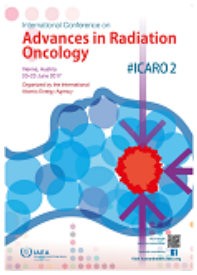

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Commissioning and validation of Total Body Irradiation (TBI) in Varian True Beam linear accelerator (LA)

Thursday, June 22, 2017 10:45 AM (5 minutes)

Aim: To report the results of commissioning and validation of Total Body Irradiation (TBI) in Varian True Beam linear accelerator (LA).

Materials and Methods: TBI technique was commissioned for 6 MV (Doserate 300MU/min) beam in Varian True Beam LA following the recommendation of AAPM TG 17. Various dosimetric parameters were measured viz: output, Tissue Maximum Ratios and profiles. The treatment distance was set at 5m, with the gantry 270, and collimator 45deg. The patient positioning device was a wooden stand kept near the primary wall with a perxpex beam spoiler of 1.5 cm thickness kept at 30 cm from the stand midline facing the beam. 10 patients were treated so far using the anterior-posterior technique from March to October, 2016. The dose was prescribed at the umbilicus. According to the required conditioning regime 3 patients were prescribed 2Gy, 1 patient 7.2Gy, 3 patients 8 Gy, 2 patients 13.2 Gy and 1patient 14.4 Gy. The number of fractions differed from single fraction (3 patients), 4 fractions (4 patients) to 8 fractions (3 patients). In- vivo dosimetry was performed using thermoluminescent dosimeters with appropriate build-up, which were placed at strategic reproducible locations namely the forehead, Supra Scapular Notch (SSN), Umbilicus, Right Palm and Left Knee. The dose measured at each point were tabulated and compared with the expected dose.

Results: The output of the machine for this technique was measured as 0.0419 cGy/MU. The depth of maximum dose was 3 mm. Flatness and symmetry was measured as 1.27% and 2.09% respectively in the horizontal direction and 3.21% and 2.2% respectively in the vertical direction. The average(sd) percentage variation in the dose measured at Forehead, SSN, Umbilicus, Right Palm and left knee were 6.64 (2.9), 2.93(2.2), 8.28(2.96), 12.01 (5.14) and 3.58(7.17) respectively. The flatness and symmetry were found to be in the acceptable range. As per the institution protocol the separation at different position like the forehead, SSN, apex of lung, mid lung, lower part of lung, umbilicus, calf etc are taken and the treatment dose is prescribed to an average depth of these points. Therefore the mean (sd) variation of 8.28(2.96) was obtained between the prescribed and the measured dose. However it was within the AAPM recommendation of ± 10%. An unacceptable variation of 13.1% and 10.11% was seen in 2 patients which correspond to a difference of 4 cm between their prescription and midline depth.

Conclusion: TBI has been commissioned and validated successfully in our new Varian True beam Linear accelerator.

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