

**Purpose:** To evaluate the radiation dose and image quality on the Varian cone beam computed tomography (CBCT) system of software Version 1.4.13. This study investigated organ absorbed dose, total effective dose, and image quality of the CBCT system for the 200 degrees head-and-neck and 360 degrees pelvic scanning protocols.

**Methods:** A calibrated Farmer chamber and two standard cylindrical Perspex CT dosimetry phantoms with diameter of 16 cm head and 32 cm body phantoms were used to measure the weighted CBCT dose index (CBCTDI<sub>w</sub>) of the Varian CBCT system. The absorbed dose of different organs was measured in a female anthropomorphic phantom with thermoluminescent dosimeters (TLD) and the total effective dose was estimated according to International Commission on Radiological Protection (ICRP) Publication 103. The dose measurement and image quality were studied for head-and-neck and pelvic regions.

**Results:** The CBCTDI<sub>w</sub> of the head-and-neck and pelvic protocols were 36.6 and 29.4 mGy, respectively. The absorbed dose to lens for the head-and-neck protocol was 3.8 mGy. The total effective doses from the head-and-neck and pelvic protocols were 1.7 and 8.2 mSv, respectively. The additional secondary cancer risks of the head-and-neck cancer with 33 fractions and pelvic cancer with 35 fractions of daily CBCT might be up to 0.28% and 1.44%, respectively. For low-contrast resolution, 7 mm in diameter at 1% target contrast level was observed for both the head-and-neck and pelvic protocols; whereas for the high-contrast spatial resolutions, 7 and 4 lp/cm were demonstrated for the head-and-neck and pelvic protocols, respectively.

**Conclusions:** The Varian CBCT of software Version 1.4.13 provided volumetric information for image guidance with acceptable image quality and lower radiation dose. This imaging tool gave a better standard for patient daily setup verification.