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Analysis of IMRT calculations and measurements using the TG119 document at the Radiotherapy Center of Suriname (RTCS)

The purpose of this work was to revise how well XiO treatment planning system (TPS 4.80 patch 03) Intensity Modulated Radiation Treatment (IMRT) calculations are delivered by an Elekta Synergy Platform-MLCi2 machine using Task Group 119 (TG119) benchmarked data of the American Association of Physicists in Medicine (AAPM) in order to implement future IMRT treatments at the Radiotherapy Center of Suriname. The approach delivery was steep and shoot and measurements were performed for the four geometries (except C Shape harder) mentioned on the guide document TG119. The photon energy 10MV was also considered. Using the XiO TPS, fixed-beam IMRT treatment plans were constructed based on the structure sets copied to a parallelepipedic phantom which consist of solid water slabs. The plans were delivered to the phantom using the Elekta machine mentioned above and the resulting dose distributions were measured in the coronal plane using EBT3 Gafchromic films. Measured planar dose distributions were analyzed using gamma index with criteria of 3 %/3 mm. Also, point measurements were taken, five times each, using a 0.125 cm3 scanning chamber situated in the same positions recommended. The confidence limit was obtained for both cases film and point measurements for ulterior comparison with the benchmark provided. The results showed that clinical implementation of IMRT only can be justified for simple IMRT calculations, like those developed in prostate´s anatomy, because an increase on complexity of IMRT plans (H&N) could produce important discrepancies between radiation doses calculated and those delivered by the linac.

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