

AbstractID: 8340 Title: Analysis of dose to patient, spouse/caretaker, and staff, from an implanted trackable radioactive fiducial for use in the radiation treatment of prostate cancer

Purpose: A fiducial tracking system based on a novel radioactive tracking technology is being developed for realtime target tracking in external beam radiation therapy. In this study we calculate the radiation dose to the patient, the spouse/caretaker, and the medical staff that would result from a 50uCi Ir192 radioactive fiducial marker permanently implanted in the prostate of a radiation therapy patient. **Method and Materials:** The local dose to the surrounding tissue was calculated using a Monte Carlo simulation. The equivalent whole body dose to the patient was calculated by summing the equivalent doses to the sensitive organs using standard organ weighting factors. The exposure of the spouse/caretaker was calculated according to the NRC guidelines. The exposure of the medical staff was calculated based on estimates of proximity to the patient and time spent in the vicinity of the patient. **Results:** The lifetime local dose to the surrounding tissue is below 40Gy at 4mm and below 10Gy at 6mm. The lifetime whole body equivalent dose to the patient is 32mSv. The lifetime dose to the spouse/caretaker is 0.2mSv, and the annual exposure of the medical staff is 0.1mSv for a doctor performing implantations and 0.17mSv for a radiation therapist positioning patients for therapy. **Conclusion:** The local dose to the tissue surrounding the implant, which is irradiated during therapy, is not expected to have any clinically significant effect. The equivalent lifetime whole body dose to the patient is insignificant in comparison to the whole body dose received from the therapy itself. The radiation exposure of the spouse/caretaker and medical staff is well below the recommended limits. We conclude that with respect to radiation exposure, there is no contraindication to applying this novel system in the radiation treatment of prostate cancer. **Conflict of Interest:** Research sponsored by Navotek Medical Ltd.