AbstractID: 12785 Title: Cone Beam Computed Tomography Dose Measurements. Head & Neck Collimators in Elekta Synergy®

Purpose: Image Guided Radiotherapy employs kV and MV images to improve treatment quality. On board cone beam computed tomography (CBCT) is widely used. Several authors have reported absorbed dose measurements using different approaches which could seem unclear if compared with diagnostic radiology literature. Our objectives are to establish a coherent set of measurements which could be used as a reference along linac life and to present our data for head and neck collimators. **Method and Materials:** An Elekta Synergy equipped with 15x15, S10 and S20 collimators for CBCT has been used. Measurements have been performed with a Farmer chamber in a PMMA CTDI head phantom placed at the isocenter. Since diagnostic radiology equipment is calibrated in air kerma ($K_{air,r}$), this has been the chosen magnitude. For that reason, ionization chamber has been calibrated against a multipurpose Barracuda diagnostic detector. After that, we have measured central air kerma ($K_{air,c}$) and peripheral air kerma ($K_{air,p}$) and derived a cone beam dose index as CBDI=(1/3) $K_{air,c} + (2/3) K_{air,p}$. Head & neck CBCT acquisition protocol comprised an arc of 210°, 100 kV and 36.1 mAs. **Results:** CBDI for 15x15 was 1.158 \pm 0.010 mGy. CBDI for S10 was 1.268 \pm 0.011 mGy. CBDI for S20 was 1.255 \pm 0.011 mGy. **Conclusion:** It is possible to find a reproducible set up to measure dose for CBCT. Although inconsistencies could be found in the recent IGRT literature, it should be considered that CT regulations stated dose measurements in a PMMA phantom. Besides, diagnostic radiology measurements should be performed in K_{air} units so CBDI is an index built upon air kerma measured inside PMMA.