

AbstractID: 8919 Title: Dose uncertainties of Head and Neck IMRT by dental implant artifacts in CT images

Purpose: The IMRT in the head and neck region is practiced frequently in order to reduce toxicity to the OARs such as parotid glands while escalating dose to the tumor volume. In spite of common use of this modality, streak artifact in CT caused by dental implants is problematic because this leads to errors in dose calculation. This study quantifies uncertainty ranges of dose and provides a way for better dose calculation. **Method and Materials:** In this study, five different H&N IMRT plans were chosen, and then for each plan two different CT sets were manipulated using the original CT images. Those three sets are: i) images without any manipulation (original CT image), ii) images with the same Hounsfield Unit equivalent to water for whole treatment body, and iii) images with HU = 0 only for the part with artifacts. After the adjustment, each image set was used for the dose calculations. The Varian's Eclipse® treatment planning system was used in this study with pencil beam algorithm. With and without heterogeneity correction options were also observed in this study. The results were analyzed using the DVH data. **Results:** The difference of overall mean doses for each set was minimal. The hot and cold spots were varied not only with the disease site but also with the selection of image sets. The variations were close to 2% in PTVs, and OARs usually a little less. **Conclusion:** Using the different image manipulation sets, mean dose variation relative to the calculation based on the original CT set was insignificant but cold and hot spots were varied due to the artifact's location. The dose calculation using this image manipulation technique can reduce the dose to the OARs and leads to improvement of accuracy of dose calculation.