

AbstractID: 11271 Title: A Monte Carlo Phantom Study for Brachytherapy Dose Perturbation in Henschke Type GYN Applicator

Purpose: The commercial brachytherapy planning system does not evaluate the dose perturbation of the rectal shielding material near the Iridium source. Because the electron equilibrium can't exist around the Iridium source, the dose measurement near the source will be very difficult. In this study, Monte Carlo simulation has been used to estimate the dose perturbation near the source. In order to realize the volume dose of normal tissue, phantom study is need. According to this study, the dose of rectum by brachytherapy will be assessed more accurately. **Materials and Methods:** The first Monte Carlo simulation result of the Iridium source in water is based on the brachytherapy planning result. This first step is used to verify the simulation parameter. Another simulation condition included with rectal shielding material will be compare to the first condition. The dose difference between these two simulation conditions will suggest the extent of influence rectal shielding material. In the co-operative hospital, physician used Hensche applicator to treat GYN patient, so the three source positions will be put into three individual tandems to cover the mucosa layer of treatment area. **Results:** When the Hensche applicator is used for the treatment of GYN patient, the rectal shielding material which is made by tungsten alloy will reduce the tissue dose around the Iridium source. So the brachytherapy planning system will overestimate the rectum point dose. Through this study, the dose of rectum can be defined more precisely. Because the limited dose of rectum can be assessed, the physicist will adjust the dose distribution to achieve the optimization dose distribution more reasonable. **Conclusions:** The influence of rectal shielding material can be assessed more precisely by this study. By adding simulation results to the volume rectum dose of external beam treatment can give the physician a comprehensive assessment.