عنوان مقاله:

Estimation of Secondary Skin Cancer Risk Due To Electron Contamination in 18-MV LINAC-Based Prostate Radiotherapy

محل انتشار:

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خلاصه مقاله:

Introduction Accurate estimation of the skin-absorbed dose in external radiation therapy is essential to estimating the probability of secondary carcinogenesis induction Materials and Methods Electron contamination in prostate radiotherapy was investigated using the Monte Carlo (MC) code calculation. In addition, field size dependence of the skin dose was assessed. Excess cancer risk induced by electron contamination was determined for the skin, surface dose, and prostate dose-volume histogram (DVH) using MC calculation and analytical methods. Results MC calculations indicated that up to 80% of total electron contamination fluence was produced in the linear accelerator. At 5 mm below the skin surface, surface dose was estimated at 6%, 13%, 27%, and 38% for 5×5 cm2, 10×10 cm2, 20×20 cm2, and 40×40 cm2 field sizes, respectively. Relative dose at Dmax was calculated at 0.92% and 5.42% of the maximum dose for 5×5 cm2 and 40×40 cm2 field sizes, respectively. Excess absolute skin cancer risk was obtained at 2.96×10-4 (PY) -1 for total 72 Gy. Differences in prostate and skin DVHs were 1.01% and 1.38%, respectively. Conclusion According to the results of this study, non-negligible doses are absorbed from contaminant .electrons by the skin, which is associated with an excess risk of cancer induction

کلمات کلیدی:

skin cancer, Monte Carlo Method, High Energy Radiotherapy, Absolute Risk Reduction, Prostate cancer, Radiotherapy