

Purpose: Evaluate the treatment of cervical cancer using High Dose Rate Iridium-192 tandem and ovoids with the addition of external beam sidewall boosts was evaluated using deformable registration software.

Methods: High dose rate tandem and ovoids treatments were planned using Oncentra 4.0 and an HDR Iridium-192 source. Each patient was treated with five to six fractions with total dose to ICRU 38's point A ranging from 28 Gy to 35 Gy. Following the HDR treatment, patients received external beam pelvic sidewall boosts created in Pinnacle 9.0 to a prescription dose of 3.4 to 9 Gy. Using Velocity AI software, the image sets from each tandem and ovoid plan were registered to the external beam treatment plan using either rigid or deformable registration. The dose files were added together using the registration created between the T&O CT sets and the sidewall boost CTs. Contours were exported from the treatment planning system for the bladder, rectum and uterus. Dose volume histograms were created to evaluate the treatments delivered.

Results: Using dose volume histograms, the average doses to the rectum and bladder were determined for volumes of 0.1cc, 1cc and 2cc. For one representative patient, the total dose to 1cc of the bladder was 74.12 Gy and 1cc of rectum average was 33.46 Gy. The combined dose to five percent of the uterus volume was 100.07 Gy.

Conclusions: The rectum average dose corresponded to approximately half of the average bladder dose for the three volumes measured. The doses for these two structures were well below the dose limits given in Emami, et al. The Velocity AI is a useful deformable registration tool for evaluating HDR and external beam treatments to the pelvic region.