AbstractID: 7005 Title: A Second Generation Linear Pd-103 Wire Source for Prostate Brachytherapy

I-125 and Pd-103 seeds have been successfully used over the past 20 years for prostate brachytherapy. Though the implantation techniques are highly developed, there still exists the possibility of seed migration, reorientation and displacement. An implantable linear source based on a wire with naturally embedded Pd-103 has been designed that may address these issues. The source length can be adjusted preoperatively or interoperatively and exists as a flexible form that can conform to changes in the shape of the tumor. The continuous nature of the source may enhance stability.

The source can be produced at various activity levels; a common source activity is 1.4 mCi/cm linear to match the activity of a Pd-103 seed. Dose simulation and dosimetry show that at distances greater than 0.5 cm on the basal plane, a source ‘n’ cm in length emulates a train of ‘n’ seeds with 1 cm spacing. At closer distances, the extended nature of the linear source delivers a more homogeneous dose to surrounding tissue, and reduces "hot spot" characteristics of discrete seeds. The linear source eliminates variation in seed spacing on the longitudinal axis and improves DVH fill factors.

The Pd-103 linear source has received US FDA clearance for distribution. The source is inherently radiopaque, its coiled wire geometry highly echogenic, and thus, is readily visible under ultrasound. Data will be presented on the mechanical and physical characteristics of the source, dose distribution simulation and measurements, as well as preliminary data from evaluation of the source in a canine prostate model.