

AbstractID: 9020 Title: Measurement of dose difference in breast HDR brachytherapy using MOSFET detectors

A few years ago, MammoSite was developed to perform breast HDR brachytherapy easily and accurately. The MammoSite was consisted of balloon and catheter, and contrast was injected into the balloon through the catheter at treatment. The real dose do not agreed well with the calculated dose by treatment planning system because of the contrast in the balloon and the lack of backscatter. In this study, we experimentally estimated dose discrepancies due to contrast and lack of backscatter in breast HDR brachytherapy with MammoSite. Using MOSFET detectors and a breast simulating phantom, the dose discrepancies between calculation condition (no contrast and with backscatter) and delivery condition (contrast and without backscatter) were measured according to contrast concentration (0, 10, and 20% volume ratio), balloon size (35 cc and 60 cc), and source to detector distance (SDD) ranging from 25 to 50 mm. Each measurement was made with three MOSFET detectors to increase measurement stability. The source was Ir-192 isotope from Nucletron HDR unit. The dose discrepancies from calculation condition due to both contrast and lack of backscatter combined ranged from about -7% to -30% in studied cases. It was found the effect of contrast was more significant with backscatter material than without. In all cases, the effect of backscatter was dominant to that of contrast (about -7% to -24%). Significant dose discrepancies existed between the calculation and the real treatment condition due to contrast and lack of backscatter. Therefore, skin dose is expected to be less than calculated. A table with which dose discrepancy can be determined will be provided using measured data of this study.