AbstractID: 5464 Title: An Alternative Technique for Breast Tumor Bed Boost: MammoSite HDR Brachytherapy

Purpose
The use of the MammoSite applicator as an alternative technique for delivering the tumor bed boost is analyzed. The equivalent fraction size in MammoSite boost is estimated based on the LQ model.
Method and Materials
42 patients treated with MammoSite brachytherapy were investigated. Two electron fields were setup for each patient: based on the scar and based on the seroma shown on the pre-scan CT. The electron energy was determined depending on maximum depth of the tumor bed on the CT scan. Isodose distributions were generated for each electron plan and compared with those from the MammoSite plan.

Employing the concept of BED and EUD, the fraction dose for the MammoSite boost (2 fractions, bid. α/β=10Gy, Tp=15 days, α=0.3 cGy) was estimated to match the electron treatment scheme (10Gy in 5 fractions). The late toxicity was estimated as well.
Results
V100 for the electron boost plan based on the scar were 39.7% and 69.2% based on the seroma location. The coverage was improved to 92.1% when the MammoSite applicator was used. There were no statistically significant differences for the V50 of normal breast tissue, lung V30, and maximum dose of the heart between the electron plan based on the seroma location and MammoSite boost plan. Contralateral breast received higher dose for the MammoSite plan. The estimated fraction size with and without considering the tumor proliferation were 3.04~3.15Gy×2 fraction and 3.21~3.32Gy×2 fraction, respectively. The late toxicity based on the calculated prescribed dose was comparable between the Mammosite and electron boost.
Conclusion
Applying the MammoSite brachytherapy to deliver a boost dose to the primary tumor bed appears to be more precise relative to the conventional electron boost technique. The benefit of dose better localized to the target is expected to result in better local control.