Purpose/Objective: To investigate the impact of surgery, oncoplastic surgery versus lumpectomy, on the volume of tumor bed delineation in irradiated breast cancer (BC) patients.

Materials and Methods: A consecutive series of 293 BC patients were treated with breast conserving surgery followed by radiotherapy. Of this series, 44 patients underwent an oncoplastic procedure and were included in this study. The control group consisted of 67 patients who underwent a lumpectomy. The contralateral breast was matched for location (lateral upper quadrant versus other) and tumor to breast ratio (small versus large). For the small tumor to breast ratio group we included 2 controls for each oncoplastic patient. For the group with large tumor to breast ratios we included all available patients (1 to 1). The tumor bed was delineated based on the presence of the surgical clips, hematoma, seroma and/or other surgery-induced changes and interpretation of radiology, pathology and surgical reports. The association between surgery (oncoplastic surgery versus lumpectomy) and delineated tumor bed volumes in cm³ was assessed with linear regression analyses. Here we present the crude association (using univariable analysis) and the association corrected for confounding factors (using multivariable analysis). Only confounders that changed the association more than 10% were included. In these analyses the outcome delineated tumor bed volume was log-transformed, the estimated beta’s represent the change in log tumor bed volume.

Results: The oncoplastic operated patients had a radiological larger median tumor diameter (21 mm versus 14 mm) than the lumpectomy patients. The volume of the pathological specimen was not significantly different between the two groups: 148.8 cm³ in the oncoplastic group and 135.0 cm³ in the lumpectomy group. The median delineated tumor bed volume was significantly larger after oncoplastic surgery compared to lumpectomy alone (26.3 cm³ vs. 16.4 cm³, p<0.001). In the univariable analysis the delineated tumor bed volume was 1.7 (β = 0.547, 95% CI 0.297-0.797) times larger in patients with an oncoplastic procedure than in the patients who underwent a lumpectomy only. After correcting for confounders (presence of postoperative seroma and radiological tumor diameter (mm)) the delineated tumor bed volume after the oncoplastic procedure was 1.9 (β = 0.616, 95% CI 0.353-0.879) times larger than after a lumpectomy only.

Conclusions: Oncoplastic surgery in breast conserving treatment for breast cancer results in larger tumor bed volumes for radiotherapy.

PO-0687
Cosmetic outcome assessment after neoadjuvant radiochemotherapy in breast cancer patients
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Purpose/Objective: Neoadjuvant radiochemotherapy (NRT-CHX) is an innovative technique for the treatment of patients with locally advanced non inflammatory breast cancer (LABC). The aim of this study was to analyze the long term cosmetic outcome in breast conserving and mastectomy patients after NRT-CHX.

Materials and Methods: In a time period from 1991 to 1998 a total of 315 LABC patients (cT1-cT4/cN0-N1) were treated with NRT-CHX. 160 patients received breast conserving surgery (BCS) and 154 patients mastectomy. One patient had no surgery. Preoperative radiotherapy (RT) consisted of external beam radiation therapy (EBRT) of 50 Gy (5 x 2 Gy/week) to the breast and the supra-/infraclavicular lymph nodes (n=255) combined with a consecutive electron boost in 214 cases or - a 10-Gy interstitial boost with (192)Ir afterloading before EBRT in n=101 cases. Chemotherapy with CMF and AC/EC was administered prior to RT in 192 patients, and Mitoxantrone concomitantly in n=113 patients; 10 patients received no chemotherapy. The cosmetic outcome was assessed by patient questionnaire in 2013. A panel with 5 independent investigators evaluated the cosmetic outcome in 4 grades (excellent, good, moderate and bad). The breast retraction assessment (BRA) was quantified by van Limbergen Score. Quality-of-life was measured by EORTC QLQ-C30 and BR23 and late radiation side effects by LENT/SOMA scale.

Results: In 64 patients after breast conserving surgery and 43 patients after mastectomy a long term follow up of the cosmetic outcome was possible. Most patients rated their overall cosmetics as 'excellent' or 'good' (94% in the breast conserving group and 55.8% of the mastectomy group). The results for the mastectomy group is in detail: excellent: 27.91%, good: 27.91%, moderate: 39.53% and bad 4.65%. After a follow up of 16-22 years we did not detect any grade III or IV late side effects in both groups. The median BRA score after breast conserving surgery was 2.9 and the over-all quality of life (QLQ-C30) was rated 'excellent' or good in 82%.

