

Abstract

Purpose:

A simple method for verifying the dose point kernel of Ir-192 source used in HDR brachytherapy using Kodak EDR2 film in a spiral phantom.

Methods and Materials:

A spiral solid water phantom available from Gammex International for IMRT QA was modified for this study. A CT scan image of the phantom was acquired with a 10 x 12 inch film loaded in the spiral groove. A 3.5 mm long 8.5 Ci pellet of Ir-192 in a Nucletron HDR system was driven to a snugly fitting catheter located at the center of the phantom. The film loaded in the groove was exposed for a dwell time calculated to deliver doses within the linear range of the film. A calibration film was processed with each film exposed in the groove. The film was scanned with a Vidar 16-bit scanner and analyzed using the RIT film analysis software. The isodose map and dose profile along the length of the spiral were calculated to a number of selected distances from the center of the source. The conversion of film optical density to dose was procured by measuring the dose at selected points in solid water sheets with a 0.6 cc Farmer ion chamber. The nC recorded at selected distances from the source was converted to cGy using the TG-21 formalism.

Results: The measured dose point kernel measured with the film was compared with published data. Corrections for obliquity and sensitivity of the chamber with energy were ignored since these are less than 2 %. The dose profile for Ir-192 was found to be in close agreement with published data.

Conclusion:

A simple film exposed in a spiral phantom can be employed to verify the dose point kernels required for Ir-192 and other radionuclides being considered for HDR and LDR brachytherapy.