

Practice of Adaptive image-guided radiotherapy (IGRT)

Gurvinder Wadhawan

Rajiv Gandhi Cancer Institute & Research Centre, India

Purpose: Accurate image guided radiotherapy (IGRT) using MVCBCT is essential prerequisite to practice IMRT or 3DCRT and forms an important factor in the quality of actual radiation delivery. The capability of generating an entire volumetric MV-CBCT data set in a single-gantry rotation, allows 3D visualization of the tumor prior to the delivery of treatment and correlation with reference plan CT data. This permits corrections of shifts beyond an acceptable limit.

Material and Methods: Prior to treatment, 2D and/or CBCT (on ARTISTE Siemens and Varian ix) was acquired and setup errors with reference to X, Y, Z were corrected online in 20 patients of breast, head & neck (H&N) and prostate. A second CBCT was acquired after the correction process and coordinates for daily set-up and images were obtained.

Results: A total number of 211 CBCT/ or 2D images were performed in 20 patients. The sites included – breast (n=10), H&N (n=6) and prostate (n=4). Images were evaluated for 95, 58 and 58 fractions respectively. The shifts observed in X, Y and Z axes are summarized below: In addition, rotational errors were observed in 7% (15/211 images). These include breast (2%), H&N (1%) and prostate (4%), which were also corrected by IGRT.

Conclusion: Despite immobilization devices, shifts beyond the acceptable limits of 2mm were observed during online CBCT or 2D imaging with IGRT in breast (79.9%), H&N (49.2%) and prostate (96.6%). IGRT permits detection and online corrections of these shifts which would have been otherwise gone unnoticed leading to dosimetric errors during radiation therapy.

© 2017 Wadhawan et al; licensee Open Access