ASSESSMENT OF TRANSLATIONAL AND ROTATIONAL SET-UP UNCERTAINTIES IN HEAD AND NECK CANCER PATIENTS USING CBCT: PRELIMINARY RESULTS OF A MONO-INSTITUTIONAL EXPERIENCE

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OBJECTIVES

This study aimed to assess setup errors, both translational and rotational, in Head and Neck (H&N) cancer patients treated with intensity-modulated radiotherapy (IMRT) and volumetric-modulated arc therapy (VMAT) techniques using pretreatment cone-beam computed tomography (CBCT).

METHODS

We analyzed 57 CBCT, referred to 7 H&N cancer patients, immobilized by head and shoulders customized thermoplastic mask and treated with an Elekta Agility Linear Accelerator.

The CBCT treatment verify protocol consisted of 5 consecutive CBCTs scans for the first week and one CBCT weekly during radiation therapy course.

Grey value automatic registration algorithm was employed.

Translations were measured in medio-lateral (x), supero-inferior (y) and antero-posterior (z) directions, as well as in rotations around axes.

✓ For each patient, mean translational displacements were off-line calculated on CBCT acquired during the first 5 fractions; these values were considered as systematic set-up errors and they were corrected if they exceeded 3 mm.

✓ Rotational shifts were recorded; patients were repositioned for rotations >3°.

✓ Mean, median, standard deviation and range of the displacements related to first 5 CBCTs scans and those corresponding to all following CBCTs scans were calculated. Wilcoxon test was performed to evaluate statistically significant differences.

RESULTS

- Translational mean values were <3 mm and within 2 mm, for all CBCTs and rotations were <3°.

- Wilcoxon test showed no statistically significant correlation between the mean calculated during first five fractions and the following CBCTs scans.

CONCLUSIONS

We analyzed translational set-up uncertainties in H&N cancer treatments using CBCT and we found that all mean displacements were within the range 2 mm and 2°.

In our experience, weekly CBCT allows to obtain a good treatment set-up monitoring.

In the future, we intend to reduce the margin from CTV to PTV considering the accuracy of our set-up allowed by treatment verify CBCT based.

REFERENCES


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