عنوان مقاله:

Enhancement of the Dose on ۱۲ MV Linac with Free Flattening Filter Mode

محل انتشار:

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خلاصه مقاله:

Purpose: In the last years, some studies investigated dosimetric benefits of a free flattening filter for the photon mode in the radiotherapy field. This study aims to provide a theoretical study published and analysis of basic dosimetric properties for a Saturne ۴۳ Linac head to implement free flattening filter beams clinically. Material and Methods: This is the first Monte Carlo study for the head of Saturne ۴۳ with replacement flattening filter mode investigating beam dosimetric characteristics, including central axis absorbed doses, beam profiles and photon energy spectra. The later ones were analyzed for flattening filter and replacement flattening filter beams using BEAMnrc and DOSXYZnrc Monte Carlo codes for ۱۰ × ۱۰ cm۲, ۵ × ۵ cm۲ and ۲ × ۲ cm۲ square field sizes. Results: A ۳.۹۴-fold increase of dose rate and electron contaminating increased by ۲۴۶.۴ % with the replacement flattening filter mode for field size of ۱۰ × ۱۰ cm۲. Reduction was made by replacement flattening filter beam in the peripheral dose up to ۳۰%, and the time was reduced more than ۵۰ %. Conclusion: Results obtained from our study revealed that some characteristic dosimetries such as the maximum increase in depth dose rate, decrease in out-of-depth dose, and reducing time can be beneficial for the unflattened beam to be used in the radiotherapy for the advanced techniques.

کلمات کلیدی:

Monte Carlo Method, Radiotherapy, Radiation dosimetry, Stereotactic Radiation