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Evaluation of Golden Beam Data for the Commissioning of 6 and 18 MV Photons Beams in Varian Linear Accelerator

Authors : Shoukat Ali, Abdul Qadir Jandga, Amjad Hussain

Abstract : Objective: The main purpose of this study is to compare the Percent Depth dose (PDD) and In-plane and cross-plane profiles of Varian Golden beam data to the measured data of 6 and 18 MV photons for the commissioning of Eclipse treatment planning system. Introduction: Commissioning of treatment planning system requires an extensive acquisition of beam data for the clinical use of linear accelerators. Accurate dose delivery require to enter the PDDs, Profiles and dose rate tables for open and wedges fields into treatment planning system, enabling to calculate the MUs and dose distribution. Varian offers a generic set of beam data as a reference data, however not recommend for clinical use. In this study, we compared the generic beam data with the measured beam data to evaluate the reliability of generic beam data to be used for the clinical purpose. Methods and Material: PDDs and Profiles of Open and Wedge fields for different field sizes and at different depths measured as per Varian's algorithm commissioning guideline. The measurement performed with PTW 3D-scanning water phantom with semi-flex ion chamber and MEPHYSTO software. The online available Varian Golden Beam Data compared with the measured data to evaluate the accuracy of the golden beam data to be used for the commissioning of Eclipse treatment planning system. Results: The deviation between measured vs. golden beam data was in the range of 2% max. In PDDs, the deviation increases more in the deeper depths than the shallower depths. Similarly, profiles have the same trend of increasing deviation at large field sizes and increasing depths. Conclusion: Study shows that the percentage deviation between measured and golden beam data is within the acceptable tolerance and therefore can be used for the commissioning process; however, verification of small subset of acquired data with the golden beam data should be mandatory before clinical use.

Keywords : percent depth dose, flatness, symmetry, golden beam data
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