

عنوان مقاله:

Estimating and Implementing Correction Factors in Small Field Radiotherapy with 6 and 18MV beams in a Heterogeneous Phantom For the treatment of cancerous brain tumors

محل انتشار:

هشتمین همایش ملی راهکارهای ارتقای سلامت و چالش ها (با محوریت سرطان) (سال: 1398)

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خلاصه مقاله:

Background and purpose: Small field sizes are increasingly used in radiotherapy to deliver higher dose gradient to patients. Estimating dosimetric parameters for such fields, lead to significant errors because of using conventional dosimeters at reference condition. To avoid this, two correction factors recommended by American Association of Medical Physicists (AAPM) were determined to investigate the variations caused by dosimeters' responses at the reference and non-reference conditions and increase dosimetric precision in small field radiotherapy. Methods and Materials: The correction factors (KNR,KNCSF) proposed by AAMP were determined for two common radiotherapy detectors, a Farmer and a Si-diode dosimeter, for 0.5×0.5, 1×1, 2×2, and 3×3 cm² small field sizes at 6 and 18 MV linear accelerator energies. An inhomogeneous phantom was also constructed to investigate the variations of dose profiles and percent dept doses (PDDs) after implementing the correction factors. Results: At 6 and 18 MV energies, the maximum PDD was noted within the Poly tetra fluoro ethylene (PTFE) (2.2 gr.cm³) slab of the phantom for the 3×3 cm² field size that can be attributed to the central axis dose changes due to the heterogeneity encountered in such field size. Extra attenuating of the beam in the areas with greater density than water was also observed due to the heterogeneity. Experimental and Monte Carlo dosimetry indicated a good agreement between the Farmer and Si-diode dosimeters regarding the PDDs in the PTFE. At 6 and 18 MV energies, the maximum PDDs were observed at the 3×3 cm² field size within the cork (0.2 gr.cm³) slab. However, due to the presence of heterogeneous lower densities of the cork a decrease in the PDDs on the central axis was observed. Conclusion: implementing the correction factors recommended by the AAPM in small field dosimetry could increase the accuracy and precision of radiotherapy practices in such field sizes. Also consider the inconsistencies between borders increase the accuracy . of the dose will be reviewed

کلمات کلیدی:

Small field dosimetry, Correction Factors, brain tumors, Heterogeneous Phantom

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