

技术及应用

质子放疗过程中射束与人眼体作用的蒙特卡罗模拟计算

刘云鹏; 汤晓斌; 谢芹; 陈飞达; 耿长冉; 陈达

南京航空航天大学 核科学与工程系, 南京 211106

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摘要 选用62 MeV质子束, 构建了人眼体MCNPX模型, 模拟计算了质子束放疗过程中人眼体模型的剂量分布。模拟中考虑了两种情况: 1) 理想的治疗情况, 肿瘤区的剂量值为50.03 Gy, 在有效的治疗水平上, 同时其他组织受量都在可接受的剂量范围内; 2) 最坏的治疗情况, 即模拟病人在放疗期间直视射束时的剂量分布, 结果大部分剂量都沉积在了角膜、晶状体和前房, 而肿瘤区的剂量为零。计算结果与有关文献报道的结果相吻合, 初步证实了MCNPX程序能很好的模拟质子放疗, 可用于病人放疗计划, 而最坏治疗情况中的模拟结果可用于临床医学事故的剂量重建。

关键词 [质子束](#) [剂量分布](#) [MCNPX](#)

分类号

Monte-Carlo Simulation of Proton Radiotherapy for Human Eye

LIU Yun-peng; TANG Xi ao-bi n; XIE Qi n; CHEN Fei -da; GENG Chang-ran; CHEN Da

Department of Nuclear and Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing 211106, China

Abstract The 62 MeV proton beam was selected to develop a MCNPX model of the human eye to approximate dose delivered from proton therapy by. In the course of proton therapy, two treatment simulations were considered. The first simulation was an ideal treatment scenario. In this case, the dose of tumor was 50.03 Gy, which was at the level of effective treatment, while other organizations were in the range of acceptable dose. The second case was a worst case scenario to simulate a patient gazing directly into the treatment beam during therapy. The bulk of dose deposited in the cornea, lens, and anterior chamber region. However, the dose of tumor area was zero. The calculated results show an agreement accordance with the relative reference, which confirmed that the MCNPX code can simulate proton radiotherapy perfectly, and is a capable platform for patient planning. The data from the worst case can be used for dose reconstruction of the clinical accident.

Key words [pronton](#) [beam](#) [dose](#) [distribution](#) [MCNPX](#)

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