p < 0.034$ ). 160 out of 212 patients in the anthracycline based chemotherapy group was found to have CIA (75.4%), while this was the case in 77 of 93 patients in the anthracycline and taxane group (82.8%) There was 100% amenorrhea in the group of 17 patients that received high dose chemotherapy followed by ABMT.

Of 148 patients with CIA and tamoxifen, 10 recovered OF: 7 were still on tamoxifen (4.7%), 3 patients had discontinued treatment (2%). Of 107 on aromatase inhibitors, 7 recovered OF (6.5%)

**Conclusions:** There is a direct correlation between the patients' age and chemotherapy schedule combining anthracycline and taxanes, and chemotherapy-induced amenorrhea. Aromatase inhibitors treatment was associated with a higher recovery rate of ovarian function.

## 2053

## POSTER

### Breast ductal lavage biomarkers in relation to estrogen response and risk factors

R. Chatterton, A. Fasi, S.A. Khan. Northwestern University, Obstetrics and Gynecology, Chicago IL, USA

**Background:** The importance of estrogen in breast cancer risk is amply confirmed by clinical data on the effectiveness of selective estrogen receptor modulators and aromatase inhibitors, yet measurements of plasma estrogen concentrations have not provided the expected degree of association with breast cancer incidence. This disparity may be explained by the poor correlation between plasma and breast fluid concentrations of estrogens and products of estrogen action. The present study provides an estimate of the association between a number of factors measured in ductal lavage fluid and risk as assessed by the Gail model.

**Methods:** Women at high risk for breast cancer were recruited (Gail score for 40 premenopausal women: 1.6–6.9, median 2.5; for 27 postmenopausal: 1.6–6.9, median 3.0). Ductal lavage was performed prior to treatment with tamoxifen. The cells were removed and the fluid was reduced to a volume of 1.0 ml for immunoassays of estradiol, estrone sulfate, androstenedione, DHEA, cathepsin D, and EGF. Significant factors from backward stepwise multiple regression for each group were determined after normalization by log transformation

**Results:** In premenopausal women with Gail score as the dependent variable, the model R2 was 0.207; estrone sulfate had a standard coefficient

of 0.506 ( $p = 0.003$ ) and EGF had a standard coefficient of  $-0.464$  ( $p = 0.008$ ). Other factors did not reach significance. In postmenopausal women with Gail score as the dependent variable, the model R2 was 0.356. EGF had a standard coefficient of 0.753 ( $p = 0.003$ ) and DHEA had a standard coefficient of  $-0.524$  ( $p = 0.048$ ). Other factors did not reach significance. Cathepsin D was related to estrone sulfate in post- but not premenopausal patients. R2 was 0.243, and the standard coefficient was 0.493 ( $p = 0.002$ ).

**Conclusions:** Gail scores in women at high risk for breast cancer are highly significantly related to components of breast fluid but the associations were quite different in pre- and postmenopausal women. An estrogen was an important predictor of risk in premenopausal women and EGF was the most important predictor of risk on postmenopausal women. The estrogen response protein, cathepsin D, was not related to estrogen in the same manner as risk.

## 2054

## POSTER

### Acute effects on cardiac function after breast radiotherapy – a strain rate imaging study

K. Erven<sup>1</sup>, R. Jurcut<sup>2</sup>, C. Weltens<sup>1</sup>, H. Wildiers<sup>3</sup>, J. D'Hooze<sup>2</sup>, J.U. Voigt<sup>2</sup>, W. Van den Bogaert<sup>1</sup>. <sup>1</sup>U.Z. Gasthuisberg, Radiation Oncology, Leuven, Belgium; <sup>2</sup>U.Z. Gasthuisberg, Cardiology, Leuven, Belgium; <sup>3</sup>U.Z. Gasthuisberg, Medical Oncology, Leuven, Belgium

**Background:** Radiotherapy for breast cancer is associated with long-term cardiac dysfunction. Doppler Myocardial Imaging (DMI) has been shown to be a sensitive echocardiographic tool for quantifying subtle changes in cardiac function. This study investigates the occurrence of early radiation-induced changes in regional cardiac function by DMI.

**Materials and Methods:** In a pilot study, 15 women (age  $54 \pm 14.4$  years) with left-sided breast cancer were examined. All patients received radiotherapy to the breast or chest wall by respectively tangential photon beams or direct electron fields. In 8 patients, the internal mammary and medial supraclavicular (IM-MS) lymph nodes were treated by direct anterior mixed photon and electron beams. Dose prescription was 50 Gy in 25 fractions. In all patients, part of the cardiac apex was irradiated. Patients with an intact breast received an additional boost to the tumour bed of 16 Gy. Epirubicin containing chemotherapy was given to 9 patients prior to radiotherapy. Standard echocardiography and DMI data were obtained before and after radiotherapy. Peak systolic longitudinal velocity (VEL) and strain rate (SR) as well as systolic strain (S) were measured in all patients for the 18 mid, basal and apical left ventricular (LV) segments.

**Results:** Conventional and DMI data could be obtained in all patients before and after radiotherapy. LV dimensions, ejection fraction and other conventional parameters of systolic and diastolic function did not change after radiotherapy. Segmental VEL was also not different. In contrast, a significant reduction in S ( $21.5 \pm 7.3$  to  $17.8 \pm 7.6$ ,  $p = 0.001$ ) and SR ( $1.41 \pm 0.52$  to  $1.17 \pm 0.41$ ,  $p = 0.001$ ) was found after treatment only at the level of apical segments, but not in the basal or mid segments ( $-21.1 \pm 6.1$  to  $-20.0 \pm 6.5$  and  $-1.50 \pm 0.40$  to  $-1.40 \pm 0.34$ , resp., both n.s.).

**Conclusions:** In contrast to conventional echocardiography, myocardial deformation parameters allowed the detection of regional decrease in myocardial function early after radiotherapy for left-sided breast cancer. Further follow up is needed to assess the relation between these early changes and long term dysfunction.

## 2055

## POSTER

### MR Imaging in the preoperative assessment of patients with lobular carcinoma of the breast

M.C. Kokke<sup>1</sup>, A. Kyriazopoulos<sup>2</sup>, M.J.C.M. Rutten<sup>2</sup>, M.F. Ernst<sup>1</sup>, K. Bosscha<sup>1</sup>. <sup>1</sup>Jeroen Bosch Ziekenhuis, Department of Surgery, Hertogenbosch, The Netherlands; <sup>2</sup>Jeroen Bosch Ziekenhuis, Department of Radiology, Hertogenbosch, The Netherlands

**Background:** Infiltrating lobular carcinoma is the second most common breast malignancy and represents 7–15% of the invasive breast cancers. The diagnosis is however not without difficulties.

Lobular carcinoma shows a diffuse growth pattern of cellular infiltration, including linear file arrangement and a lack of desmoplastic reaction, necrosis or calcification. These typical histological characteristics may account for the existing imaging difficulties. Tumour extent can be underestimated on mammography and ultrasound or multifocal disease can be missed.

In this study we retrospectively compared findings on preoperative MR imaging with mammography and US in 35 patients with lobular carcinoma and evaluated the effect on the surgical therapy.

**Methods:** 35 patients who were diagnosed with a lobular carcinoma between december 2003 and december 2006 and underwent pre-operative MR imaging were included. Two radiologists retrospectively reviewed all