

AbstractID: 11408 Title: A Novel Applicator System for HDR Treatment of Endometrial and Cervical Cancer

**Purpose:** A new HDR applicator system has been designed to treat gynecological cancers with following specific goals in mind: 1) ability to do volumetric image based patient specific dosimetry, 2) ability to significantly spare the surrounding critical structures, 3) Performing volumetric dosimetry based on delineated target volume and moving away from Manchester point calculation, and 4) provide patient comfort during the implant. It is expected that this system will provide all the functionality of a Fletcher-Suit-Delclos (FSD) device and has more versatility in treatment of these cancers.

**Method and Materials:** A disposable applicator manufactured\* from plastic material with inflatable partitioned sections to displace rectum and bladder away from the radiation source has been designed. Monte Carlo simulations were performed to compare dosimetry with conventional Manchester system and show superiority of this device in delivering dose to the target volume while sparing rectum and bladder. Comparable optimized plans with conventional FSD system were made using BrachyVision system.

**Results:** Preliminary trials of this applicator used on cadavers revealed superiority in inserting the system in cervical canal through stent, filling the vaginal cavity with liquid contrast for proper CT/MRI imaging. The unaccounted attenuation from the Stainless Steel tubing in FSD applicator is no longer an issue when this applicator is implemented. This new applicator manufactured from all disposable plastic materials, is CT & MR friendly, allows 3-D treatment planning executable to accurately deliver dose to the target volume as prescribed, allows sparing the normal tissue structure at any desirable level. Our dosimetric studies indicate superior volumetric dose coverage to PTV and easy detachment from the conventional Manchester system.

**Conclusions:** The new applicator once applied will overcome most of the disadvantages from the conventional FSD device and offers numerous superior clinical advantages for patients with gynecological cancer.

\*Project supported by Varian Medical-system