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## Quality audit of IMRT treatment using EBT3 film and RPL glass dosimetry system

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This work presents the main results of INOR's participation in the IAEA Coordinated Research Project (CRP) E2.40.18. on "Development of Quality Audits for Advance Technology in Radiotherapy Dose Delivery". The national External Audit Group (EAG) has developed a procedure, based on the CRP's step 9, for using a radio-photo luminescent glass dosimetry system (RPL-GD), combined with a radiochromic dosimetry system, based on EBT3 films, for IMRT treatments' commissioning and auditing. It was implemented in three linear accelerators (Elekta Precise and Elekta Synergy), licensed for IMRT procedures, in order to verify the feasibility for accurate and precise assessment of dose calculations, both in high dose-low gradient regions. The plans were calculated with two computerized treatment planning systems (TPS), i.e., XIO and PrecisePlan. A phantom specially designed by the CRP was used for irradiations in the accelerators, and relative and absolute dose measurements in the phantom were performed with RPL-GD and EBT3 systems, respectively. Redundant absolute dosimetry measurements with ionization chamber (Semiflex 0.125cc) were used. PTW Verisoft software's Gamma analysis tool was used to compare the isodoses maps obtained from the TPS and measured with EBT3 dosimetric film. The RPL-GD system, donated by IAEA through a technical cooperation project was commissioned for 6 MV photon beams, to obtain the dose in the PTVs and OARs. The results showed a 4% and 3% differences between the calculated dose and measured dose at the PTVs and OARS, on the accelerators Synergy and Precise respectively. The absolute doses obtained with RPL-GD were consistent with the ionization chamber measurement. Further experience and skills should be gained by the EAG in order to ensure the required accuracy for the purposes of auditing advanced treatments as IMRT, however, the combination RPL-GD/EBT3 seems to be an adequate alternative for performing the recommendations of the CRP.

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