Track 11

3312

Study on Image Reconstruction for Seed Implant Localization of Permanent Prostate Brachytherapy

Ju-Young Hong[1] Jeong-Eun Rah[1], Kwang-Ho Cheong[1,2], Ji-Na Chang[1], and Tae-Suk Suh[1]

[1] Dept. of Biomedical Engineering, College of Medicine, The Catholic University of Korea,

[2] Dept. of Radiation Oncology, Hallym University Kangnam Sacred Heart Hospital

lo4251@catholic.ac.kr

Most research regarding the use of 3-dimensional (3D) seed reconstruction of the prostate brachytherapy for accurate dose distribution has concentrated on seed-image matching algorithms. However, such conventional algorithms for seed location suffer limitations because of the superimposed seeds in the projection images. In this study, to overcome these problems, we made a prostate phantom and performed segmentation and reconstruction using an image processing technique. The 3D reconstruction algorithm was based the 3-film technique, and seed localization software and phantom were developed. The phantom included the arbitrary 60 seeds and images were taken on the X-ray simulator at 15° intervals from -30° to 30°. The software for seed localization and 3D reconstruction was developed using the multi-threshold method and 3-film reconstruction method. The software detected an average of 93% seeds correctly. The average differences in seed location were determined within 2 mm compared to the seed coordinate in the phantom. We described a new method to identify the exact position of the superimposed seeds with a high success rate. Therefore, it can be a useful and reliable method for intraoperative evaluation of radiation dosimetry in permanent prostate brachytherapy.

Keywords : Prostate Brachytherapy, Perfectly Superposed Seeds, Reconstruction