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技术及应用

^{60}Co治疗机散射校正因子的蒙特卡罗计算

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摘要 利用蒙特卡罗程序MCNP模拟计算了^{60}Co治疗机的3种散射校正因子，并计算了总散射校正因子$S_{c,p}$与模体散射校正因子S_p随射野及深度的变化。计算结果表明：散射校正因子计算结果与测量结果符合较好；$S_{c,p}$与S_p随射野的增大而增大；射野大于10 cm×10 cm 时，$S_{c,p}$与S_p有随着深度的增加而增大的总趋势；射野小于10 cm×10 cm时，$S_{c,p}$与 S_p有随深度增加而减小的总趋势。因此，在计算处方剂量时不可忽略散射校正因子的影响。利用蒙特卡罗方法可建立1组准确和全面的散射校正因子，为放射治疗临床使用、质量保证和质量控制提供依据。

关键词 ^{60}Co治疗机 散射校正因子 蒙特卡罗方法

分类号

Calculation of Scatter Calibration Factor for ^{60}Co Therapy Unit With Monte-Carlo Method

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Abstract Three scatter calibration factors of ^{60}Co therapy unit were calculated by using Monte-Carlo method. The effects of radiation field and depth to total scatter calibration factor $S_{c,p}$ and the phantom scatter calibration factor S_p of ^{60}Co therapy unit were also calculated. The calculating results agree well with the measuring results. $S_{c,p}$ and S_p increase with the increasing of the fields. $S_{c,p}$ and S_p have increasing trend with depth increasing while beam field larger than 10 cm×10 cm. $S_{c,p}$ and S_p have decreasing trend with depth increasing while beam field smaller than 10 cm×10 cm. Scatter calibration factor is not be overlooked in calculating the prescription dose. Monte-Carlo method is able to establish a set of accurate and comprehensive scatter calibration factor, and provides the basis of clinical use, quality assurance and quality control for radiotherapy.

Key words ^{60}Co therapy unit scatter calibration factor Monte-Carlo method

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