3.1% and 5.6%, respectively; more patients are required to determine statistical significance.

Conclusion: RapidArc gives an improved CI around each metastasis as well as a lower whole brain dose at 2, 5, and 12.5 Gy compared to iPlan. This suggests that the RapidArc single isocentre technique offers a potential option for the treatment of multiple metastases, but further studies into optimal arc arrangement, whole brain doses and dosimetric delivery are required. In particular, the work of Evan et al (2013) suggests that 4-arc VMAT may further improve dose conformity, dose fall-off and whole brain doses relative to the 2-arc method discussed here. Ongoing work includes a comparison to a 4-arc arrangement together with analysis of beam-on and treatment times. In addition, investigation into the most suitable plan quality metrics such as those suggested by Paddick (2000) will be carried out.

EP-1701

VMAT or IMRT- what is better solution in sparing bone marrow in WPRT of patients after prostatectomy

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Purpose or Objective: For postprostatectomy patients at higher risk of nodal involvement the irradiation of pelvic lymph nodes may improve the therapeutic ratio. Larger volumes irradiated for these patients result in increased doses delivered to OAR. IMRT and VMAT techniques allow to better protect OAR in comparison to 3D-CRT. The aim of this study was to compare IMRT and VMAT techniques in terms of sparing of OAR. The main attention was paid to pelvic bones' marrow protection.

Material and Methods: Ten patients were selected retrospectively for this planning study. The 3D-CRT, IMRT and VMAT plans were created for each of patients. Treatment plans were generated for prostate bed (PTV1) and pelvic lymph nodes (PTV2). The delivered dose to the sum of PTV1 and PTV2 was 46Gy in 23 fractions and additionally dose 18 Gy in 9 fractions was delicered to PTV1 Target coverage (at least 98% of the PTV received≥95% of the prescription dose) and OAR sparing were compared across techniques. The following OAR were delineated: rectum, bladder, bowel bag and pelvic bones. The Wilcoxon test was used to compare the dosimetric parameters. Dose-values: bowel bag V30Gy[cc], pelvic bones V30Gy[%], V40Gy[%], bladder V40Gy[%], V50Gy[%], V60Gy[%], rectum V40Gy[%], V50Gy[%], V60Gy[%] were considered.

Results: The dosimetric qualities of 3D-CRT, IMRT and VMAT plans were comparable for target coverage (the mean value of PTV1 V95%, the mean value of PTV2 V95% all >99%). The IMRT and VMAT plans resulted in significant reduction in pelvic bones V30Gy[%], V40Gy[%], bladder V40Gy[%], V50Gy[%], V60Gy[%], rectum V40Gy[%], V50Gy[%], V60Gy[%] and bowel bag V30Gy[cc] in comparison to 3D-CRT plans. A comparison between IMRT and VMAT techniques shown better sparing bone marrow (pelvic bones V30Gy[%]) and increase of following values: bowel bag V30Gy[cc], bladder V60Gy[%], rectum V60Gy[%] in VMAT plans. Differences between values of V40Gy[%] and V50Gy[%] for bladder and rectum across mentioned techniques were statistically not significant.

Conclusion: The lower doses delivered to pelvic bones and thus also to red marrow for IMRT and VMAT techniques allow to expect the lower hematological toxicity. A comparison between IMRT and VMAT techniques shows, that the VMAT technique reduces the delivered dose to pelvic bones. However IMRT provided better rectum, bladder and bowel bag sparing at higher doses. All these results should be taken into consideration when IMRT and VMAT techniques being used in WPRT of patients after radical prostatectomy.

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Cardiac dose evaluation in left breast cancer radiotherapy: Direct and Helical Tomotherapy

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Purpose or Objective: The aim of the present study was to retrospectively evaluate the delivered doses to the cardiac structures for two different tomotherapy techniques in adjuvant radiotherapy for early stage left breast cancer patients

Material and Methods: Five consecutive conservatively operated left breast cancer patients, who underwent adjuvant radiotherapy, were retrospectively considered. CT simulation was acquired with patients in a supine position, using the breast immobilisation device. Image acquisition was performed with a 2.5 mm slice thickness in a free breathing modality without contrast agent administration. The prescription dose was 45 Gy/20 fr and 50 Gy/20 fr, respectively to the PTV2 (left whole breast) and PTV1(tumour bed), obtained as a 5 mm isotropic expansion of the CTVs, with a 5 mm margin from the skin. The following volumes were used for plans optimisation: lungs, right breast, spinal cord and PRV, heart. For each patient, two independent optimisations were carried out using a fixed ganty technique, Tomodirect (TD) and helical technique (HT). For TD planning two tangential plus other two-four static beams were used. For HT planning, the controlateral lung and breast were directionally blocked. All plans were optimized in order to minimize dose to OAR according to our internal protocol (lung V20<10%, V10<20%, V5<42%, controlateral breast: Dmax<5Gy, controlateral Lung: V5<5%) and to obtain a coverage of D95>95% and Dmax(1cc) <105% for PTVs. In a second time, cardiac structures have been identified on the basis of the University of Michigan Cardiac Atlas, and DVH parameters (D1%, Daverage, V20, V10, V5) for the left and right ventricle (LV, RV), left main coronary (LMC) artery, right coronary (RC) artery and left anterior descending coronary (LAD) artery were retrospectively evaluated for all plans using the plan evaluation tool of the RayStation software v 4.7.2

Results: Constraints on target coverage and OAR constraints were respected for both techniques in all plans. All results are reported in table 1. HT plans achieved a better conformation for the high doses for the whole heart (figure 1). The average maximum doses were 23±7 and 15±2 for TD and HT modality respectively. However HT showed a larger low-dose bath and the average doses were 20% higher than TD. For the LV the D1%, V10 and V5 for HT plans were 8±3, 0.6±1, 13±15, vs 19±10, 6.0±2.8, 34±12 for TD plans. Considering LAD artery the V20 was 0.1±0.1 with HT vs 29±18 for TD. On the average, the greater differences in DVH parameters between HT and TD plans were observed for V5 in LV, (-21.7%), V5 in RV (+14.3%) and V20 in LAD artery (-28.7%)