

AbstractID: 5873 Title: Development of method to visualize I-125 seed in postimplant seed identification in prostate permanent implant brachytherapy.&#12288;

**Purpose:**

We investigated the method to visualize I-125 seeds in CT-based postimplant seed identification in prostate permanent implant brachytherapy using CT sinogram. Furthermore, we evaluated the impact of manual seed identification using our method on dosimetric parameter compared with automatic seed identification of commercially available planning system.

**Method and Materials:**

The reprojected CT sinogram was used to visualize I-125 seeds. CT images of the metal parts only were separated from the original CT images by setting the threshold for pixel value. Then we performed edge detection. Using these images, sinograms of CT images with and without seeds were obtained by inverse Radon transform, and the sinogram of the metal image was subtracted from that of the original image. Finally, the image was reconstructed using the sinogram by Radon transform. The phantom study was performed to verify whether our method can separate adjacent seeds correctly. For patient study, postimplant analyses of 10 patients were performed. The implanted seeds were identified both by manually using our method and automatically using Variseed auto seed finder system. The differences of the number of seeds, dose delivered to 90 % of prostate volume (D90), and D5 of urethra between two methods were investigated. For statistics, paired t-test was performed.

**Results:**

In phantom study, even two adjacent seeds were clearly separated by our method but not by automatic seed finder. For patient study, the number and orientation of seeds could be clearly determined. In post implant dosimetry, significant differences were observed between our method and automatic seed finder in seed number ( $p=0.009$ ) and D90 of prostate ( $p=0.028$ ).

**Conclusion:**

Although our method can only be applicable in manual seed identification, it can be useful in postimplant dosimetry in clinical practice.