

AbstractID: 10729 Title: Measurements of dose discrepancies due to inhomogenities and radiographic contrast in balloon catheter brachytherpay

Purpose: Recently, a device called MammoSite consisting of balloon and catheter was developed to perform partial breast irradiation using high-dose-rate (HDR) brachytherapy unit with ease and reproducibility. However, the actual dose to the skin does not agree well with the calculated dose by the treatment planning system because of the difference between the calculation condition and the real treatment condition (i.e., homogeneous water and full scatter condition vs. contrast existing and lack of full scatter condition). In this study, we experimentally estimated dose discrepancies due to contrast and lack of full scatter in breast HDR brachytherapy with MammoSite. **Method and Materials:** Using MOSFET detectors and a breast simulating phantom, the dose discrepancies between calculation and treatment condition were measured according to contrast concentration (10 and 20% volume ratio), balloon size (35 cc and 60 cc), and source to detector distance (SDD) ranging from 25 to 50 mm. The source was Ir-192 isotope from Nucletron HDR unit. To correct the energy dependency of MOSFET detectors, the mean energy of each measured condition was obtained using Monte Carlo simulation with simplified geometry. For uncertainty analysis, the 80% confidence level of measurements was assessed by Student's t distribution. **Results:** The dose discrepancies from calculation condition due to both contrast and lack of full scatter combined ranged from about -1.4% to -18.2% in studied cases. **Conclusion:** In all cases, the effect of lack of full scatter was dominant to that of contrast. Significant dose discrepancies existed between the calculation and the real treatment condition due to contrast and lack of full scatter. Therefore, actual skin dose is expected to be less than calculated.