Verification of Setup Errors in Head and Neck Cancer Patients Treated by 3D-CRT and IMRT using Electronic Portal Image (EPID)

*Abdelhady I, Khalil K and Mashhour K**

ABSTRACT

Purpose: To study the geometric uncertainties in the treatment and evaluate the adequacy of the margins employed for PTV generation in the treatment of patients undergoing head and neck cancer radiotherapy.

Material & Methods: Weekly portal images of setup fields in anterior-posterior and lateral directions were obtained for each patient. These images were matched with the reference image from Varian Acuity simulator. Six anatomical landmarks were selected for comparison. The displacement of portal image from the reference image was recorded in X (Left-Right, L-R) and Z (Anterior-Posterior, A-P) direction for anterior field and Z (Anterior-Posterior, A-P) & (Superior-Inferior, S-I) Y direction for lateral field. The systematic and random errors for individual and population were calculated.

Results: The estimated population systematic errors were 2.9 mm for (L-R), 2.7 mm for (A-P) for anterior field & 2.1 mm for (S-I) for the lateral field. The estimated population random errors were 1.9 mm for (L-R), 2.4mm for (A-P) for anterior field & 1.8 mm for superior-inferior (S-I) for the lateral field. Using the ICRU recommendation, the CTV-PTV margin in the, ML, AP, and SI direction were 7.5, 6.4 & 5.6 mm, respectively.

Conclusion: The calculated population-based margin is more than the empirical one (5 mm), thus the margin does not provide sufficient coverage for all of the patients. Collected data confirmed the need for a strict check of patient position reproducibility