AbstractID: 10571 Title: Dose Perturbation Due To Contrast Solution In Mammosite Balloon In Ir-192 HDR Treatment

Purpose: To determine the dosimetric consequences of radiopaque contrast in balloon used in Mammosite® brachytherapy.

Method and Materials: Mammosite brachytherapy is delivered using a balloon catheter placed inside a lumpectomy cavity in a breast. The balloon is filled with a contrast solution to fit inside the lumpectomy cavity. In our institution the treatment is planned using CT images of the breast on an Eclipse treatment planning computer. We have found that the density of the contrast solution can vary significantly depending on the solution inserted in the balloon by the surgeons. CT numbers as high as 3000 Hounsfield Unit (HU) have been found in the mammosite balloon at our institution. The Eclipse treatment planning system does not take into account the heterogeneity of the contrast solution in treatment time calculation. We investigated the effect of the contrast solution on dose using film dosimetry and Varian Varisource 200 HDR unit with an Ir-192 source. The solution form the balloon of a patient with CT number of 3000 HU was used in our study. A plan was created to deliver a dose which fell within the linear range of Kodak X-Omat V film. The same geometry and irradiation time was used to irradiate films which under the contrast solution and water respectively. The films were read with a densitometer and the ratio of the optical density gave the dose ratio for the solution relative to water.
Results: Solutions with CT numbers of 3000HU and 2000HU showed a reduction in dose of 10% and 5% respectively compared to water.

Conclusion: Our study indicates that there can be a dose reduction in mammosite treatments where the CT number of the solution is high compared to water. The appropriate corrections should be made to deliver the intended dose in mammosite treatments with Ir-192 source.