

Dosimetric evaluation of critical organs at risk in mastectomized left-sided breast cancer radiotherapy using breath-hold technique

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ABSTRACT

Aims and background. The aim of the study was to evaluate the dosimetric impact of the active breathing control-moderate deep inspiration breath-hold (ABC-mDIBH) technique on normal tissue sparing in locally advanced left-sided breast cancer radiotherapy.

Methods and study design. Twenty-seven consecutive patients with left-sided locally advanced breast cancer referred to our department for adjuvant radiotherapy were enrolled in the study. Each patient was scanned at free breathing and ABC-mDIBH for radiation treatment planning. Two separate radiotherapy treatment plans were generated with and without ABC-mDIBH to investigate the dosimetric impact of ABC-mDIBH in breast cancer radiotherapy.

Results. Between June 2011 and February 2012, 27 consecutive patients with left-sided locally advanced breast cancer referred to our department for adjuvant radiotherapy were enrolled in the study. Dose-volume parameters of left anterior descending coronary artery, lungs, heart, contralateral breast, esophagus and spinal cord were significantly reduced with the use of ABC-mDIBH ($P < 0.001$).

Conclusions. Our study revealed that the use of ABC-mDIBH in the practice of locally advanced mastectomized left-sided breast cancer radiotherapy improves normal tissue sparing with the expected potential of decreasing treatment-related morbidity and mortality. Moreover, the resultant reduction achieved with ABC in doses to the left anterior descending coronary artery, which plays a central role in cardiac perfusion, may have implications for decreasing the potential of radiation-induced cardiac morbidity and mortality.

Key words: active breathing control, breast cancer, breath-hold, radiotherapy.

There is no conflict of interest.

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Received April 26, 2012;
accepted October 15, 2012.