

AbstractID: 13437 Title: Dosimetric comparison of 3D conformal proton therapy and IMRT for retroperitoneal-sarcoma treatments

Purpose: To determine the difference in dose to target and critical structures when treating retroperitoneal sarcoma with 3D conformal proton therapy or IMRT, and to evaluate the sensitivity to setup errors for both techniques. **Method and Materials:** 3D conformal proton, IMRT, and 3D conformal photon plans were made for 8 patients. GTV volumes varied between 277 and 3482cc. A uniform 2cm GTV to CTV margin was applied, followed by a 0.5cm CTV to PTV margin. Laterally the proton plans were conformed to the PTV, while a distal margin equal to 1.5% of the range plus 1mm was applied to the CTV. Range-compensator smearing of 0.5cm was used. For proton plans 2 to 4 beams were used; 5 to 8 for photon plans. Prescribed dose is 50.4CGE. To evaluate the effect of setup uncertainty on target coverage and dose to critical structures, proton and IMRT plans were re-calculated for 5mm shifts along the cardinal axes. Pinnacle (Philips) treatment planning system was used to generate photon plans; Eclipse (Varian) to generate proton plans. **Results:** The bowel V15Gy is lower in the proton plan (19.9% versus 51.7% averaged over all patients), while V45Gy is near identical (6.9% versus 6.3%). Mean dose to liver is 5.8 and 13.2Gy for proton and IMRT respectively. When not involved in the CTV, the V20Gy of the ipsilateral kidney is significantly lower in proton plans (by up to 45%). Both techniques avoid the contralateral kidney giving comparable V20Gy (0.2% and 2.3%). **Conclusion:** Conformity of the dose to the target is comparable for both techniques. Critical-structure volumes receiving high doses are comparable, while the volume receiving low dose is reduced significantly in proton plans. IMRT plans are less sensitive to variations in setup.