

Penentuan Faktor Koreksi Monitor Unit Berkas Elektron pada Variasi Luas Lapangan Applicator dan Variasi Block pada Pesawat Linier Accelerator

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Abstrak

Penelitian ini bertujuan untuk menentukan faktor koreksi monitor unit pada berkas elektron berdasarkan variasi applicator dan variasi luas lapangan penyinaran block elektron untuk masing-masing energi elektron pada pesawat Linear Accelerator (Linac). Berikutnya adalah menganalisis pengaruh factor koreksi monitor unit pada perhitungan Treatment Planning System (TPS) untuk mendapatkan waktu penyinaran (MU) yang sesuai dengan keluaran radiasi linac. Pengukuran keluaran radiasi berkas elektron dilakukan pada variasi ukuran applicator berdasarkan variasi luas lapangan penyinaran block elektron pada energi 4 MeV, 6 MeV, 8 MeV, 10 MeV, 12 MeV, 15 MeV. Sumber energi elektron dan detektor markus berasal dari solid phantom yang berukuran 30 cm x 30 cm. Hasil penelitian menunjukkan bahwa nilai Monitor Unit di TPS dan hasil pengukuran keluaran radiasi berkas elektron dari pesawat linac medik sangat dipengaruhi oleh luas lapangan penyinaran radiasi block elektron dan penggunaan variasi ukuran applicator. Faktor koreksi monitor unit di TPS (Fk-tps) sebesar 0,483 hingga 1,252 (applicator 20 x 20 cm²), sebesar 0,975 hingga 1,269 (applicator 14 x 14 cm²), dan sebesar 1,005 hingga 1,207 (applicator 10 x 10 cm²). Untuk faktor koreksi pengukuran (Fk-p) sebesar 0,798 hingga 1,026 (applicator 20 x 20 cm²), sebesar 0,795 hingga 1,049 (applicator 14 x 14 cm²), dan sebesar 0,815 hingga 1,023 (applicator 10 x 10 cm²). Ada korelasi antara Fktps dan Fk-p yang menghasilkan Fk-V. Nilai koreksi nya sebesar 0,471 hingga 1,568 (applicator 20 x 20 cm²), dan 0,934 hingga 1,596 (applicator 14 x 14 cm²) serta 0,982 hingga 1,480 (applicator 10 x 10 cm²). Faktor koreksi yang dihasilkan akan mempengaruhi waktu penyinaran dan dosis radiasi yang diterima organ target.

Kata kunci : Faktor koreksi, Monitor Unit, applicator, Block elektron

Determination of Correction Factor Monitor Unit of Electron Beam on Variation Applicator and Variation Block on Linear Accelerator

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Abstract

The purpose of this study is determine a correction factor on the monitor unit of the electron beam with variations applicator and the irradiation field wide variety of blocks for each of the energy of electrons on the Linear Accelerators and analyze the effect of the correction factors to the calculation of the TPS, in order to gain exposure time (MU) in accordance with the output of the Linac. The measurement of the output radiation electron beam is done on the variation of the size of the applicator to the wide variation of irradiation block electrons by plane linear accelerator on the energy of 4 MeV, 6 MeV, 8 MeV, 10 MeV, 12 MeV, 15 MeV energy source of electrons and detector markus on solid phantom measuring 30 cm x 30 cm. The results shows that the monitor unit a value of TPS and Monitor Unit a value of TPS and the polling stations and the results of measurements of electron beam radiation output of medical linac is strongly influenced by the broad field of radiation exposure and the use of the electron block size variations applicator. A correction factor of monitor unit in TPS (Fk-tps)

there are 0,483 to 1,252 (applicator 20 x 20 cm²), 0,975 to 1,269 (applicator 14 x 14 cm²) and 1,005 to 1,207 (applicator 10 x 10 cm²). For the correction factor of measurement (Fk-p) there are 0,798 to 1,026 (applicator 20 x 20 cm²), 0,795 to 1,049 (applicator 14 x 14 cm²) and 0,815 to 1,023 (applicator 10 x 10 cm²). There are two correlations between Fk-tps and Fk-p which generates Fk-V. Its corrected values 0,471 to 1,568 (applicator 20 x 20 cm²), and 0,934 to 1,596 (applicator 14 x 14 cm²) and than 0,982 to 1,480 (applicator 10 x 10 cm²). The resulting correction factors will influence the exposure time and dose of radiation received by the target organ.

Keywords: Correction factor, Monitor Units, applicator, Eelektron block

Pembimbing Akademik

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