

AbstractID: 1266 Title: Intravascular irradiation of a hemodialysis graft using a Sr90/Y90 source train: initial dosimetry results of the BRAVO clinical trial

The treatment of renal disease requiring a dialysis procedure is a major medical problem. For long-term vascular assess in these patients an arterial-venous graft (AVG) is constructed. However, blood flow often becomes obstructed due to venous or arterial stenosis within the graft. Intravascular brachytherapy (IVBT) of the AVG is being explored for providing longer vascular assess in these grafts. The dose distribution was calculated for patients having IVBT with a catheter containing a Sr⁹⁰ radioactive source train jacketed in a balloon inflated with CO₂ to fill the lumen of the vessel. The position of the wall of the inflated balloon and the 24-Sr⁹⁰ seeds in the source train were identified on radiographic images of the AVG implant. The dose distributions were calculated, taking into account the geometrical fall-off from each source and the path-length of the beta particles in tissue. The prescribed dose was 18.4Gy in tissue at the center of the source train and 0.5mm from the balloon wall. The dose distribution was superimposed on the radiographic images, and dose-area histograms (DAH) calculated. The uniformity of the dose distribution surrounding the implant was quantified by determining the area that received within $\pm 10\%$ of the prescribed dose. It was found in 25 AVG intravascular implants that when the sources were centered in the catheter the vessel wall was more uniformly irradiated then when the sources were off-centered. This dosimetry data may be useful for evaluating the clinical results of IVBT for hemodialysis grafts. This work is supported by Novoste Corp.