

AbstractID: 5587 Title: First report on a badge survey for family members living with permanent Pd-103 breast seed implant patients

Purpose: A phase I/II clinical trial is ongoing for a new form of accelerated partial breast irradiation using permanently implanted Pd-103 brachytherapy seeds. The procedure takes about one hour operating room time and the patient is released from the hospital the same day. One concerning issue associated with this procedure is the dose received by family members living with these implanted patients, particularly because the amount of overlying tissue in a permanent breast seed implant is much less compared to a permanent prostate seed implant. The purpose of this study is two-fold: 1.) to determine measured doses to family members living with the implanted patients and 2.) to compare these measured doses with theory. The NCRP recommends a dose not exceeding 5mSv for family members living with implanted patients.

Methods and Materials: Landauer luxel radiation badges (sensitive to 1mrem=0.01mSv) were given to family members living with implanted patients. Instructions were to wear the badge at all times when in vicinity of the patient for a period of 1-month. The raw badge readings (deep dose equivalent) were then extrapolated over the lifetime of the source to reflect total dose to the family member. A theoretical equation was developed (that accounts for the activity implanted, the seed type, the overlying tissue depth, and the time in vicinity of the patient) and this was compared with the measured badge readings.

Results: To date, n=33 badge readings have been received. The average spousal dose was 0.94 mSv (n=21). The maximum and minimum doses were 3.1 and 0.01 mSv. The theoretical equation, in most cases, over-estimated the measured dose (up to a factor of 2.5).

Conclusions: In all cases, the total dose received by family members was less than 5 mSv. The theoretical equation provides a worst case scenario estimate of dose to a family member.