

AbstractID: 11694 Title: Accelerated Partial Breast Irradiation With Shielded MammoSite-type Applicator

Purpose: We propose a method to improve delivery of APBI and therefore improve patient access to BCT. **Method and Materials:** BCT in conjunction with accelerated partial breast irradiation (APBI), using for instance the Hologic MammoSite applicator, is becoming popular due to the good dose distribution, and relatively short five day treatment procedure. Brachytherapy-based APBI procedures typically work by implanting a double lumen balloon catheter in the lumpectomy cavity of breast following surgery. The balloon is inflated with an iodine-based material mixed with saline. If the skin to balloon distance is less than 7mm, the procedure may not be recommended due to adverse skin reactions leading to poor cosmesis. This problem could be avoided by partially shielding the radiation dose to the skin by introducing a thin layer of high density material (high Z powder) inside the balloon catheter. In this case, the metal powders may be controlled by a relatively weak external magnetic field applied externally to the patient to form an internal shielding layer inside the balloon in the region of concern, thus avoiding radiation damage to the skin. **Results:** Our preliminary results indicate that if, for example, the skin-to-balloon spacing is only 4 mm, when about 2 mm thin layer of iron powders arranged internally under that segment of surface of the MammoSite balloon will decrease the skin dose to an acceptable level. Our laboratory tests show that only a slight magnetic field is required to bring such a small amount of ferrous powders to controllable configuration. **Conclusion:** The suggested approach will improve cosmetic outcome for all APBI patients treated, in addition to increasing survival expectancy and minimizing negative side effects.