

## THE INFLUENCE OF THE PELVIC IMMOBILIZATION DEVICE TO SETUP ERROR DURING RADIOTHERAPY

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**Purpose:** To evaluate the extent of influence of setup deviation by pelvic immobilization device.

**Materials and Methods:** This prospective randomized study composed of two study groups that were with or without pelvic immobilization device. We included three kinds of malignant diseases that originated in pelvic cavity; these were 10 cases of cervical cancer, 4 cases of prostate cancer, and 2 cases of rectal cancer. Except from the two patients of rectal cancer, all of them were treated with four-field box technique and the principle of radiation technique was all the same in both groups. The portal films were taken from anterior-posterior and bilateral directions with the frequency of twice per week. There were 34 simulation films and 149 portal films to be evaluated. The setup error was recorded by comparison the iso-center shift between simulation and portal films of four individual axes, that were latero-lateral, caudo-cranial, anterior-posterior axis and degree of rotation. The statistic methods for evaluation the results were two-tail t-test and chi-square methods for mean value of setup deviation and ratio of iso-center shift exceeded 5-mm, respectively.

**Results:** The patterns of setup error were different between non-immobilization and immobilization groups. When evaluated by mean setup error, there were no significant difference between the two groups of the latero-lateral ( $p=0.445$ ) and caudo-cranial ( $p=0.092$ ) axes, the degree of rotation was also no difference at all ( $p=0.337$ ). In anterior-posterior axis evaluated by gantry 270 degree, the mean setup error of the immobilization group (0.21-mm, SD=1.11mm) was significant smaller than non-immobilization group (1.54-mm, SD=2.58mm) ( $p=0.016$ ). Evaluation by the ratio of iso-center shift exceeded 5-mm, the immobilized group showed significant reduction in the error of anterior-posterior axis ( $p=0.046$ ), but this group had opposed behavior of the caudo-cranial axis ( $p=0.018$ ). The latero-lateral ( $p=0.359$ ) and rotational ( $p=0.803$ ) axes did not show any significant difference between the two groups.

**Conclusion:** With the immobilization device, there has significant improvement of the anterior-posterior axis, but the caudo-cranial axis has opposed effect when we evaluated by the ratio of setup error exceeded 5-mm. The iso-center shift in latero-lateral axis has no significant difference despite of the used of this immobilization device. So, we must pay more effort to avoid the inter-treatment variation of the caudo-cranial axis when we use this kind of pelvic immobilization device.

[Therapeut Radiol Oncol 1998; 5: 119 -125 ]

Key words: Pelvic immobilization device, Pelvic cavity, Radiotherapy, Quality assurance.