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-postive breast cancer patients ñ single institution analysis

J. Topczewska-Bruns[1], D. Hempel[1], B. Pancewicz-Janczuk[2], D. Kazberuk[1], E. Rozkowska[1], T. Huzarski[3], T. Filipowski[1]
[1]*Comprehensive Cancer Center, Department of Radiotherapy, Bialystok, Poland*
[2]*Comprehensive Cancer Center, Department of Physics, Bialystok, Poland*
[3]*International Hereditary Cancer Center, Department of Genetics and Pathology, Szczecin, Poland*

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. Clinicopatological 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 assessed in 21.6% of pts, IV – 3.9% of pts. The BRCA1 mutation types were 5283incC (59.5%), C61G (28.6%) and 4153 delA (11,9%). The negative estrogen, progesterone and HER2 receptors status was reported in 70.3%, 74.5% and 66% of pts, respectively. The mastectomy was performed in 61% of pts, breast conserving therapy (BCT) in 35% of pts. The pts with metastatic disease at the time of diagnosis (3.9%) were treated with chemotherapy. Radiotherapy was performed on cobalt machine or linear accelerator with conventional fraction scheme. Patients were irradiated to CW – 43.7% (mean dose 49.8Gy) or BT – 56.3% (mean dose 49.4 Gy) plus/minus regional LNs – 50% (mean dose 50Gy). The mean treatment time accounted 35 days for pts after mastectomy and 45 days – after BCT. The boost was delivered by external beam radiotherapy in 93.8% of pts (mean dose 11.4 Gy) or by brachytherapy HDR – in 6,2% of pts (mean dose 10 Gy). In RTH-treated group regional recurrence occurred in 6.8% of pts who underwent mastectomy and in 5,3% of pts after BCT. No reoccurrence in LNs was observed in RTH group. However, in non-irradiated patients group, 3% developed recurrence in LNs and 10% of pts in CW area. With a median follow up of 6.4 years, 13 pts (25.5%) developed distant metastases and 11 pts (21.5%) suffered from another cancer. The most frequently reported malignancies were CBC (70%) and ovarian cancer (20%). Skin, coli uteri and parotid gland cancers were also observed. The LR recurrence or OM were not reported among pts with 4153 delA mutation.
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 hipofractionated treatment with SIB using VMAT with tangentials arcs in breast cancer

A. Serradilla[1], D. Alvarez[2], A. Barbosa-Chaves[2], A. Ristori[1], A. Ramos[1], A. Bezares[1], A. Sacchetti[1]
[1]*Clinica RADON-Oncojerez, Radiation Oncology, Jerez de la Frontera, Spain*
[2]*Clinica RADON-Oncojerez, Radiophysics, Jerez de la Frontera, Spain*

Purpose/Objective: There are radiobilogical reasons justifying the use of hypofracctionation in breast cancer. Since the α/ß 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:

· Targets: PTV_1: mamary gland or anterior chest wall. PTV_2: ipsilateral supraclavicular area. PTV_3: tumor bed.
· Dose and prescription: PTV_1 and PTV_2: 42,56 Gy (2,66 Gy/fr). PTV_3: 46,4 Gy (2,9 Gy/fr).
· OAR constraints: contralateral breast: D_{max} < 5 Gy; spinal cord: D_{max} < 40 Gy; lung : V_{20} < 10 %, V_{10} < 20 %; coronary artery/ heart: V_{30} < 30 %; esophagus: D_{max} < 40 Gy; thyroid: D_{max} < 40 Gy.
· Treatment planing system: Monaco 3.3 using Monte Carlo dose calculation algorithm.
· Technique: tangencials arcs for breast and boost, and a semiarc for supraclavicular fold.

- Dosimetric verification: Delta 4 system has been used for pre-treatment QA.
- Patient positioning verification: cone beam CT (IGRT) diary.

Results: The median age of the patients was: 53 years (32-75). Breast-conserving surgery: 72%; Surgery of the axila was lymphadenectomy in 50% and sentinel node biopsy in 50%.
Tumor size (TNM): T1: 50%, T2: 40%, T3: 5%, T4: 5%; positive axillary nodes were found in 50%. Acute skin reactions (RTOG toxicity criteria): G0: 50%, G1: 42,5%, G2: 4,5%, G3: 0%, there was no G4 toxicity. There were no acute adverse cosmetic results (assessed in agreement with the Harvard criteria).
Conclusions: The explored hypofractionated radiotherapeutic approach with VMAT and SIB seems to be feasible providing consistent clinical results with excellent short-to-medium-term toxicity profile.
However longer follow-up is required with a major number of patients to asses long-term outcomes.

