

## Assessment of Setup Errors in Intensity Modulated Radiotherapy for Pelvic Tumours Using Cone Beam-Computed Tomography

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Assessment of setup errors during conformal radiotherapy becomes more common to achieve the goal of radiotherapy. Radiotherapy centres have developed unique margins for better treatment delivery which are generated according to their centres after analysing the relevant factors. The aim of this research was to assess setup errors in Intensity Modulated Radiotherapy (IMRT) for pelvic tumours using cone beam computed tomography (CBCT) to define clinical target volume (CTV) to planning target volume (PTV) margins at American oncology institute (AOI), Asiri Surgical Hospital, Colombo, Sri Lanka. A total of 35 patients who were treated from December 2019 to December 2021 were selected for the study. Translational errors of all three dimensions were collected and the setup errors were calculated. CTV to PTV margins were obtained according to the Van Herk, Stroom's, and ICRU 62 margins recipes from the calculated setup errors. From the ICRU 62 margin recipe, calculated CTV to PTV margins were 0.22 cm, 0.27 cm, and 0.30 cm for vertical, longitudinal, and lateral directions. The margins calculated from Van Herk's formula were 0.43 cm, 0.45 cm, and 0.45 cm, and from Stroom's formula were 0.37 cm, 0.39 cm, and 0.40 cm in vertical, longitudinal, and lateral directions respectively. According to the ICRU 62 margin recipe calculations, a range of 0.3 cm in all directions of the PTV can be maintained within the margins of the pelvic region. But, the rotational error was not considered, and it is a drawback in the study. Looking at all the margins which were calculated using three different methods were within 0.5 cm. Therefore, considering a 0.5 cm margin is safe. But it can be minimized by considering the rotational errors in future.

**Keywords:** IMRT, setup error, pelvic tumours, PTV, CTV, CBCT, prostate carcinoma