Abstract ID: 19148    Title: Comparison of HDR Brachytherapy for Cervix Cancer Using An Adaptive Simulated Annealing Program and Oncentra® for Simultaneously Integrated Boost

Purpose:

High dose rate (HDR) volumetric brachytherapy is an effective method of treating advanced cervix carcinoma. Local failure is associated with multiple factors including higher maximal standardized uptake value (SUV) values in fluorodeoxyglucose positron emission tomography (FDG-PET) scans. The purpose of this study is to evaluate the ability to simultaneously boost regions of high SUV values using an in-house adaptive simulated annealing (ASA) algorithm and the Oncentra® (Nucletron V.B., Veenendaal, The Netherlands) treatment planning system, thereby potentially improving local control.

Methods:

Five cervix cancers were evaluated for brachytherapy treatment (tandem/ring and/or interstitial needles). MRI and PET images were obtained post-implant and fused with treatment planning CTs to define a high-risk (HR) CTV (cervix and tumor on MRI) and GTV (volume with >50% of the maximum SUV on PET). The prescribed dose was 5-6 Gy to the HR CTV and 7-9 Gy to the GTV. Treatment plans were first generated in Oncentra® with IPSA followed by manual graphic optimization by the physician. Plans were also independently optimized using the ASA program. The two plans were compared side by side and one was chosen for treatment. Dose-volume parameters including D90, V100 of targets, D2cc to the critical organs, and generalized equivalent uniform dose (gEUD) of all structures were compared between the ASA and the Oncentra plans.

Results:

Both ASA and Oncentra plans were considered acceptable by the physician in four of five cases. Two ASA plans were chosen due to better critical organ sparing and tumor coverage. Two Oncentra plans were preferred because of lower doses to critical organs. One ASA plan was not accepted because of a higher bowel dose.

Conclusions:

Both ASA and Oncentra® planning methods produce acceptable treatment plans for optimized brachytherapy of cervix carcinoma. Continued studies are warranted to further determine the relative strength of each method.
Funding Support, Disclosures, and Conflict of Interest:

This study was supported in part by a research grant from Varian Medical System Inc.