Purpose or Objective
The combination of Adaptive Radiotherapy (ART) and VMAT allows to create more conformal plans for patients with bladder cancer without risk of missing target during changes of bladder volume and shape. Relative position of small bowel is influenced by the volume of treated bladder. Recent reviews demonstrated the advantages of using ART in bowel sparing during bladder irradiation. The aim of this study was to assess feasibility of simultaneous sparing of bone marrow, small bowel and rectum using combination of ART and VMAT.
Material and Methods
The planning CT and 20 CBCT images of each of the five patients were taken into account in this retrospective study to simulate adaptive radiotherapy. The prescribed dose was 52Gy in 20 fractions to the whole bladder. PTV_{large} was created by adding isotropic margin of 1,5 cm to the bladder in the planning CT. PTV_{small} and PTV_{medium} were constructed based on the bladder contours in CBCT images by adding 7-mm margin to the smallest and the largest contour, respectively. The conventional non-adaptive VMAT plans were calculated for PTV_{large}. A library of treatment plans for ART was created by generating three VMAT plans linked to the different PTVs for each patient. Simulating the ART treatment, the appropriate plans were selected according to the volume of the bladder registered in CBCT images. The cumulative dose distribution (the ART dose distribution) was calculated as a sum of dose distributions obtained for each fraction. DVHs for pelvic bones, bowel bag and rectum were calculated and compared with corresponding histograms obtained for conventional plans. The following parameters were analysed: V45Gy[cc], V30Gy[cc] for pelvic bones and bowel bag and V50Gy[%], V45Gy[%] for rectum.
Results
For a cohort of 100 registered CBCT images, 16 of PTV_{large}, 66 of PTV_{medium} and 18 of PTV_{small} were selected to create ART plans. The dosimetric quantities of ART plans and conventional plans were comparable for target coverage. The ART plans resulted in significant reduction in pelvic bones V45Gy[cc], V30Gy[cc], bowel bag V45Gy[cc], V30Gy[cc] and rectum V50Gy[%], V45Gy[%] when compared to conventional plans.
Conclusion
The ART connected with VMAT technique offers feasibility to create advanced conformal plan without a risk of missing target. It allows better pelvic bones sparing while maintaining bowel bag and rectum dose limits. The lower doses delivered to pelvic bones and thus also to bone marrow allow to expect the lower hematological toxicity.

EP-1587 feasibility investigation of prone position robotic radiosurgery treatment for dorsal metastasis
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Purpose or Objective
Treatment of dorsal region tumors with radiosurgery includes different types of problem such as movement of chest, large inhomogeneity region because of lung, exposure risk of arms etc. Decision of patient position before treatment planning is very important to minimize these problems. The purpose of this study is to investigate feasibility of prone position robotic radiosurgery treatment with real time tumor tracking for dorsal region metastasis.
Material and Methods
10 patients were selected for this study. Planning CT scans were acquired both supine and prone position for all cases. CTV and all critical structures were contoured by same physician. RTOG 0631 protocol criterias were used for contouring and treatment planning. Multiplan 5.3 (Accuray Inc) with Monte Carlo algorithm was used for all dose calculations. Treatment plan quality indices and organ at risks were compared. Paired Samples T Test was used for statically analysis.
Results
Mean PTVmin, PTVmax and PTVmean values are 11.65, 24.49 and 20.90 Gy for supine and 12.40, 23.35 and 20.52 Gy for prone positions, respectively. PTVmin value in prone plans is significantly higher than in supine plans (p=0.035). There is no significant differences for spinal cord, partial spinal cord, heart, and liver but we found lower values in prone plans for lung (1000cc) and esophagus and statically important (p=0.07 and p=0.031, respectively). Beam on time and MU values in prone plans are significantly lower than in supine plans (p=0.017 and p=0.004 respectively). No significant difference was found in conformity and gradient index. No significant difference in dose outside of the target volume and maximum dose within 1.0 cm from the edge of the target volume.
Conclusion
Prone robotic radiosurgery with real time tumor tracking has a lot of advantages than supine treatment for dorsal region metastasis. Lower organ doses (esophagus and lungs), beam on time and MU can be achieve with prone setups.

EP-1588 Dosimetric feasibility of an "off-breast isocenter" technique for whole-breast cancer radiotherapy
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Purpose or Objective
The use of kilovoltage orthogonal setup images has spread in last years in breast radiotherapy. There is a potential risk of collision imaging system-patient when the isocenter is laterally placed. The aim of this study is to investigate the viability of placing the treatment isocenter at the patient midline for breast cancer radiotherapy, in order to avoid the risk of collisions during image-guided setup and treatment delivery.
Material and Methods
Twenty IMRT plans designed by placing the isocenter within the breast volume ("plan_ref"), were retrospectively replanned by shifting the isocenter at the patient's midline ("plan_off-breast"). An integrated simultaneous boost (SIB) technique was used. Multiple metrics for the planning target volumes (PTVs) and organs at risk (OARs) were compared for both approaches using a paired t test.
Results
Comparing plan_ref vs. plan_off-breast, no significant differences in PTV coverage (V95%) were found (96.5% vs. 96.2%; p= 0.361 to PTVbreast; 97.0% vs. 97.0%; p= 0.977 to PTVtumor_bed). With regard to OARs, no substantial differences were observed in any analyzed metric: V5Gy (30.3% vs. 31.4%; p= 0.486), V20Gy (10.3% vs. 10.3%; p= 0.903) and mean dose (7.1 Gy vs. 7.1 Gy; p= 0.924) to the ipsilateral lung; V5Gy (11.2% vs. 10.0%; p= 0.459), V30Gy (0.7% vs. 0.6%; p= 0.251) and mean dose (2.3 Gy vs. 2.2 Gy; p= 0.400) to the heart; and average dose to the contralateral breast (0.4 Gy vs. 0.5 Gy; p= 0.107).
Conclusion
The off-breast isocenter solution resulted in dosimetrically comparable plans as the reference technique, avoiding the collision risk during the treatment session.