Purpose: This investigation was undertaken to study the dosimetry of P-32 wire with a simplified point source function to be easily used in intravascular brachytherapy.
Methods: Conventionally , the schema developed by Lovinger, Berman, and Berger and the Lovinger point source function is wildly used to do the dosimetry for beta particles and electrons. At the distance c/u, where c is a parameter (c=1 for P-32) and u is the absorption coefficient, the Lovinger point source function is separated into two different forms and becomes tedious to implement. By using the continuous point source function developed at the Johns Hopkins for radio-immunotherapy with four parameters, we are able to resolve this problem.
Results: With an absorption coefficient of 9.1 cm**2/g and an average energy of 0.695 MeV, the dose rates per mCi along a 27 mm P-32 wire are 2.115, 0.885, 0.472, 0.266,0.150, 0.085 ,0.047 cGy/sec at radial distances 0.05,0.10, 0.15, 0.20, 0.25, 0.30, 0.35 cm respectively. Compared with the Lovinger point source function, the difference is 2.6% at the usual prescription point 0.2 cm.
Conclusions: The Johns Hopkins point source function can be easily adapted to calculate the dosimetry accurately at short treatment distances encountered at the intravascular brachytherapy.