Conclusions: NRT-CHX is associated with an acceptable radiotherapeutic toxicity and a good cosmetic outcome.
was evaluated on a consecutive series of patients with left sided breast cancer. Breath hold training and the acquisition of an inspiratory (IN) and expiratory (EX) planning dataset were the basis for deciding which patients would be eligible for gated irradiation. After contouring of PTV, left lung, heart and LCV in the IN dataset, the structures were copied to the EX dataset and adapted nonrigidly. Treatment planning was performed in identical manner for both datasets (IMRT via mainly 2 tangential fields with up to 16 segments), allowing optimal comparison between IN- and EX plans. We also report the positioning deviations in the A-P direction derived from the weekly portal images.

Results: Of the initial 26 consecutive patients, 25 could be CT-planned with the system resulting in 2 datasets each (IN and EX). Of these, 14 (56%) were initially selected for treatment in inspiration due to a significant difference in one or more OAR. Lung gating had to be discontinued in two patients after 3 and 2 fractions respectively due to breathhold difficulties which had not been apparent during the training session. In patients initially selected for lung gating, the maximum (D02) and median (D50) doses to the LCV were 9.5(range 2.5-48.4) Gy and 3.1(1.8-25.1) Gy, respectively, and were significantly lower than those derived from the EX plans (p<0.001). The corresponding doses for the patients not selected for lung gating were 35.5 (7.3-57.2) Gy and 7.0 (3.1-39.7) Gy for D02 and D50, respectively, which was not significantly different from their IN plan values. Better LCV sparing in lung gated patients was not due to compromising PTV coverage: The volume of the PTV covered with 95% of prescribed dose was 90(73-97)% and 89(83-97)% for lung gated and non-lung gated patients, respectively (p=0.90). Median treatment times were 478±63s seconds for the lung-gated patients vs. 278±37s seconds for the patients treated without. The average A-P deviation (n=121) was 2.1 mm.

Conclusions: These results represent the very first patients treated at our institution with this system. Lung-gating prolonged treatment time surprisingly little by approximately 3 minutes per fraction and offered significant benefits on OAR sparing to 50 % of the patients. Thorax-exursion reproducibility is highly accurate with this system. As a limitation, it is only suitable for patients who are able to understand both the spoken and visual commands and are fully compliant.

PO-0689
Comparison of automated cosmesis assessment and skin toxicity testing after hypofractionated breast irradiation
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Purpose/Objective: To compare two automated systems of cosmesis and skin evaluation, based on a computer assisted photographic assessment and a multiprobe skin tester in patients with breast cancer after conservative surgery and hypofractionated irradiation.

Materials and Methods: 50 women with early stage breast carcinoma treated with conservative surgery and receiving whole breast irradiation and a boost were evaluated. Irradiation consisted in 15 whole breast fractions of 2.7 Gy followed by a boost to the tumor bed in 6 fractions. The minimal follow-up was 2 years. Patient cosmesis evaluation by means a validated scale was took as a reference for comparisons. Physician evaluation of cosmesis and skin toxicity was performed according Harvard scale an RTOG scoring criteria respectively. Patient and physician evaluations were compared with computerized photographic assessment employing a dedicated software (BCCT.Core 2.0) and also the analysys of hydration, elasticity and skin pigmentation performed by means a multiprobe skin tester (Multi Skin Test Center® MC750).

Results: The most important correlation was obtained with computerized assisted photographic assessment and the self assessed patient cosmesis scoring. It has been detected that the best morphologic values for asymmetry in accordance to the patient perception of breast deformity were the BCE (Breast Compliance Evaluation) (p=0,018), pBRA (proportional Breast Retraction Assessment) (p=0,021) and pUNR (proportionalUpward Nipple Retraction) (p=0,023) obtained by the software analysys. Also a good association was demonstrated between the values of the chronic toxicity and the overall evaluation of cosmesis by means the photographic software (p=0,041). The multiprobe skin testing demonstrated differences both in pigmentation and elasticity in the boost area compared with the ipsilateral breast (p=0,011 and p=0,003 respectively) and of major magnitude when compared to the contralateral breast (p=0,001 and p=0,001 respectively). A correlation was found among the loss of elasticity of the boost with the patient cosmesis evaluation (p=0,055). Physician cosmesis evaluation was correlated with breast hydration loss measured by the skin tester probe (p=0,015).

Conclusions: The overall cosmesis seems to be better evaluated by software compared to the subjective clinical physician evaluations. Nevertheless, the multi-probe skin tester device is capable to detect minor changes in elasticity and hydration that also correlate with patient and physician cosmesis evaluations respectively.

PO-0690
Answering questions for hypofractionated RT in Indian breast cancers: analysis of toxicities and outcomes
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