

AbstractID: 5583 Title: Quality Assurance of Partial Breast Irradiation using Permanent Breast ^{103}Pd Seed Implant (PBSI).

Purpose - For early stage breast cancer, accelerated partial breast irradiation using High Dose Rate brachytherapy appears as effective as whole breast radiation. A permanent breast seed implant (PBSI) technique has been developed that realizes the implantation of ^{103}Pd seeds under ultra-sound guidance in a single one-hour session. The objective of this study is to compare early and delayed post-implant dose distribution to assess the Quality of the procedure.

Material and Methods - A Phase I/II clinical trial has been activated in May 2004 and as of February 2006 forty seven patients have received PBSI. A minimal peripheral dose of 90Gy was prescribed to a volume corresponding to the CTV plus a margin of 1.5 cm. Each patient has a CT scan immediately following seed implantation and another one at two months. After identification of the seeds, new plans were calculated using the MMS TPS.

Results - On average, 70 seeds are used per patient, with an activity ranging from 1.59U to 2.7U per seed. The V_{100} values demonstrate a satisfactory coverage and minimal variations over the course of 2 months. V_{100} were improving over time demonstrating a learning curve. The V_{200} for both the PTV and CTV shows significant and dramatic increases over time (65% and 87% respectively, $p < 0.001$). The mean PTV and CTV volumes were small and do not vary significantly between the "immediate" and two month post-implant.

Conclusions - Post-implant PBSI Quality Assurance data shows adequate dose coverage of the target volumes that remains stable over time suggesting that there is no significant seed motion. Significant changes in the hot-dose sleeves are seen two months from seed implantation. This could be due to a breast oedema at the time of implant that disappears with time and/or to the development of a retractile fibrosis over time.