

**Purpose:** To investigate differences in dose calculated using cone-beam CT (CBCT) and conventional CT (CT) using pencil beam convolution (PBC) and analytical anisotropic algorithms (AAA).

**Methods:** CBCT images were acquired using on-board imaging system of Varian Trilogy. The clinical plans were calculated on CT and CBCT using PBC and AAA in Eclipse treatment planning system. The structures, beams and leaf sequences from clinical plans were preserved and transferred to CBCT. Treatment plans for 8 lungs, 1 lumbar spine, and 1 liver patient were used. Dose differences from 2D distributions on CT and CBCT slices were calculated. The gamma index was used to analyze dose distributions with tolerance criteria of (3%, 3 mm).

**Results:** The data show that nearly 67% and 90% of patients had an average dose calculated on CBCT higher than on CT using PBC and AAA, respectively. The overall average of mean percentage dose difference (MPDD) between CT and CBCT from all patients in different planes was 0.5% (PBC) and 1.8% (AAA). The MPDD ranged from -13.2% to 7.9% (PBC) and -13.9% to 9.9% (AAA). The gamma analysis using AAA had lower or equal passing rates (84% of 139 cases) than PBC.

**Conclusion:** The dose calculated was generally higher on CBCT than CT. The AAA dose showed larger deviations in CBCT compared to CT and accounts more for image artifacts inherent to CBCT than PBC. The discrepancies in dose between CBCT and CT were the largest in lung patients due to large variations in CBCT and CT numbers.