obtain consistent results, as well as including patient QOL evaluation to complement the clinician assessment.

**EP-1189**

**Acute sub-acute and short term effects with hypofractionated adjuvant RT and concomitant boost in breast cancer**

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**Purpose/Objective:** Adjuvant RT after quadrantectomy or lumpectomy plays an essential role in breast conserving therapy for early stage carcinoma and 60 Gy delivered in 30 fractions in 6 weeks is generally considered the standard dose. The present study aims to evaluate acute, sub-acute and short term late side effects in patients with early stage breast cancer treated with adjuvant radiotherapy (RT) using concomitant boost.

**Materials and Methods:** Between June 2010 and October 2013, 586 patients (median age 60 years, range 27-96 years) with early-stage breast cancer were treated with a hypofractionated schedule of external beam RT after conserving surgery; 143 patients underwent post-operative chemotherapy before starting RT. RT was delivered as follow: 45 Gy in 20 fractions (225 cGy/fr) in 4 weeks to the whole breast and a daily concomitant boost dose (5Gy) to the lumpectomy cavity (25 cGy/fr). The cumulative nominal dose was 50 Gy. The technique used was 3D-conformal RT with 2 tangential fields for the whole breast and 2 oblique fields for the boost. The surgical bed was primarily defined with clips. Toxicity was scored according to LENT-SOMA scale.

**Results:** Twenty-five patients experienced grade 3 skin toxicity within one week from the end of the RT course (eight after adjuvant chemotherapy administered before breast RT). After 19-month median follow-up (range 12-52 months), no grade 4 toxicity were detected; only 5 patients developed scar retraction; the others 585 patients showed excellent or good cosmetic results. Disease recurrences were recorded in 4 patients: one of them with local relapse, the others three with systemic spread. Twenty-five patients experienced grade 3 skin toxicity. Concerning cosmetic results, one patients developed scar retraction; the others 585 patients showed excellent or good cosmetic results. Disease recurrences were recorded in 4 patients: one of them with local relapse, the others three with systemic spread.

**Conclusions:** The explored regimen seems to be feasible providing consistent clinical results with excellent toxicity profile.

**EP-1190**

**Prone breast irradiation: from indirect to direct tumor bed localization**

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**Purpose/Objective:** To evaluate a mathematical model, based on direct tumor indicators, for target volume delineation of breast cancer in prone position.

**Materials and Methods:** Seven patients with unifocal, early stage breast cancer CT1-2 cN0 were prospectively enrolled. Patients were installed on our breast board, applying prone positioning with both arms elevated above the head and an inclination of 10-15° towards the ipsi-lateral breast. A preoperative CT-scan was performed on a Toshiba® 16-slice CT with 100cc Visipaque® injected intravenously and using our standard CT-protocol (5mm slices, 120kV). Four tattoos were applied to reproduce positioning at the moment of postoperative simulation, 4 to 6 weeks later. During tumorectomy an 'indicator' clip (9mm) was placed in the cavity wall at the level of the tumor to indicate depth of the tumor bed. Full thickness closure was performed. The postoperative simulation CT (non contrast-enhanced) was fused with the preoperative CT, based on visual correlation. Delineation protocol included:

- **GTVvisual**: tumor delineation based on visual CT-fusion
- **GTVvector**: tumor delineation based on deformation of tumor volume from preoperative to postoperative CT
- **CTVmath**: a ‘mathematical’ sphere with axis defined as the center between the indicator clip and GTV visual centers. A radius of 20mm was used (Holland, Vicini), minus the minimal excision margin (±10mm). Thoracic wall was subtracted from the resulting sphere.
- **CTVstandard**: volume at risk based on indirect indicators (clips, seroma, tissue distortion, scar, imaging...) according to standard delineation guidelines

