

AbstractID: 2907 Title: Effects of patient positioning and treatment techniques on the potential for dose escalation in patients with gynecological malignancies with para-aortic lymph node involvement

Purpose: To investigate the effect of patient positioning and treatment technique on the potential for dose escalation in pelvic and para-aortic irradiation.

Method and Materials: 5 patients with gynecological malignancies were CT-scanned in prone, with belly-board, and supine positions. For each patient and position 3D and IMRT plans were generated to 45 Gy. The CTV encompassed the pelvis and para-aortic nodes. PTV was a 3D, 0.6 cm expansion. We contoured kidneys, spine, small bowel, bladder and rectum, and compared the doses distributions. Dose conformity was assessed using the conformity index $CI = V_{T,P} / V_P$, where $V_{T,P}$ is the target volume

receiving prescription dose or greater, and V_P is the volume receiving the prescription dose. For organs at risk we compared mean (e.g. for kidneys) or maximum (e.g. for spine) doses.

Results: Target conformity was significantly improved for IMRT plans as compared to 3D plans. IMRT plans, regardless of position, resulted in superior sparing of spine and bowel compared to 3D plans. For IMRT we found no significant difference in bowel doses between supine and prone belly-board positions. The kidneys received lower doses in the 3D plans, but IMRT doses were much lower than tolerance. Contrary to small field irradiation, the integral dose in these large-field IMRT plans was not more than in the 3D plans.

Conclusion: IMRT has the potential to allow dose escalation in whole pelvic and para-aortic radiation as compared to 3D plans, with increased sparing of critical organs. For IMRT, *regardless* of patient positioning, there is no significant difference in doses to either targets or critical structures. Thus, for reasons of setup reproducibility and patient comfort, supine IMRT would appear to be the better choice. The problem of organ motion in the irradiated area must be addressed before IMRT can be implemented.

Conflict of Interest (only if applicable):