Verification of absorbed doses using thermoluminescent detectors and mapping of isodose curves in IMRT planning

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Quality assurance in radiation therapy included all actions for ensure the maximum dose for the target volume (tumour) and minimum dose for the healthy tissues [1, 2, 3]. The use of thermoluminescent detectors for evaluation of the absorbed doses in ionizing radiation is widespread and well established in clinical routine [4].

This work aimed the evaluation of absorbed doses in IMRT plannings using thermoluminescent detectors (TLDs) of $CaSO_4$:Dy and a PMMA phantom that simulated a patient in treatment. This phantom contained five cavities: the central cavity with rectangular format and the other cavities with different formats: one circular, two squares and one triangular. In this study the central cavity (rectangular format) was considered like target volume (tumour) and the others four cavities were considered like organs at risk. The TLDs were positioned inside the cavities; each cavity have an EVA mold for the positioning of TLDs. The TLDs were positioned inside the phantom cavities and were irradiated for photon beams (6 MV) of a linear accelerator Varian 6EX ("True Beam").

The results demonstrated the good agreement for the absorbed doses calculated by TLDs of CaSO4:Dy and the doses provided by the treatment planning system.

Keywords: thermoluminescent dosimetry, $CaSO_4$:Dy, quality assurance, radiation therapy

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