terms of cosmetic results, 99% and 1% of patients considered the result as good/excellent and as fair after RT, respectively. No patients had a poor cosmetic outcome.

Conclusion: These results support the feasibility and good tolerability of SIB-VMAT in elderly patients with a diagnosis of breast cancer following CS with acceptable acute and late treatment-related toxicity. These preliminary results justified continuing the clinical study with the goal to establish the impact of hypofractionated SIB-VMAT in elderly patients with diagnosis of early stage breast cancer.

**EP-1154**

Post mastectomy radiotherapy and peri-prosthesic capsule contraction: a clinic-pathological analysis


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Purpose or Objective: To investigate the pathogenesis of peri-prosthetic capsule contraction (CCPP) related to post mastectomy radiotherapy in breast cancer patients undergoing breast reconstruction with heterologous material.

Material and Methods: Patients developing (early or late) CCPP after breast reconstruction were enrolled in this study. CCPP was clinically evaluated by Baker score in order to define pain, erythema, firmness and distortion of the implant. CCPP was assessed considering pathological aspect after subtotal capsulectomy with anterior removal of peri-prosthetic capsule. Patients were split into two groups according to radiotherapy administration. Group 1 accounted for irradiated patients (50 Gy, 2 Gy per fraction on chest wall, using tangential field-in-field technique). Group 2 included not irradiated patients. Baker Score and microscopic observation (simil-synovial reaction, hyalinosis, vascular reaction, giant cells) of the two groups were compared by univariate and multivariate analysis.

Results: Analysis was performed on 26 patients who developed CCPP (29 capsulectomy, because 3 bilateral) in the period between April 2012 and February 2015 (34 months). All patients developed CCPP within 1 year from first reconstructive surgery. Characteristics of both groups are reported in Table 1.

Univariate analysis showed a positive association between Baker Score and radiotherapy (OR: 1.65), and hyalnosis and radiotherapy (OR: 1.2). Multivariate analysis confirmed association between CCPP and radiotherapy (OR: 17.9); chemotherapy (OR: 4.3) and hormone therapy (OR: 48.44) in terms of contraction grade and simill-synovial reactions respectively.

Conclusion: Radiotherapy after breast reconstruction significantly influenced onset and severity of CCPP, although other variables contributed to CCPP multifactorial aetiology. In particular, hormone therapy and chemotherapy played a role in modifying capsular architecture.

**EP-1155**

Radiation-induced morbidity evaluated by high-frequency ultrasound: a pilot study

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Purpose or Objective: Evaluation of radiation-induced morbidity is routinely done as an integrated part of treatment response follow-up, and can be scored according to clinical assessment tools such as the CTCAE or LENT-SOMA. Objective measures in this evaluation would be valuable given their quantitative nature, facilitating comparison across cohorts and treatment institutions. High-frequency ultrasound (US) is a high-precision, objective tool to measure dermis thickness of the skin. We aimed to analyze dermis thickness in a cohort of women following radiotherapy (RT) for breast cancer with various grades of induration and edema.

Material and Methods: The cohort was recruited from the DBCG HYPO/PBI RT protocols and comprised 15 women treated for early breast cancer during 2009-2013 with lumpectomy and RT 50 or 40 Gy +/- systemic therapy. Clinical morbidity follow-up of induration and edema was done at baseline and annually according to the LENT-SOMA scale. Dermal thickness was measured in mm using high-frequency US. Points of measurement were 3 cm from the areola in four quadrants in both irradiated and contralateral non-irradiated breasts. Differences in mean dermis thicknesses were tested by two-tailed paired t-test. The US scanner utilized was a high-resolution 20 MHz DermaScan® C from Cortex Technology ApS. This device is optimized for recognizing structures at 60 µm, corresponding to tissue microstructures sized like collagenous fibres.

Results: Median follow-up time was 3.0 years (range 1.0 - 4.6). Overall, mean dermis thicknesses were 2.22 mm (1.78 - 2.66) in the irradiated (I) breast and 1.26 mm (95% CI: 1.08 - 1.44) in the contralateral (C) breast. Mean difference between breasts was 0.96 mm (0.49 - 1.43, p<0.001). Dermal thicknesses were distributed in quadrants as follows: Lower lateral I: 2.62 (1.92 - 3.31) C: 2.11 (0.96 - 1.26), lower medial I: 2.64 (2.06 - 3.21) C: 1.45 (1.18 - 1.72), upper lateral I: 1.55 (1.33 - 1.78) C: 1.17 (1.01 - 1.34), upper medial I: 2.08 (1.49 - 2.67) C: 1.31 (1.09 - 1.53). In patients without clinical edema, the mean difference in dermis thickness for grade 1 induration was 0.35 mm (-0.46 - 1.16, p=0.21) and for grade 2 induration 0.71 mm (-0.01 - 1.43, p=0.05). In patients with clinical edema, only one patient had grade 1 induration (dermis thickness difference 1.34 mm). In
patients with clinical edema and grade 2 induration, mean difference in dermis thickness was 1.61 mm (0.27 - 2.95, p=0.03). Edema was associated with a more diffuse signal and an indistinct demarcation against the subcutaneous tissue. This was more pronounced in the lower quadrants (Figure).

