

## THE VARIABILITY OF APPLICATOR POSITION AMONG HIGH DOSE RATE INTRACAVITARY BRACHYTHERAPY APPLICATIONS IN CERVICAL CANCER PATIENTS TREATED WITH RING & TANDEM APPLICATORS

Cuneyt Ebruli<sup>1</sup>, Ayşe Nur Demiral<sup>2</sup>, Rıza Çetingöz<sup>2</sup>, Ferhat Eyiler<sup>3</sup>, and Münir Kınay<sup>2</sup>

<sup>1</sup>Kocaeli State Hospital Radiation Oncology Clinic, Kocaeli; <sup>2</sup>Dokuz Eylül University Medical School Department of Radiation Oncology, İzmir; <sup>3</sup>Adana State Hospital Radiation Oncology Clinic, Adana, Turkey

**Objective:** To evaluate the interindividual and intraindividual applicator position variability in high dose rate ring and tandem intracavitary brachytherapy applications in locally advanced cervical cancer.

**Patients and methods:** Eight patients with locally advanced cervical cancer formed the study population. They had been treated in Dokuz Eylül University Department of Radiation Oncology between the years 2000 and 2005 with high dose rate intracavitary brachytherapy using ring and tandem applicators. The 3-dimensional geometric variation of the applicator center in craniocaudal, mediolateral and anteroposterior directions was determined on the basis of bony reference points in 24 pairs of orthogonal films obtained in the conventional simulator. Then the following evaluations were performed: 1) the applicator position variability in all applications (interindividual variability), 2) the intraindividual applicator position variability relative to the first application, 3) the intraindividual applicator position variability relative to the aver-

age of three applications. Among the potential factors that might influence the reproducibility of ring and tandem applications, age, stage, the period between external radiotherapy and brachytherapy were evaluated by univariate analysis.

**Results:** Standard deviation of interindividual applicator variability was 3.83 mm in craniocaudal, 0.39 mm in mediolateral and 2.86 mm in anteroposterior directions. The standard deviation of intraindividual variability relative to the first application was 1.91 mm in craniocaudal, 0.4 mm in mediolateral, and 4.26 mm in anteroposterior directions. The standard deviation of intraindividual variability relative to the average of three applications was 0.95 mm in craniocaudal, 1.86 mm in mediolateral, and 1.24 mm in anteroposterior directions. According to univariate analysis, no factor influenced applicator position variability.

**Conclusions:** In order to extract definitive conclusions about factors that affect positional reproducibility of ring and tandem applicators, studies are needed that include larger numbers of patients.

**Key words:** applicator position variability, brachytherapy, cervical cancer, ring and tandem.

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*Correspondence to:* Ayşe Nur Demiral, Dokuz Eylül Üniversitesi Radyasyon Onkolojisi AD, 35340 İnciraltı, İzmir, Turkey. Tel +90-232-4124210; fax +90-232-2772440 (to the attention of Dr Demiral); e-mail ayse.demiral@deu.edu.tr

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