**Results:** We compared volumes and location of CTVmath with CTVstandard and their relation to tumor GTV. The small CTV volumes only partially explain low Jaccard Index for CTVmath vs. CTVstandard (0,35 SD 0,09), Distance of geometrical centers varies between 9,6 to 24,5mm (mean 14,26mm ± SD 4,7) indicating a substantial difference in target volume localization. Tumor GTV on pre-operative CT-scan is more frequently included in the CTV when a mathematical delineation is used (overlap 0,86, SD 0,21) versus standard delineation (0,68, SD 0,38). No substantial difference in CTV volumes is observed, partly due to larger caudo-cranial diameter of CTVmath. Clips were often placed onto the pectoral fascia, even with tumors located centrally in the breast.
Conclusions: Replacing delineation based on guidelines by mathematical delineation corresponds more closely to microscopic spread probability, including a more systematic delineation of cranio-caudal tissue at risk. Deep and superficial clips and tissue distortion improve observer conformity, but do not systematically correspond to initial tumor location. Clips on the pectoral fascia tend to protract CTV unnecessarily towards the thoracic wall, thus increasing dose to organs at risk.

Impact on inter-observer variation is ongoing.

EP-1191
Clinical features and treatment outcome in BRCA1-positive breast cancer patients: single institution analysis
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Purpose/Objective: BRCA1 mutations contribute to about 5-10% of breast cancer (BC) cases. The aim of the study was to analyze clinicopathological features, efficacy of oncological treatment, incidence of contralateral breast cancer (CBC) and other malignancies (OM) among BRCA1-positive BC patients (pts).

Materials and Methods: Fifty one BRCA1-positive BC pts treated in Comprehensive Cancer Center in Bialystok, Poland between 1996 and 2010 were retrospectively analyzed. 61% of pts required multimodal treatment: surgery, chemotherapy and/or radiotherapy to breast tissue (BT), chest wall (CW) or regional lymph nodes (LNs) area while others (36.5%) were subjected only to surgical and/or chemotherapeutic treatment. Clinicopathological characteristic of pts were retrieved from clinical database.

Results: The median age of the pts was 45.5 years (70% of pts were below 50). The majority of pts were at early clinical stage of the disease (I - 11.7%, II - 56.8%). The IIIrd stage was below 50).

Conclusions: Breast cancer in BRCA1 carriers represents mostly negative status of steroid or HER2 receptors and is locally advanced at the time of diagnosis. Unfortunately, locoregional relapse or other malignancies are observed among this subset of pts. What is interesting, pts with 4153 delA mutation did not demonstrate any adverse events. Identification of predictive factors is necessary to estimate the individual risk of developing LR recurrence or other cancers in BRCA1 carriers. Better understanding of correlations between type of BRCA1 mutations and treatment results is necessary for creating patients-directed approach.

EP-1192
Preliminary results of hypofractionated treatment with SIB using VMAT with tangentials arcs in breast cancer
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Purpose/Objective: There are radiobiological reasons justifying the use of hypofractionation in breast cancer. Since the α/β value of breast cancer has been estimated around 4 Gy, high fraction doses may be more efficient. However, this doses may also increase the frequency and severity of side effects in normal tissues. IMRT has the potential to improve target coverage and reduce inhomogeneities observed within the breast (and regional lymph nodes) and enables dose reduction to normal structures with the potential to reduce treatment toxicity improving cosmesis. According to the results published of phase III trials that compared standard treatment versus hypofractionated treatments, we started a hypofractionation protocol with Volumetric arc therapy (VMAT) with simultaneous boost to the tumor bed in those patients at high risk of local recurrence. The purpose of the study is to communicate the preliminary results in 40 patients treated in 2013-2014.

Materials and Methods: Inclusion criteria: left breast, irregular chest wall, prophylactic irradiation of supraclavicular area, voluminous breast and patient desire.

- Treatment Protocol:
  - OAR constraints: contralateral breast: Dmax < 5 Gy; spinal cord: Dmax < 40 Gy; lung: V20 < 10 %, V10 < 20 %; coronary artery/ heart: V30 < 30 %; esophagus: Dmax < 40 Gy; thyroid: Dmax < 40 Gy.
  - Treatment planning system: Monaco 3.3 using Monte Carlo dose calculation algorithm.
  - Technique: tangentials arcs for breast and boost, and a semicircular for supraclavicular fold.