

Early results of our SCRIPPS trial showed that coronary irradiation using catheter-based Ir-192 significantly reduced the rate of restenosis. It randomized patients with known coronary artery restenosis to receive either radioactive Ir-192 or placebo treatment immediately after angioplasty and stenting. Arterial dimensions were obtained via intravascular ultrasound (IVUS) to prescribe dose and compute treatment time. We have analyzed the dosimetric parameters associated with 180 intracoronary radiation therapy (ICRT) procedures; over half of these patients received radioactive seeds in a double-blinded fashion. We further analyzed the arterial anatomy from cross-sectional IVUS scans to examine the value of source-centering. Our evaluation showed that the minimum and maximum distances from the non-centered source to leading edge of media were 1.7 ± 0.21 mm and 3.31 ± 0.44 mm, respectively. The corresponding doses were 2415 ± 403 cGy and 778 ± 37 cGy. Based upon mCi*hr of each ICRT procedure, we computed a dose of 1375 ± 190 cGy at 2 mm distance for these patients. Our data showed that prescribing dose at a fixed distance (e.g. 2mm) regardless of arterial dimensions, leads to a $\pm 15\%$ variation in minimum dose to the media. Employing IVUS data, we computed (maximum/minimum) dose ratio to media of 2.1 for centered source; this inhomogeneity arising from the presence of plaque within the artery. We conclude that (1) prescribing dose to a fixed point from the source regardless of arterial anatomy may be acceptable only if therapeutic dose window is broad; and (2) source-centering does not seem to be essential during Ir-192 ICRT, especially for restenotic lesions.