AbstractID: 14116 Title: Surface-dose Enhancement Characteristics of Brass Mesh for Breast Cancer Treatments

Purpose: To characterize the surface and build-up dose-enhancement characteristics of a brass mesh material and compare it to widely-used tissue-equivalent bolus. **Method and Materials:** A parallel-plate ionization chamber was used to measure the enhancement effect of brass mesh (Whiting & Davis) versus that of tissue-equivalent bolus ("Superflab," Mick Radio-Nuclear Instruments) under varying layers of water-equivalent plastic. The measurements were performed using 1 to 4 layers of brass mesh (1.78-mm thickness, 2.69-mm mesh spacing) and bolus of 0.5- and 1.0-cm thickness. A Varian linear accelerator was used to deliver 6- and 10-MV beams, and a Tomotherapy system was used for helical delivery of a 6-MV beam. The distance between the measurement point and the phantom surface (located at 100 cm SSD) ranged from 0 to 30 mm; field sizes of 10x10, 5x5, and 20x20 cm were used for conventional linac measurements, and a field width of 2.5-cm for Tomotherapy. **Results:** For a conventional linac with either 6 or 10 MV, the differences in enhancement by the brass mesh compared to tissue-equivalent bolus were greatest at the surface, where the brass mesh considerably underdosed the surface even when four layers were used. The difference between brass mesh and bolus was negligible beyond 5 mm of depth. For Tomotherapy, the enhancement by 2 layers of brass mesh was greater than for 0.5-cm bolus due to the tangential effect. **Conclusion:** The results indicate that the characteristics of the surface dose enhancement by brass mesh are not equivalent to 0.5-cm bolus for the first 5 mm of depth. Therefore, despite anecdotal reports, a single or multiple layers of brass mesh are not adequate for treatments where bolus is routinely used specifically to enhance dose in the superficial region to prevent recurrence due to microscopic disease in and under the skin.