

AbstractID: 5060 Title: Radiation Leakage from Acrylic Electron

Cones for an Intraoperative Therapy Linear Accelerator.

Purpose: To determine the radiation leakage at the outer wall of intraoperative radiation treatment (IORT) cones.

Method and materials: The leakage radiation dose for the acrylic IORT cone system attached with a Clinac 2100C of Varian was studied. Radiographic films were wrapped around the cone wall to locate the area of the high radiation leakage according to the optical density of the films. Then the leakage doses at the cone wall with high optical density starting from the distance of 0 – 8 cm upward from the cone end and also the dose at the depth of maximum dose were measured by using TLD-700 rods type in solid water phantoms. The measurement were made for 4.5, 6.4, 8.3, and 9.5 cm diameter cones (both flat and bevel ends) with 6, 12 and 20 MeV electron beams.

Results: The leakage dose as the percentage of the maximum dose at the central axis of the beam tended to increase with the energy and cone size except the 8.2 cm cone at 20 MeV which showed more leakage dose than the value of 9.5 cm diameter for both flat and bevel ends at the distance 8 cm from the cone end. Both flat and bevel cones presented the minimum and maximum leakage radiation with the same cone size (4.5 cm for minimum and 8.2 cm for the maximum) and the distance from the cone end (at the cone end for minimum and 8 cm for maximum). Their values were very close with the minimum of 4.37% and 4.92% and the maximum of 22.94% and 23.10% for flat and bevel end cones respectively.

Conclusions: The tolerance dose of the normal tissue involved in each treatment should be considered together with the maximum leakage dose for the cone size and energy used in the treatment.