

A COMPARISON OF DIFFERENT PELVIC IMMOBILIZATION DEVICES IN THE TREATMENT OF PROSTATE CANCER WITH THREE-DIMENSIONAL CONFORMAL RADIOTHERAPY

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Purpose : To determine the variability of patient setup errors during three-dimensional conformal radiotherapy (3D-CRT) for prostate cancer treatment without immobilization or with different immobilization devices.

Materials and Methods : Forty-eight prostate cancer patients treated with 3D-CRT were prospective evaluated. They were treated by the same physician, technician and machine. Five groups of patients and technique were compared: (A) supine position without immobilization; (B) prone position without immobilization, but with belly-board; (C) prone position with belly-board and cast immobilization; (D) supine position with alpha cradle from waist to below knee immobilization; (E) supine position with stereotactic body frame immobilization. Serial portal films were recorded and compared with simulation films. The deviation in each axis and rotation angle were compared.

Result : Group A has the least deviation in X-axis of anterior-posterior view (AP-X; $p = 0.044$); group B has the least deviation in Z-axis of anterior-posterior view (AP-Z; $p = 0.065$); group D has the least deviation in rotation angle of anterior-posterior view (AP-Ang.; $p = 0.067$); group E has the least deviation in rotation angle of lateral view (Lat-Ang.; $p = 0.078$). There is no significant difference in deviation both in each directions and angles according to body habitus as normal or obese. Heavier weight has less AP-Z and Lat-Z deviation ($p = 0.011$ and $p = 0.108$); the deviation of Lat-Z has positive correlation with AP-Z ($p < 0.001$), deviation AP-X has positive correlation with deviation Lat-Z and Lat-Ang. ($p = 0.037$ and $p = 0.05$). For patients with thickness of pelvic circumference (PC-AP) < 19.0 cm have the least deviation in AP-Z ($p = 0.034$), Lat-Ang. ($p = 0.034$) in group B and the least AP-Ang. ($p = 0.031$) in group D; for patients with width of pelvic circumference (PC-Lat) < 35.0 cm have the least deviation in AP-X ($p = 0.013$) in group A, Lat-Z in group C; for patients with body weight < 67.5 kg have the least deviation in AP-X ($p = 0.039$) in group A.

Conclusion : Group A has better setup error in AP-X and Lat-Z with statistics significant ($p < 0.05$), group B has better setup error in AP-Z; group D and E have better setup error in rotation angle; group C has less setup error in Lat-Y, but without statistical significance. We conclude supine position without immobilization fixation technique seems to be a suitable method for treating patients with localized prostate cancer either in accuracy or conveniency.

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Key words: Pelvic immobilization devices, Three-dimensional conformal radiotherapy (3D-CRT), Setup error, Portal film, Simulation film