analysis showed no relationship between cosmetic result and age (p>0.13).

Conclusion: Our experiences is limited to a low number of cases but confirm that adjuvant radiotherapy is not controindicated when reconstructive surgery is expected. The patient must be informed about the possible radiation sequelae.

EP-1168

Phase II trial of hypofractionated VMAT treatment for early stage breast cancer: 2-years outcomes

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Purpose or Objective: To report 2-years toxicity and clinical results of hypofractionated simultaneous integrated boost (SIB) tecnique with Volumetric Modulated Arc Therapy (VMAT) as adjuvant treatment after breast-conserving surgery.

Material and Methods: Patients presenting early-stage breast cancer were enrolled in a phase II trial. Eligibility criteria: age>18 years, invasive cancer or DCIS, Stage I-II (T<3 cm and N≤3), breast-conserving surgery without oncoplastic reconstruction, any systemic therapy was allowed in neoadjuvant or adjuvant setting. All patients underwent VMAT-SIB technique to irradiate the whole breast and the tumor bed. Doses to whole breast and surgical bed were 40.5Gy and 48Gy, respectively, delivered in 15 fractions over 3 weeks. Acute and late skin toxicities were recorded based on RTOG scoring criteria and CTCAE v. 4.0, respectively. Cosmetic outcome was assessed as excellent/good or fair/poor, according to the Harvard scale.

Results: The present study focused on long-term results of a cohort of 144 patients with a minimum follow-up of 24 months (median 37, range 24-55 months). Median age was 62 y.o. (range 30-88). At one year, the highest reported skin toxicity was G1, in 14% of the patients; this data dropped to 4% at the last follow-up, after more than 2 years. Breast pain was recorded in 21.6% of the patients 6 months after treatment, while it was present in 3.5% of the patients at the last follow-up, showing a significant improvement with time. No correlation with liponecrosis as recorded from ultrasound exam, nor with dosimetric data. Skin toxicity was correlated with breast volume. No pulmonary or cardiological toxicities were recorded. After an early evaluation of clinical outcomes, only one case presented disease relapse, as liver metastases.

Conclusion: The hypofractionated VMAT-SIB course as adjuvant treatment after breast-conserving surgery showed to be safe and effective with optimal local control. This approach requires validation with long-term follow-up data.

EP-1169

The effect of escalating boost dose in breast cancer patients with involved resection margin

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Purpose or Objective: To investigate the impact of the boost dose escalation on ipsilateral breast tumor recurrence (IBTR), for breast cancer patients with involved surgical margins after breast conserving surgery.

Material and Methods: Between January 1998 and December 2010 at Asan Medical center, among 4275 breast cancer patients who were treated with breast conserving therapy (BCT), a total 192 patients were treated with boost dose over 10 Gy for involved resection margin. We retrospectively analyzed the outcomes in 192 patients who had whole breast irradiation of 50.4 Gy followed by median boost dose 15.0 Gy (range, 12 - 16 Gy) for breast cancer with involved resection margin. Surgery preceded referral for radiotherapy with a 1-2 mm margin of macroscopically normal tissue. The resection margins were evaluated by pathologist for the presence of invasive carcinoma or ductal carcinoma in situ at the inked margin. Neoadjuvant chemotherapy was done in 3 patients (1.6 %). Adjuvant chemotherapy was given in 93 patients (48.4%). 157 patients (81.8%) received systemic hormone therapy. The median age was 46 years (range, 25-73 years). 182 patients (94.8%) were stage 0 to II and 10 patients (5.2%) with stage III breast cancer were also included. The boost dose delivered with electrons or tangential fields given in daily fractions of 1.5 to 2.5 Gy. The boost volume was described as the site of the primary tumor with a margin of 1.5 cm to the field borders after breast conserving surgery.

