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Are doses to ICRU reference points valuable for predicting late rectal and bladder morbidity after definitive radiotherapy in uterine cervix cancer?

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ABSTRACT

Aims and background. To evaluate whether doses or dose rates at International Commission on Radiation Units (ICRU) reference points are of value for predicting risks of late rectal and bladder morbidity in patients with uterine cervical cancer who have undergone external beam radiotherapy and intracavitary irradiation.

Methods. Late rectal complications and late bladder complications were evaluated in 54 patients who were treated by external beam radiotherapy followed by intracavitary irradiation between January 1996 and December 1999. External beam radiotherapy was delivered in 1.8 Gy daily fractions to a whole pelvis dose of 50.4 Gy followed by intracavitary irradiation at total point A doses ranging from 75 Gy to 85 Gy. Intracavitary irradiation was performed with dose rates of 0.5-0.7 Gy/h to point A in most patients, but 8 patients were treated at a higher dose rate (0.83-1.15 Gy/h) to shorten the hospitalization period. Biologically effective doses for the reference points were calculated using a linear quadratic model.

Results. Grade 3 rectal and bladder morbidity by Radiation Therapy Oncology Group (RTOG) criteria developed in 4 patients (7.4%) and 1 (1.9%), respectively. An age of >60 years ($P = 0.01$) and a total dose to the rectal reference point of ≥80 Gy ($P = 0.03$) were found to be correlated with a higher rate of rectal morbidity. Total dose (≥80 Gy), dose rate (≥0.75 Gy/h), and biologically effective doses (≥135 Gy_3) at the bladder reference point were found to be significant factors for the development of late bladder morbidity. By multivariate analysis, age was identified as the only significant factor of late rectal complications, and biologically effective doses at the bladder reference point was the only significant factor of late bladder complications.

Conclusions. RTOG grade 3 late rectal and bladder morbidity developed in respectively 7.4% and 1.9% of the patients. The significant risk factors for late rectal and bladder morbidity were old age and biologically effective doses at the bladder reference point, respectively.

Key words: *late complication, radiotherapy, uterine cervix cancer.*

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