The results of dosimetry (table 1) show a uniform dose distribution on skin surface of the patient. The maximum and minimum absorbed doses were 35.80 and 32.35 cGy which are equal to 104.48% and 98.03% of the prescribed dose, respectively. Variability of dose distribution in different points of patient skin arises from two elements: statistical errors, experimental uncertainties and irregular surface contouring.

Conclusions: By providing homogeneous dose coverage on patient skin, TSEBT can be considered as one of the most excellent and effective palliative and curative therapeutic modalities for Mycosis Fungoid.

Uniform dose distribution needs an appropriate patient positioning and the results of treatment depend on the total dose and number of fractions which are determined by staging of cancer.

**EP-1643**
A dosimetric comparison of 3D-CRT, IMRT and VMAT techniques for locally advanced rectal carcinoma
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**Purpose/Objective:** To evaluate three different techniques: 3D-CRT, IMRT and VMAT and their ability to spare organs at risk (OAR) in rectal carcinoma patients. In addition, to establish a set of inverse planning parameters (class solution) for this tumor group.

**Materials and Methods:** 40 patients with locally advanced rectal carcinoma were included in the study, of which 20 patients presented with hip prostheses (unilateral or bilateral), and 20 patients without (standard group). PTV expansion from CTV was done with anisotropic margins: 7 mm in dorsal and lateral direction, 15 mm in anterior direction and 10 mm in cranio-caudal direction. PTV volumes ranged from 445 cc to 1622 cc.

3D-CRT plans consisted of one posterior field and two opposing, lateral fields. IMRT plans were created with 7 equidistant fields (26°, 77°, 128°, 180°, 231°, 283° and 334°), and VMAT plans were produced with 2 arcs (VMAT-2ARC) and 4 arcs (VMAT-4ARC). For patients with hip prostheses the beam configuration of the 3D-CRT and IMRT plans was altered avoiding the prostheses, and in the case of VMAT avoidance sectors were introduced.

All plans were normalized to cover 98% of the PTV with 95% of the prescribed dose (50.4 Gy). With the D2% (Dnear-max), Dmean and Vfut parameters of the Anal Channel (AC), Bladder (BL), Intergluteal Cleft (IC), Small Bowel (SB) and Perineum (PE), the dose to the OAR minus PTV was evaluated.

**Results:** For all patients a significant reduction of high (V90%) and mean dose was seen in all OAR (Dmean: AC: -51%, BL: -22%, IC: -55%, SB: -30%, PE: -52%; p < 0.001) for the IMRT/VMAT plans compared to 3D-CRT (Figure 1 and Table 1). In these plans, D2% in all OAR was also significantly lower (AC: -22%, BL: -11%, IC: -53%, SB: -15%, PE: -45%; p < 0.001). Regarding dose to the PTV, IMRT plans resulted in a higher D2% in all patients (ca. 1 Gy, p < 0.001), whereas the D2% for the PTV in VMAT plans was not significantly different to that of 3D-CRT plans.

For the group of patients with hip prostheses, VMAT-4ARC plans produced the best and significant sparing of all OAR (p < 0.001). In the standard group differences between IMRT and VMAT were small and only significant for the small bowel (lower doses with VMAT, p < 0.001).

Because VMAT plans produced overall the most homogeneous plans and best sparing of OAR, three class solutions with this technique (standard, unilateral or bilateral prostheses) were derived with sets of constraints and objectives covering the majority of patients.

**Conclusions:** Significantly lower doses to OAR are achieved with the use of IMRT/VMAT treatment techniques compared to 3D-CRT, which may lead to less toxicity after preoperative chemoradiation for locally advanced rectal carcinoma. In
addition, three VMAT class solutions were created for this patient group covering most of the rectal carcinoma cases, reducing the time needed to plan individual treatments. The technique has since been implemented clinically at our department.

