

Ethanol Chlorobenzene Dosimetr Usage for Measuring Dose of the Intraoperative Linear Electron Accelerator System

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Abstract : Intraoperative radiation therapy (IORT) is an innovative treatment modality that the delivery of a large single dose of radiation to the tumor bed during the surgery. The radiotherapy success depends on the absorbed dose delivered to the tumor. The achievement better accuracy in patient treatment depends upon the measured dose by standard dosimeter such as ionization chamber, but because of the high density of electric charge/pulse produced by the accelerator in the ionization chamber volume, the standard correction factor for ion recombination K_{sat} calculated with the classic two-voltage method is overestimated so the use of dose/pulse independent dosimeters such as chemical Fricke and ethanol chlorobenzene (ECB) dosimeters have been suggested. Dose measurement is usually calculated and calibrated in the Z_{max} . K_{sat} calculated by comparison of ion chamber response and ECB dosimeter at each applicator degree, size, and dose. The relative output factors for IORT applicators have been calculated and compared with experimentally determined values and the results simulated by Monte Carlo software. The absorbed doses have been calculated and measured with statistical uncertainties less than 0.7% and 2.5% consecutively. The relative differences between calculated and measured OF's were up to 2.5%, for major OF's the agreement was better. In these conditions, together with the relative absorbed dose calculations, the OF's could be considered as an indication that the IORT electron beams have been well simulated. These investigations demonstrate the utility of the full Monte Carlo simulation of accelerator head with ECB dosimeter allow us to obtain detailed information of clinical IORT beams.

Keywords : intra operative radiotherapy, ethanol chlorobenzene, k_{sat} , output factor, monte carlo simulation

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