Setup errors in cone-beam computed tomography and their effects on acute radiation toxicity in cervical cancer radiotherapy

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ABSTRACT. This study aimed to evaluate cone-beam computed tomography setup errors during cervical cancer treatment and the effects of these errors on acute radiation toxicity and treatment efficacy. A total of 170 cervical cancer patients were randomly divided into image-guided radiation therapy (IGRT; 86 patients) and intensity-modulated radiation therapy (IMRT; 84 patients) groups to receive IGRT and IMRT, respectively. After correcting setup errors for the 86 patients in the IGRT group, the X-, Y- and Z-axis errors were smaller than the corresponding errors before correction (P < 0.01, P < 0.05, and P < 0.05, respectively). The setup errors unevenly influenced the affected organs and dosage distributions in the targeted regions. The frequencies of patients with grade 0 or I urinary toxicity were 86.0% (74/86) and 44.0% (37/84) in the IGRT and IMRT groups, respectively (P < 0.01), whereas the frequencies of patients with grade 0 or I gastrointestinal toxicity were 83.7% (72/86) and 53.6% (45/84) in the IGRT and IMRT groups, respectively (P < 0.01). The two groups had similar response rates (P > 0.05). IGRT significantly corrected and reduced setup errors during cervical cancer treatment and enhanced the dosage distribution
accuracy within the affected organs and targeted regions. IGRT can
reduce the adverse effect of radiotherapy, thereby achieving improved
efficacy during cervical cancer treatment.

**Key words:** Cervical cancer; Cone-beam computed tomography;
Image-guided radiation therapy; Setup error