EP-1193

Axillary coverage by whole breast irradiation in 1 to 2 positive sentinel lymph nodes breast cancer patients

M.C. De Santis[1], F. Bonfantini[2], B. Diletto[1], S. Meroni[2], E. Mantero[1], F. Soncini[1], V. Cosentino[2], D. Posté[2], E. Pignoli[2], L. Lozza[1]
[1]Fondazione IRCCS Istituto Nazionale dei Tumori, Radiotherapy Department, Milan, Italy
[2]Fondazione IRCCS Istituto Nazionale dei Tumori, Medical Physics Department, Milan, Italy

Purpose/Objective: The possibility of providing a tumoricidal dose to sentinel lymph nodes (SLNs) and I axillary level areas by standard tangential fields, designed to cover whole breast parenchyma, is controversial. Aim of our analysis is to evaluate the dosimetric coverage of the I and II axillary levels by standard whole breast irradiation in 1 to 2 positive sentinel lymph nodes patients not submitted to axillary lymph nodes dissection (ALND), and to compare the lymph nodes areas coverage obtained with standard 3D tangential RT, static and volumetric intensity modulated radiotherapy (IMRT).
Materials and Methods: Patients with 1 to 2 positive SLNs undergoing breast conserving therapy, without ALND, were included in the analysis. For each patient a simulation CT scan was acquired Axillary level I, II lymph node anatomic volumes were defined on the CT scan by the same radiation oncologist according to RTOG contouring atlas, in order to reduce interobserver variability. For each patient three treatment plans were performed: a 3D conventional tangential plan, a static IMRT plan and a volumetric IMRT, designed to encompass the entire breast parenchyma. The axillary level I and II volumes recieving 90% and 95%(V90, V95) of the whole breast prescribed dose were evaluated. Dose-volume histograms were compared by means of the Friedman test.
Results: Ten patients were enrolled. All defined breast volumes received >95% of the prescribed dose with the three techniques. Median for the I axillary level was 26.4% (range 4.7-61.3) for 3D plans, 8.6% (range 0.64 -19.1%) for static IMRT plan and 2.6% (range 0.4-4.7%) for volumetric IMRT plans ($p<0.001$). Median V95% for the II axillary level was 5.4% (range 0-14.6%), 1.9% (range 0 -15%), and 2.6% (range 0.4-4.7%) for 3D, static IMRT and volumetric IMRT, respectively ($p<0.001$). Median V90% for the I axillary level was 39.7% (range 17.8-71.5%), 9.5% (range 1.3 -27.1%), and 6% (range 1.3-11.4%) for 3D, static IMRT and volumetric IMRT, respectively ($p<0.001$). Median V90% for the II axillary level was 21.4% (range 3.1-42.1%), 3.7% (range 0 -28.9%), and 2.4% (range 0-19.9%) for 3D, static IMRT and volumetric IMRT, respectively ($p<0.001$).
Conclusions: Results of our analysis show that standard 3D tangential whole breast irradiation in 1 to 2 positive SLNs patients, treated by BCT without ALND, failed to deliver a therapeutic dose to the I and II axillary levels I. The coverage is even lower using static and volumetric IMRT techniques.

EP-1194

IMRT-SIB for locally advanced inoperable breast cancer patients

D. Gabrys[1], R. Kulik[2], A. Namysl-Kaletka[1], I. Wzietek[1], K. Trela-Janus[1]
[1]Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology III Dept, Radiotherapy Department, Gliwice, Poland
[2]Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology III Dept, Radiotherapy and Brachytherapy Planning Department, Gliwice, Poland

Purpose/Objective: Radiobiological and clinical data suggest that higher dose per fraction with shortening overall treatment time in breast cancer patients may enhance locoregional control. This, ethics approved, prospective study was designed to evaluate the technical feasibility, toxicity and early results of simultaneous integrated boost (SIB) for locally advanced, breast cancer patients.
Materials and Methods: Eighteen women (8 right; 10 left-sided) received radiotherapy with SIB applying various dose levels in 30 fractions. Doses were individualized according to the stage of the disease. The regional lymph nodes received 49.8-60 Gy, df 1.66-2 Gy, metastatic lymph nodes received 66-69.9 Gy, df 2.2-2.33 Gy, breast with chest wall was irradiated with a dose 49,8-60 Gy, the whole breast to 60Gy, and the highest dose was delivered to the breast tumour 69.9 Gy. Early toxicity and results were prospectively recorded using CTCAE 4.03, QLQ 30, QLQ Br23, and Lent Soma scale. All patients underwent planning CT or FDG PET-CT. The majority (13 patients) were treated with the use of Clinac IMRT-SIB, 5 patients were treated with Tomo-SIB.
Results: The median age was 59 years (range 37 – 78). Median tumor size was 6 cm (range 1-12 cm). Almost all (13) patients presented with clinical stage IIIB of the disease, one patient with IIIA, two with IIIC. Two patients in stage IIA were not qualified to surgery, one was not suitable for resection due to medical conditions, the second did not agree for a surgery. All patients received chemotherapy, 11 patients FAC only, remaining various combinations with taxanes. Ten patients were treated with hormonal therapy, the majority of them (8 patients) were treated with Tamoxifen. The mean dose to the ipsilateral lung was 16 Gy (range12.9 - 20.7). The percentage of lung receiving >5Gy was 74.4, >10Gy - 50.3, >20Gy - 25.6. The mean heart dose was 9.6 Gy (range5.4 - 16.9) and V5Gy was 64.1, V10Gy - 28.9, V30Gy - 4.9. There