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In Vivo Dosimetry in Total Body Irradiation


Eilen Llanes veiga, Rodolfo Alfonso Laguardia and Roberto Caballero Pinelo

Institute of Oncology and Radiobiology, Cuba

Total Body Irradiation (TBI) is a radiotherapy technique that consists of irradiating homogeneously the whole patient's body and it is characterized by an extended source to surface distances and the use of large irradiation fields. The limitations of the available input data and inherent problems with the calculation procedures make it very difficult to accurately determine the dose distributions in TBI. For these reasons, it is highly recommended to use In Vivo Dosimetry (IVD), to guarantee the quality of TBI treatments as a direct measurement of the delivered dose. An IVD QA system was implemented based on semiconductor diodes and radiochromic films. For the commissioning of the

system, both detector types were calibrated independently. This guarantees the traceability of the measurements. An assessment was made on the sources of uncertainties. A tolerance level of $\pm 10\%$ was established for the combined contribute on of both computational and experimental uncertainties. An experiment to a phantom was carried out to simulate a clinical TBI procedure. In this way, the calibration of the dosimetry system was corroborated. Finally, the IVD system was applied in TBI of three real patients. The discrepancies obtained between the prescribed and measured doses were below the established tolerance level of $\pm 10\%$.

e: ellanes2307@gmail.com

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