AbstractID: 4857 Title: Dose variation within lung tumor and in its fingerlike extension as a function of incident photon angle

Purpose: Report the dose variation within a lung tumor and its finger-like extension as a function of incident photon beam angle.

Method and Materials: A phantom with 3-cm diameter acrylic sphere (tumor) inside a cork medium was designed so that the sphere could be rotated. TLDs were placed at various locations within the sphere and just outside the sphere. The outer TLDS simulated the tumor's finger like extension. Two 2.8cm thick acrylic plates (chest wall) sandwiched the phantom. The TLDS were exposed to a 6 MV beam of 10x10 cm^2 with the sphere centered at isocenter (100 SAD). The field size was such that the dose at the periphery of the acrylic sphere was not influenced by the beam penumbra. The exposures were repeated at every 30^0 of the fingerlike extension with respect to the incident beam angle. The doses at the TLDs were also calculated using MCNPX Monte Carlo codes and CC convolution algorithm.

Results: The measured and calculated doses were normalized to the dose at the center of the sphere. Then ratios of MC and convolution values to measured values were calculated and plotted as a histogram. The standard deviations for MC and convolution to TLD ratios were 3.5% and 1.1% respectively. The standard deviations of random error in TLD, MC and convolution methods were 2, 3 and 1.5% respectively.

Conclusions: MC and CC convolution values agreed well with measured data. The data would be presented as function of incident beam angle. In addition, analysis of a PB algorithm and an 18 MV beam data would be presented.