Conclusion: High-frequency US has potential to measure increased dermis thickness associated with radiation-induced induration in breast cancer patients. Edema may increase dermis thickness and lead to a more diffuse US signal.

High-resolution ultrasound images of two patients without and with edema. Both have grade 2 fibrosis.

EP-1156
Radiotherapy for ductal carcinoma in situ: patterns of recurrence and risk factors stratification
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Purpose or Objective: Ductal carcinoma in situ (DCIS) represents around 20% of breast cancers (BC). Standard treatment after breast conserving surgery is still adjuvant radiotherapy (RT). Several randomized trials and meta-analysis showed a 50% risk reduction in LR after adjuvant RT. The aim of our analysis was to evaluate the LR rate and possibly to identify a risk groups stratification for DCIS treatment optimization.

Material and Methods: We analyzed 457 patients that underwent BCS and adjuvant RT between 1990 and 2012. Median dose to the whole breast was 50 Gy in 25 fractions; patients with positive/close final surgical margins received a tumor bed boost. We stratified patients in low risk group using well known risk factor for LR (n=203; ag≥60 years, surgical margins<10 mm, nuclear grade 1-2, pT<25 mm), and intermediate-high risk group (n=254; age<50 years, surgical margins<10 mm, nuclear grade 3 or pT>25 mm). We performed also a patient stratification according to Van Nuys Prognostic Index. Estrogen and progesterone receptors status, nuclear grade, and Ki-67 proliferative index were available for most patients.

Results: The mean age was 57 years (range 33-80). Hormonal status was positive in 92% of patients. 83 cases (18.2%) received adjuvant endocrine therapy. All patients received postoperative RT, 198 cases (43%) received also a RT boost on tumor bed. At a median follow up time of 12 years (range 3-23), we observed 26 LR (5.6%). Following risk groups stratification, we observed seven LR (3.4%) in low risk group and nineteen LR (7.4%) in intermediate-high risk group (p=0.001).

Conclusion: Our experience evidenced a significant difference in LR incidence after adjuvant RT based on our risk factors stratification.

This confirms the wide heterogeneity of DCIS. Identification of clear subgroups of patients following risk factors is still lacking. Waiting for results from ongoing clinical phase 3 trials and genomic studies, postoperative RT still remains a mainstay in adjuvant treatment for DCIS.

EP-1157
Abstract withdrawn

EP-1158
Should breathing adapted radiation therapy also be applied for right-sided breast irradiation?
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Purpose or Objective: Voluntary moderate deep inspiration breath-hold (vmDIBH) is widely used for patients with left sided breast cancer. The purpose of this study was to investigate the utility of vmDIBH in local and locoregional radiation therapy (RT) for patients with right-sided breast cancer.

Material and Methods: For fourteen patients with right-sided breast cancer, forward IMRT plans were calculated on free-breathing (FB) and vmDIBH CT-scans, for local- as well as locoregional breast treatment, with and without internal mammary lymph nodes (IMN). We compared dose volume parameters to estimate the reduction in the risk of radiation pneumonitis, the influence on pulmonary lung function tests and the risk of secondary lung cancer with the use of vmDIBH.

Results: For local breast treatment, no relevant reduction in mean lung dose (MLD) was found. For locoregional breast treatment without IMN, the average MLD reduced from 6.5 to 5.4 Gy (p=0.005) for the total lung and from 11.2 to 9.7 Gy (p=0.005) for the ipsilateral lung. For locoregional breast treatment with IMN, the average MLD reduced from 10.8 to 9.1 Gy (p=0.005) for the total lung and from 18.7 to 16.2 Gy (p=0.005) for the ipsilateral lung. We also found a reduction in mean heart dose between 0.6 and 2.6 Gy in four patients; with a mean of 0.4 Gy for all 14 patients together (p=0.07). We estimate that 1 out of 100 patients will not develop radiation pneumonitis when breath-hold is applied during locoregional right-sided breast cancer treatment. For ever-smoking women, the risk of secondary lung cancer might also be reduced by vmDIBH.

Conclusion: Breathing adapted radiation therapy in patients with left-sided breast cancer is becoming widely introduced. As a result of the slight reduction in lung dose found for