Results: The median follow-up duration for all patients was 6.7 years. IBTR were considered as any local failures on ipsilateral breast regardless of the location. The 5-year cumulative risk of ipsilateral breast tumor recurrence as a first event was 5.4%. The 5-year local relapse free survival (LRFS) was 94.4%. IBTR occurred as a first failure in 13 of 192 patients. In boost field recurrences were found in 11 patients (85%). 5 patients (39 %) were out-of boost field failures and 3 of them were both failures. On univariate analysis, age, cell type, pT stage, pN stage, extensive intraductal component (EIC), multiplicity and location of resection margin were prognostic factor for IBTR (p <0.05). In multivariate analysis only young age (<40 years old) and positive radial resection margin were unfavorable prognostic factor for LRFS (p =0.037, p=0.021 respectively). pT stage was marginally significant prognostic factor for IBTR. (p=0.088)

Conclusion: Median boost dose of 15 Gy is comparable to historical boost research results for local control in breast cancer patients with involved resection margin after BCT. Young age (<40 years old) and positive radial resection margin rather than superficial or deep margin were important risk factors for ipsilateral breast tumor recurrence. More than 80% of local recurrences were in boost field, more boost dose escalation needs to be considered.

EP-1170

Onset of fatigue during and after radiotherapy in breast cancer patient

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Purpose or Objective: Cancer-related fatigue is one of most prevalent symptom among women submitted to radiotherapy (RT) for breast cancer (BC). Despite its prevalence the mechanism of onset is unknown still: one possible mechanism is activation of the immune system, through the mediation by proinflammatory cytokines interleukin (IL), IL1-b,, IL-6, and tumor necrosis factor-*a* (TNF-*a)* as host response to tissue damage determined by the radiant treatment. To purpose of this study was to determine the level of fatigue in a group of BC patients its relation to anxiety, depression, serum cytokines, cortisol and blood count levels

Material and Methods: Between October 2013 and May 2015 twenty-eight patients who received adjuvant RT after breast conserving surgery were studied. The patients' subjective feeling of fatigue intensity was measured according to with two standardized self-assessment instruments the Fatigue Assessment Questionnaire (FAQ) and a visual analog scale (VAS) on fatigue intensity before the start and weekly during RT, as well as 14 days and 3-6 and 12 months after RT. In addition, a differential blood cell count and the serum levels of the cytokines- IL1-b,, IL-6, and TNF-*a,* were determined in parallel to the fatigue assessments.

Results: 60% of patients reported non presence of fatigue before the start of RT Fatigue intensity as assessed with the VAS increased gradually during radiotherapy, 14 days after the end of radiotherapy, the fatigue intensity was still higher than before treatment, but 3 months later, fatigue was lower than at the pre-treatment level. Fatigue measured with the FAQ did not increase significantly during treatment, but the subscores on physical and cognitive fatigue were elevated during treatment weeks 4 and 5. IL-1b, IL-6, and TNF-*a,* and hemoglobin levels did not change during therapy. Peripheral blood cell levels declined significantly during therapy and were still low 3 months after treatment. Until treatment week 5, lymphocytes were reduced to almost 50% of their initial values. Patients that introduce fatigue had significantly lower serum levels of cortisol than the nonfatigued patients as well as differences in two lymphocyte populations, at 3-6 and 12 months after the end of radiotherapy

Conclusion: This study has shown that significant fatigue is common in patients receiving breast irradiation and is precipitated during radiotherapy in some patients but not other. In the patients that show an increase of the fatigue during adjuvant RT, fatigue returned to pre-treatment levels 3 months after treatment. In our study, no evidence was found that anxiety, depression, serum levels of IL1-b, IL6, TNF-*a* and hemoglobin levels were correlate with treatment induced fatigue. The results of our observation suggest the existence of a mechanism among activation of the immune system and alteration in cortisol and lymphocyte subsets.

EP-1171

The impact of body mass index on organs at risk in breast axillary nodal radiotherapy

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Purpose or Objective: There has been recent move within the U.K. to contour the nodal CTV for patients receiving adjuvant radiotherapy for breast cancer. Axillary radiotherapy (ART) following a positive sentinel lymph node biopsy is becoming more common for certain groups of patients. Organs at risk (OAR) should be delineated and considered during the planning process. Body mass index (BMI) has been shown to impact upon spinal cord and brachial plexus doses in irradiation of the supraclavicular fossa. The impact upon the OAR in the axilla has not yet been well documented.

Material and Methods: Patients undergoing ART between 01/04/15–01/10/15 were identified. Non - contrast radiotherapy planning CT scans were taken. External beam radiotherapy was planned with extended tangents using a field in field approach with an additional low weighted anterior oblique field if deemed appropriate for adequate dose coverage. Dose delivered was 40.05 Gy in 15 fractions.BMI was calculated by: weight(kg)/height (m)2. CTV's were contoured in accordance with the RTOG contouring atlas.OAR including ipsilateral lung, humeral head and brachial plexus were delineated.

