

**Purpose:** Clinical target volumes (CTV) for patients with endometrial cancer treated with external beam radiotherapy are large and irregularly shaped. The frequent obesity endemic to this patient population makes precise treatment positioning often difficult to achieve. Without a six-degree treatment couch, rotational errors cannot be directly corrected by patient shifts. This study investigates the dosimetric effects of these residual, uncorrected rotational errors.

**Methods:** Fifteen patients, who underwent IMRT with daily kilo-voltage cone beam CT (CBCT) image guidance, were included in this IRB approved study. A total of 374 daily CBCT were co-registered with the corresponding planning CT and translational and rotational shifts were recorded. Clinically, rotational errors  $> 50$  prompted patient repositioning, while those  $< 50$  were ignored. For each fraction, the planning dose matrix was rotated to evaluate dosimetric effects of the ignored rotation. Subsequently, all rotated dose matrices were combined to obtain a cumulative dose distribution. Student's t-test was used to estimate the 95% confidence interval of the percentage change of the dosimetric endpoints D99 and D95 of the CTV.

**Results:** For each fraction, the D99 and D95 of the CTV varied from -8.7% to 3.3%, and -5.5% to 1.3%, respectively compared to the corresponding planning values. For the entire treatment course, the cumulative D99 and D95 of the CTV varied between -2.2% - 0.4% (95% CI -2% - 1.6%), and -1.3% - 1.0% (95% CI -1% - 0.9%), respectively.

**Conclusions:** Despite large target volumes and sharp dose gradients inherent in IMRT plans, the dosimetric effect of less than 50 of uncorrected rotational error is not clinically significant for the entire treatment course, despite variations in daily fractional doses of more than 5%. Our IGRT protocol and the planning margin for this group of patients are adequate.