

AbstractID: 13827 Title: Dose calculation with MV CBCT images for head and neck from a new imaging beam line

Purpose/Objective: Megavoltage cone-beam computed tomography (MVCBCT) is an imaging technology originally developed for image-guided radiation therapy (IGRT). However, ongoing investigations have shown that images acquired with this technology can be used for dose calculation, thus making possible daily dose verification. The purpose of this work is to report a cupping correction method to MV CBCT images obtained from a new imaging beam line (IBL). **Method and Materials:** To achieve this goal, correction factor method specific to images acquired with the IBL were developed and applied to a head and neck patient. Dose calculations were compared using the conventional CT and corrected MVCBCT images (IBL). Dose difference maps were calculated to validate the use of the correction method to the IBL MVCBCT images. **Results:** The corrected IBL images show good agreement on the CT numbers to the conventional CT images. Our study shows the maximal difference is about 30HU in soft tissue and 200HU in dense bone. The planned dose and treatment dose matches well on most of regions where there are almost no anatomical changes. The 200HU difference in dense bone seems no significant effect on the final dose distribution because of the small volume. A large dose difference appears in the skin region. In a clinical case, the dose difference matched within $\pm 3\%$ is 79.2% and 89.0% without and with removing skin, respectively. The 89% agreement is mainly caused by the deformation of patient between treatment day and planning day. **Conclusion:** MVCBCT images acquired with the IBL can be used for dose recalculation, and that properly processed MVCBCT images in general can be used for dose verification on actual treatment delivery. *Research sponsored by Siemens OCS.*