AbstractID: 10257 Title: Dosmietric Comparison of Fixed Beam Geometry with Optimized Beam Geometry IMRT Plans:

Purpose: To achieve a clinically accepted optimum treatment plan in a reasonable time, IMRT parameters; energy, gantry angle, number of segments and intensity levels and collimator angle are iteratively attempted. Each parameter may provide complex and unstable solution. The selection of beam angle may provide better conformality that is studied with availability of beam angle optimizer (BAO) compared to the fixed beam angle. **Method and Materials:** Dosmietric comparison of fixed beam geometry (FBG) and BAO for IMRT plans is investigated for 17 patients. IMRT dosimetry plans (prostate, pancreas, brain and head and neck) with same target volumes were studied for both techniques. The head and neck and prostate PTV volumes ranged between 95.96-319.9 cm^3 and 153.6-321.3 cm^3 where as OAR were 8.3-47.8 cm^3 and 68.3-469.2 cm^3. In FBG, a standard coplanar 7-9 fields equally spaced gantry angles were used. In BAO the selection of gantry angle was chosen by the algorithm for the same number of beams. The desired dose volume constraints were kept the same for both techniques. Treatment planning was performed on Eclipse treatment planning system using beam data generated for Varian IX linear accelerator with 0.5 cm multileaf collimator. **Results:** The DVH for PTV are similar for both techniques but BAO provided superior sparing of the OARs in comparison with FBG. However, when the MUs were analyzed, FBG provided an average 16.9 % higher MU compared to the BAO. **Conclusions**: The comparison of the fixed beam and optimized beam geometry plans reveal identical DVHs of PTVs and much better sparing to OARs. However the differences in monitor units are significantly lower (7-36%) in BAO with reduction in treatment time. Such reduction in MU translates into the reduction in total body and integral dose. It is concluded therefore that BAO feature should be clinically used against FBG.