AbstractID: 10638 Title: IMRT ad-hoc adaption - initial results for prostate: a retrospective planning study

Purpose: A planning study was performed to investigate the geometry-based adaption of a step and shoot IMRT-plan. **Method and Materials:** Six cases with large rectum and prostate deformations were selected. A 9 field IMRT-plan (A) was planned on a first CT(CT1). The plan fulfilled all requirements for prostate IMRT in our clinic and its quality was comparable to a conventional high-quality step and shoot IMRT plan. For a second CT(CT2), three plans were considered: the original plan with optimized isocentre position (B), a newly optimised plan (C) and the original plan, adapted using optimization rules (D), based on a geometry-based concept called "2-Step IMRT". Several DVH-parameters were utilized for quantification of plan quality: CTV D99, central PTV D95, V95 for an outer PTV, V80 and V50 for rectum and bladder. **Results:** Unlike B, D achieved almost the same target coverage as plan C. For the OARs, the rectum V80 was slightly increased for the original plan. The volume with more than 95% of the target dose was 1.5 ± 1.5 cm³ for C, compared to 2.2 ± 1.3 cm³ for A in CT1 and 7.2 ± 4.8 cm³ in CT2. D resulted in 4.3 ± 2.1 cm³, an intermediate dose load to the rectum. All other parameters were comparable for C and D in contrast to the results from B. **Conclusion:** The first results for adaptation using the 2-Step IMRT algorithm are encouraging. The plans were superior to plans with optimised isocentre position B and only marginally worse than a newly optimized plan C. Computerisation is needed to accelerate the procedure, which is currently performed manually. Checks have to be developed to allow an ad-hoc application of the adapted plan.