عنوان مقاله:

Monte Carlo Simulation and Experimental Determination of Tissue Phantom Ratio for Photon Beams delivered from Medical Linear Accelerator

محل انتشار:

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خلاصه مقاله:

For an external radiotherapy procedure, the tissue phantom ratio (TPR۲۰,۱۰) is used as a photon beam quality index. This work presents an estimate of TPR۲۰,۱۰ using two cylindrical ionization chambers (NE۲۵۷۱ Farmer and PTW۳۰۰۱۳) in three high-energy photon modes (۶, ۱۰ and ۱۵ MV) using both the Monte Carlo simulation and the experimental setup. The MCNPX (version ۲.۶.۰) was used for the simulation of photon beams delivered by Varian-۲۳۰۰CD linac for the determination of TPR۲۰,۱۰ according to technical report series (TRS) ۳۹۸. Again, applying the same protocol TPR۲۰,۱۰ values were measured experimentally with NE۲۵۷۱ Farmer and PTW۳۰۰۱۳ chambers for the same medical linear accelerator (LINAC). The differences of TPR۲۰, ۱۰ between MCNPX and experimental values were found for NE۲۵۷۱ Farmer chamber within ۴.۱۷ percent, ۲.۹ percent and ۲.۵ percent and similarly, these were within ۳.۸۹ percent, ۲.۷۱ percent and ۱.۹۸ percent at ۶, ۱۰ and ۱۵ MV respectively for PTW۳۰۰۱۳. The TPR۲۰,۱۰ values simulated by MCNPX demonstrated close agreement with our experimental results.

کلمات کلیدی:

Tissue Phantom Ratio (TPR), TRS-۳۹۸, Monte Carlo simulation