

AbstractID: 4342 Title: Dosimetric comparison of tandem and ovoids vs. tandem and ring for intracavitary gynaecologic applications

Purpose: To evaluate dosimetric differences in Tandem and Ovoid (TO) and Tandem and Ring (TR) gynaecologic brachytherapy applicators.

Method and Materials: 10 patients with cervical cancer (stages II-IV) were treated with three brachytherapy applications: either one TO and two TR, or one TR and two TO applications. All patients underwent CT scans at 2.5 mm slice thickness. Contrast was inserted into the bladder prior to scan. Patients were prescribed 8 Gy to ICRU points A, with additional optimization goals of maintaining the traditional pear-shaped dose distribution and limiting bladder and rectum doses to below 6 Gy. ICRU bladder and rectum point doses, as well as mean and maximum doses were calculated. Maximum dose was defined as the highest dose received by 2cc of the organ. Total treatment time and volumes treated to 95%, 85% and 50% of the prescription dose were also compared. Data were analyzed using the Mann-Whitney rank-sum test.

Results: There were no significant differences between TO and TR applicators in doses to prescription points or to critical organs. However, there was a significant difference ($p < 0.05$) between the applicators in the treated volumes and total treatment time. The TO treated larger volumes over a longer time. The treated volumes were also found to be significantly different between applicators within each patient ($p < 0.05$, Chi-square).

Conclusion: Our results demonstrate that the two applicators, whilst delivering prescription doses to points A and keeping critical organ doses within tolerance, treat significantly different volumes. It is unclear if this difference is clinically advantageous or not. TO applicators may be treating healthy tissue unnecessarily, or TR applicators may be underdosing tumor tissue. Further investigation with appropriate imaging modalities is required for accurate delineation of target volumes. Clearly, the TR and TO are *not* identical, and should not be used interchangeably without further study.