

## AbstractID: 6703 Title: Daily Patient Dose from Kilo-Voltage Cone-Beam Computed Tomography: A Comparison Between XVI and OBI

**Purpose:** To make a comprehensive set of absolute dose measurements from the X-ray Volumetric Imager (XVI<sup>®</sup>, Elekta Medical Systems) and the On-Board Imager (OBI<sup>®</sup>, Varian Medical Systems) on cylindrical phantoms using a calibrated ion chamber.

**Method and Materials:** Two cylindrical (acrylic) phantoms with diameters of 18 cm (head phantom) and 30 cm (body phantom) were used for all measurements. Each phantom has a hole in the center and 2 cm below the phantom surface. For the XVI unit, the four manufacturer-supplied protocols were measured, namely, “head & neck”, “prostate”, “pelvis”, and “pelvis – large”. The total mAs settings were also varied for each protocol to verify the dose linearity. For the OBI unit, full bow-tie, half bow-tie, and no bow-tie filters were used in combination with the two scanning modes, namely, “full-fan” and “half-fan”.

**Results:** For the XVI unit, the (isocenter) doses range between 0.1 and 2.2 cGy for the “head & neck” and “prostate” protocol, respectively, and agree well with the “Nominal Scan Dose” supplied by the manufacturer. The measured doses were highly linear with the total mAs settings. For the OBI unit, the (isocenter) doses range between 0.9 and 8.5 cGy. In the full bow-tie with the “full-fan” mode, the head phantom central dose was 8.5 cGy. This is significantly larger than a similar protocol scan measured with the XVI unit (“head & neck”). Half value layers were between 4.6 to 7.0-mm-Al for the two x-ray units.

**Conclusion:** A comprehensive series of dose measurements were made on the XVI and OBI CBCT imagers. It was observed that the OBI unit generally results in higher dose with up to 8.5 cGy measured with the head phantom. More studies are required to determine the increase in image quality expected from the increase in patient dose from the OBI unit.