

Abstract Submitted
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Development of proton CT imaging system for evaluation of proton range calculation accuracy SODAI TANAKA, The University of Tokyo, TEIJI NISHIO, National Cancer Center Hospital East, KEIICHIRO MATSUSHITA, Rikkyo University, MASATO TSUNEDA, YUKI AONO, Kitasato University, SHIGETO KABUKI, Tokai University, AKINORI SUGIURA, National Institute of Radiological Science, MITSURU UESAKA, The University of Tokyo — [Purpose] In treatment planning of proton therapy, X-ray CT image is generally utilized for proton dose and range calculations in a patient body. However, there is an error of the conversion from CT value to WEL (Water Equivalent Length), and it turns into the error of proton range calculation. Therefore, WEL can be directly derived by use of pixel value on proton CT (pCT) image. The purpose of this study is development of a simple and convenient pCT imaging system for evaluation of proton range calculation accuracy. [Method] PCT imaging system was constructed with a plastic scintillator and a cooled CCD camera, which acquires the image of integrated value of the scintillation light toward the beam direction. Experiment for evaluation of this system with 70-MeV protons provided by NIRS cyclotron was performed. The proton beam was irradiated to objects of water and other substances phantom with complicated shape. The pCT image reconstructed from the experimental data was quantitatively evaluated. [Result] Construction of pCT image of various objects was successful. The value of WEL factor of water was 1.0 ± 0.1 . [Conclusion] The simple and convenient pCT imaging system for evaluation of proton range calculation accuracy was developed and was evaluated by experiment using proton beam.

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