

Purpose: To determine the location of completely overlapped seeds in prostate brachytherapy, image processing was performed by a phantom according to our own design and subsequently using a program developed by a 3-film technique, and completely overlapped seeds were separated.

Methods and Materials: For the assessment of the location of the seeds inserted within the phantom, the images of AP direction as well as from -30° to $+30^{\circ}$ were obtained at 15° intervals. The obtained images were applied to the program after the image processing. The study was performed by creating the situation of the overlap of 1 seed, the situation of the overlap of more than 2 seeds, and the situation that the total number of inserted seeds could not be assessed because of the overlap of seeds on all 3 images. The developed program separates completely overlapped seeds by establishing a prescribed region, calculating the distance between the seed to be assessed and the center of the reference seed, and repeating the identical process on each film. In addition, the location of overlapped seeds was compared a traditional 2-film technique.

Results: The detection rate of each method was 92.2 % at $\pm 15^{\circ}$, 94.1 % at $\pm 30^{\circ}$ and 70.6 % on the 2-film technique. Under the situation of the overlap of one seed and the situation of the overlap of more than 2 seeds, complete separation was possible, nonetheless, under the situation that the seed to be detected could not be detected on 3 images due to the overlap with other seeds, noticeable results could not be obtained.

Conclusion: In permanent prostate brachytherapy that applies our program, errors that may be made during the reconstruction process because of overlapped seeds could be reduced, and thus it is anticipated to contribute to the improvement of treatment efficiency.