AbstractID: 6438 Title: Observation of dose enhancement between two gold foils with 25MV photon beam

Purpose: To study the effect of backscattered electrons in enhancing absorbed dose using gold foils.

Methods and materials: Tissue equivalent solid phantom and two gold foils with 0.034 mm thickness were used. The first gold foil was placed at 4.5 cm depth and EDR2 film was placed at 6 mm downstream position relative to the gold foil. The second foil was placed at 5.4 mm downstream position relative to the EDR2 film. We used a 25 MV photon beam and 10 ×10 cm^2 field size. The phantom was set at 100 cm SSD. 200MU was delivered. After the second gold foil was removed, another film was irradiated with the same photon beam, field size, and SSD. Films were analyzed with RIT 113 version 4 (RIT Inc. Colorado Springs, Co). Microsoft Office Excel was also used to analyze the data.

Results and discussion: We found that removing the second foil caused a 6% reduction of the dose at the film location. Because the pair production dominates at this energy and with high Z material (gold foil), it is possible that the enhancement was due to the pair production. Pair production generates more electrons and positrons, thereby, increasing backscattered electrons as well as annihilation photons.

Conclusions: This study showed that there is dose enhancement between two gold foils. The result suggests the possibility of local dose enhancement by using gold nanoparticles.