**EP-1644**

Absorbed dose due to guide tube path in HDR Brachytherapy

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**Purpose/Objective:** Since 2010 the treatment of localized skin cancer on the nose is irradiated, in our service, with HDR ($^{192}$Ir) using a custom mold. By the characteristics of the unit, skin cancer on the nose is irradiated, in our service, with HDR conserving surgery for breast cancer implies a risk of late Materials and Methods:

**Purpose/Objective:** improved reproducibility and reduced lung dose with CT-scanned during non-coached breathing manoeuvre including free breathing (FB), end-inspiration gating (IG), end-expiration gating (EG). The Varian Real-time Position Management system (RPM) was used to monitor respiratory movement and to gate the scanner. For each breathing phase, a population based internal margin (IM) was estimated based on average chest wall displacement, and incorporated into an individually optimized isocentric wide tangential photon field treatment plan for each scan. Treatment plans for 42.4 Gy over 16 fractions were calculated.

**Results:** The mean anteroposterior body excursion during FB was 2.5mm. For IG and EG, the mean excursions within gating windows were less at 1mm. The internal margin was reduced in 3 mm. and the dose in lung and heart were reduced in a 5% Conclusions: This preliminary analysis confirms measurable dosimetric benefits for free breathing gated breast cancer radiotherapy.

**EP-1645**

Improved reproducibility and reduced lung dose with breathing adapted radiotherapy for breast cancer

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**Purpose/Objective:** Adjuvant radiotherapy after breast-conserving surgery for breast cancer implies a risk of late cardiac and pulmonary toxicity. This pilot study evaluates cardiopulmonary dose sparing of respiratory displacement adapted radiotherapy (BART) using free breathing gating.

**Materials and Methods:** 30 patients were computed tomography (CT) scanned with EGI audio coaching during scan and treatment process. Respiration curves were analysed with average maximum IL and standard deviation (SD) for the EIG part of the respiratory signal. Analysis of dosimetric and respiration parameters were performed.

30 patients were CT-scanned during non-coached breathing manoeuvre including free breathing (FB), end-inspiration gating (IG), end-expiration gating (EG). The Varian Real-time Position Management system (RPM) was used to monitor respiratory movement and to gate the scanner. For each breathing phase, a population based internal margin (IM) was estimated based on average chest wall displacement, and incorporated into an individually optimized isocentric wide tangential photon field treatment plan for each scan. Treatment plans for 42.4 Gy over 16 fractions were calculated.

**Results:** The mean anteroposterior body excursion during FB was 2.5mm. For IG and EG, the mean excursions within gating windows were less at 1mm. The internal margin was reduced in 3 mm. and the dose in lung and heart were reduced in a 5% Conclusions: This preliminary analysis confirms measurable dosimetric benefits for free breathing gated breast cancer radiotherapy.

**EP-1646**

Development of an in-house TomoTherapy transfer plan check

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**Purpose/Objective:** At the UHB Radiotherapy department we have two TomoTherapy HD units. The QA procedure for patients being treated on TomoTherapy (Tomo) is that a patient specific delivery QA (DQA) must be carried out prior to the patient beginning treatment, using out Delta4 phantom. For Category 1 patients, a secondary DQA must be carried out (known as a transfer plan), so there is one plan for each of the two rooms in case of a treatment delivery unit breakdown. The Tomo HD units have dynamic jaws functionality (known as TomoEDGE) which speeds up the delivery time thus enabling us to increase patient throughput. More throughput means more time required on the machines to carry out DQA. The aim of this project is to reduce the workload of patient specific QA on transfer plans. The solution should be auditable, safe, secure, maintainable, not impact on already deployed clinical software and present the required results in a presentable format to attach to patient records in our Oncology Management System (OMS), MOSAIQ.

**Materials and Methods:** The two DICOM Tomo RT plan files were validated and interpreted using dcm4chee library and private Tomo DICOM tags compared using standard Java libraries. A web application was created using the robust infrastructure of Enterprise Java Beans (EJB) to allow the user to load the two plans for comparison. The sinogram from the two plans were compared against each other by taking into account the latency differences between the machines. As TomoEDGE functionality is used, the jaw positions for each projection were also compared. The results of the comparison are displayed in the Graphical User Interface.