

AbstractID: 9599 Title: Explorations Of Optimal Dwell Positions In Intracavitary Brachytherapy For Cervical Cancer

**Purpose:** The purpose of this work is to explore other possible location of these vaginal intracavitary dwell positions for the treatment of cervical cancer with brachytherapy.

**Materials and Methods:** CT images and the contours for the clinical target volume (CTV), bladder, rectum, vagina, and bowel, from eleven women previously treated for cervical cancer with the tandem and ring applicator were included in the study. Two plans were constructed for each patient: A reference plan using the tandem and ring applicator, and a plan using the tandem with an hypothetical “matrix” applicator formed by placing between 132 to 466 (depending on the volume of vagina) source positions inside the vagina. All plans were optimized IPSA. After the plan using the tandem and matrix was constructed, the dwell positions with dwell times less than 1% of the maximum relative dwell time were removed. The remaining optimized dwell positions were analyzed visually to see if there was a recurring geometric pattern to the dwell positions. The optimized dwell positions were also evaluated to determine their proximity to the cervix.

**Results:** The optimized dwell positions of the eleven patients were evaluated. In 9 of the 11 patients, the optimization preferred the dwell positions to be closer to the vaginal wall (as opposed to in the middle of the vagina). In 5 patients the optimization selected positions that formed a circular pattern with diameters ranging from 3.1-4.2 cm. In addition, the optimization favored dwell positions superior and closer to the cervix in 10 of the 11 patients.

**Conclusion:** This study identified two general characteristics regarding the optimal dwell positions for intracavitary applicator for cervical cancer: 1) the optimization favors dwell positions superior/closer to the cervix; 2) the optimization favors dwell positions that lie closer to the perimeter of the vagina.

Research sponsored by Nucletron corporation.