

Active Breathing Coordinator in adjuvant three-dimensional conformal radiotherapy of early stage breast cancer: a feasibility study

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ABSTRACT

Aims. To investigate the technical feasibility of utilizing the Active Breathing Coordinator for planning of postoperative three-dimensional conformal radiation therapy in patients with early stage breast cancer undergoing breast conservation therapy.

Methods. Patients with early stage breast cancer for whom adjuvant radiotherapy after breast-conserving surgery was planned were consecutively enrolled. Five sessions of simulation with the Active Breathing Coordinator were planned for each patient. Computed tomography for simulation was not acquired until a good level of compliance with the procedure was achieved by the patient. Patients who did not show a satisfactory level of compliance after the planned fifth session were defined as noncompliant. Two simulation computed tomography scans were acquired: the first without the Active Breathing Coordinator during free breathing, the second with the Active Breathing Coordinator. Forward intensity-modulated treatment plans were calculated. Mean lung dose ($MLD_{\text{ipsilateral}}$) and $V30$ ($V30_{\text{lung}}$) for the ipsilateral lung and $V30$ for the heart ($V30_{\text{heart}}$), were evaluated.

Results. Twenty consecutive patients were enrolled (6 with left-sided breast cancer and 14 with right-sided breast cancer). Eighteen of the patients completed the simulation computed tomography with the Active Breathing Coordinator after 1-5 sessions (median, 3). In 16 of the 18 patients, a reduction of $V30_{\text{lung}}$ was observed with the Active Breathing Coordinator. In 15 of the 18 patients, a reduction of $MLD_{\text{ipsilateral}}$ was also observed. In 5 of the 6 patients with left-sided breast cancer, a reduction of $V30_{\text{heart}}$ was noted.

Conclusions. Routine application of the Active Breathing Coordinator in clinical practice is feasible, even though it requires an increased workload. Dosimetric results are encouraging in terms of a better sparing of the ipsilateral lung and the heart. Free full text available at www.tumorionline.it

Key words: Active Breathing Coordinator, adjuvant radiotherapy, breast cancer.

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