Results: Fifteen patients were identified. Six patients had a BMI between 20–25, 3 between 25–30, 5 between 30–40 and 1 BMI>40. Mean ipsilateral lung V12 was 10.44% (range 2.3%–14.33%). Mean V12 did not vary with BMI (BMI 20–25;mean V12=9.33%, BMI 25–30; mean V12=8.52%, BMI 30–40;mean V12=9.51%, BMI>40 mean V12=6.38%, p=0.55 Chi-Squared). The mean humeral head maximum dose was 35.2 Gy (range 1.2–41.5 Gy). Mean humeral head maximum dose did not vary with BMI (BMI 20–25; mean=34.2Gy, BMI 25–30;mean=27.8Gy, BMI 30–40; mean=40.3Gy, BMI>40; mean=38.2Gy,p=0.49 t-test). The ipsilateral brachial plexus D2 mean was15.6Gy (range 1.2–37.4 Gy). Mean ipsilateral brachial plexus D2 dose did not vary with BMI(p=0.21 t-test).

Conclusion: BMI did not significantly impact upon OAR dosage although this series is limited by a small sample size. Ipsilateral lung and brachial plexus were comfortably within departmental tolerance. A planning risk volume of 10 mm around the humeral head has now been adopted within the department. It is recognised that intravenous contrast provides better quality images for delineating OAR in particular for the brachial plexus. However, this impacts upon resources in terms of radiographer scanning time. Adequate time needs to be allocated in consultant and physics teams job plans to enable high quality delineation and subsequent radiotherapy plans to be produced.

EP-1172

Thyroid tolerance in adjuvant supraclavicular fossa nodal radiotherapy in breast cancer

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Purpose or Objective: Hypothyroidism is the most commonly reported long-term toxicity following radiotherapy to structures near to the thyroid gland. Emami suggested the thyroid gland tolerance as 45Gy (TD 5/5) although a much wider range of 10–80 Gy has been reported in the literature. When irradiating the supraclavicular fossa (SCF) in adjuvant radiotherapy for breast cancer, it is inevitable that the thyroid gland will receive a high dose of radiation due to its proximity to the target volume. Recently there has been a move to CT based delineation of the CTV and organs at risk (OAR) in patients requiring nodal radiotherapy for breast cancer compared with the previous bony land mark/field based techniques. Dose received by the thyroid gland and subsequent late toxicity has not yet been well studied in breast cancer.

Material and Methods: Patients undergoing external beam radiotherapy to the breast or chest wall plus SCF between 01/04/15–01/10/15 were identified. Radiotherapy planning contrast enhanced CT scans were taken. External beam radiotherapy was planned with tangents using a field in field approach with a matched direct anterior field. A low weighted posterior field was added if deemed appropriate for adequate dose coverage. Angle corrections were used as appropriate. A dose of 40.05 Gy in 15 fractions prescribed at depth was employed. CTV's were contoured in accordance with the RTOG contouring atlas.The thyroid gland was prospectively delineated and D5% was recorded.

Results: Seventeen patients undergoing adjuvant SCF radiotherapy were identified. T stage was as follows: T1:2 patients,T2:9 patients,T3:4 patients, T4a:1 patient,T4d:1 patient. N stage; N1:1 patient, N2:14 patients, N3:2 patients. Fourteen were hormone receptor positive, 3 hormone negative. Twelve were HER2 negative, 5 HER2 positive. Mean D5% thyroid was 37.9Gy (range 7–42.7 Gy). Excluding one patient with a previous hemi-thyroidectomy, the mean D5% thyroid was 39.8 Gy (range 16–42.7 Gy). An abnormality requiring referral to a surgeon for was discovered in one patient.

Conclusion: Our departmental tolerance for the thyroid gland was set as 40Gy (for 2.67Gy per fraction). It is hard to achieve this without compromise of the CTV. The effect modern chemotherapy/targeted agents may have on this prior to receiving radiotherapy is inknown. Baseline TSH recording is desirable. Long-term follow up to detect clinical or biochemical thyroid dysfunction is needed to inform practice but would present challenges with capacity in busy oncology departments.

EP-1173

10-years results of accelerated hypofractionated RT for breast cancer

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