Purpose: To dosimetrically compare the whole-IMRT, hybrid-IMRT (combination of IMRT and 3D-CRT) and 3D-conformal radiotherapy (3D-CRT) plans for larger targets.

Methods: Five previously treated patients of carcinoma cervix with para-aortic lymph-nodes (target length 33-34cm) were selected. PTV-P (PTV-Primary), PTV-PA (PTV-para-aortic) and organ at risks (OARs) were defined. Three plans were generated using Eclipse TPS for Varian CL2300C/D linear accelerator using 6MV photon beam. Three plans were: (i) Whole-IMRT: IMRT for both PTV-P and PTV-PA (ii) Hybrid-IMRT: IMRT for PTV-P and 3D-CRT for PTV-PA (iii) 3D-CRT: 3D-CRT for both PTV-P and PTV-PA. Prescription dose for PTV-P is 50.4Gy and PTV-PA is 45Gy in 28 fractions. Coverage index (CI=Target volume covered by prescription dose/Target volume), mean doses to bladder, rectum and bowel were used for plan comparison by using DVH. Integral dose (liter-Gray) to normal tissue (i.e., patient volume minus PTV-P and PTV-PA) and total monitor units (MUs) required to deliver a plan was also noted.

Results: The CI for PTV-P is 0.98±0.20, 0.96±0.09, and 0.95±0.01 for Whole-IMRT, Hybrid-IMRT and 3D-CRT plan and for PTV-PA is 0.98±0.01, 0.98±0.01, and 0.97±0.20. Maximum doses to PTV-P are 5660.85±90.85cGy, 5640.35±70.35cGy and 5813.80±97.40cGy. Maximum doses to PTV-PA are 5000.60±109.10cGy, 5079.85±20.25cGy and 5092.25±19.75cGy. Mean doses to the bladder are 3810±225.80cGy, 3842.10±182.70cGy and 5204±98.25cGy for Whole-IMRT, Hybrid-IMRT and 3D-CRT plan, respectively. Mean doses to rectum are 3955.35±324.95cGy, 3971.15±354.15cGy and 4741.20±371.60cGy. Mean doses to bowel are 2623.35±320.85cGy, 2855.30±371.05cGy and 3011.7±433.80cGy. Average MUs required to deliver one fraction is 1285±87, 1585±186, 485±46 for Whole-IMRT, Hybrid-IMRT and 3D-CRT plans, respectively. Higher integral doses to normal tissue were observed for whole-IMRT (267.60±76 liter-Gy) followed by hybrid-IMRT (259.20±53 liter-Gy) and 3D-CRT (186.30±33 liter-Gy).

Conclusions: Whole-IMRT is useful for larger targets compared to hybrid-IMRT in terms of dose conformity, lesser MUs and reduced critical organ doses with little compromise on integral dose, where 3D-CRT sacrificed the OAR sparing.