COMMISSIONING OF THE BRACHYTHERAPY MODULE ON THERAPLAN PLUS

Clinical implementation of any treatment planning software requires a thorough evaluation of the dose calculation algorithm. In this study, we present results of tests of the brachytherapy module for Theraplan Plus. Iridium-192 wires of lengths ranging from 0.5 cm to 5 cm were modeled, and the predicted dose distributions were compared to standard dose distributions from the literature.[1] In the absence of published dose data, the predicted dose distributions were compared with the results of Monte Carlo simulations of the wires using the MCNP (Monte Carlo N-Particle) code. In general, the agreement between the Theraplan data and the published and Monte Carlo results was good, (within 3% for distances from 0.5 to 10 cm), with the largest errors occurring near the source (up to 5% at 0.2 cm) and at large distances (10% at 12 cm). This level of agreement required appropriate selection of normalization factors to account for deviations from the inverse square law. Line sources were also adequately modeled by arrays of point sources of equal activity, provided that the spacing between sources was sufficiently small. The calculated dose distributions for a cesium-137 uterine tandem source were found to agree well with the published data of Williamson.[2]

[1]Dutreix A. and Marinello G., p. 17-24 in *Modern Brachytherapy*, Masson Publishing, 1987.
[2]Williamson, J.F., Int. J. Rad. Onco. Biol. Phys., vol 41, p960, 1998.