Factors Affecting Urethral Dose in Intracavitary Brachytherapy Using Multichannel Vaginal Applicator

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\textbf{PURPOSE}

In intracavitary brachytherapy (ICBT) performed with multichannel vaginal applicators (MVA), there is scarce data on the factors affecting urethral dose. In this study it was aimed to define the factors influencing urethral dose in patients with vaginal involvement treated with external beam radiotherapy (EBRT) and ICBT using tandem+Miami applicators (MA).

\textbf{PATIENTS and METHOD}

Five consecutive gynecological cancer patients (4 cervical and 1 vaginal) given ICBT using tandem+MA were included. The patients’ disease stage was II in 2, and III in 3. EBRT total dose was 45-50.5 Gy while ICBT total dose was 19.5-26 Gy delivered with 4-7 Gy/fx in 3-5 fxs. The diameter of the MA was 3-4 cm. Mean HR CTV $D_{90}$ (as percentage of the prescribed dose) was 86% (77.6%-99.3%) in all patients. ICBT urethra $D_{0.1}cc$ (as percentage of the prescribed dose) was obtained from the DVHs in TPS. Patients were grouped according to the diameter of MA used (=4cm vs <4cm) and ant. loading ratio of MA (total dwell time of anterior channels 2, 3, and 7 / total dwell time of channels 2-7) (ratio$>$0.6 vs ratio$<$0.6). Mann Whitney test was used to compare groups with respect to urethra $D_{0.1}cc$.

\textbf{RESULTS}

ICBT mean urethra $D_{0.1}cc$ was 99.8% (43.3%-134.9%). The mean values and the results of comparison between high and low ant. loading groups and large and small applicator diameter were shown in Table 1.

<table>
<thead>
<tr>
<th>Anterior Loading</th>
<th>$\geq 0.6$</th>
<th>$&lt; 0.6$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter (cm)</td>
<td>$= 4$</td>
<td>$&lt; 4$</td>
<td></td>
</tr>
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Although mean urethra $D_{0.1}cc$ was higher in the patients with large diameter MA, this difference did not reach statistical significance ($p=0.083$). This may be due to the small number of patients in the study.

\textbf{CONCLUSION}

Larger and prospective studies are needed in order to determine factors affecting urethral dose when using MVAs.

\textbf{Keywords}

Brachytherapy, Multichannel Vaginal Applicator, Urethra Dose

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\textbf{Note:}

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