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Benefit of Deep Inspiration Breath-Hold in patients treated with radiotherapy for left-sided breast cancer

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Purpose/Objective

To evaluate the heart-sparing benefit of Deep Inspiration Breath-Hold **(**DIBH) as compared to Free Breathing (FB) in patients treated to the Left-Sided (LS) breast or chest wall and locoregional lymph nodes using a monoisocentric three-dimensional Conformal Radiation Therapy (3DCRT) with fieldin-field technique.

Materials and Methods

A prospective study of a cohort of 31 patients with LS breast cancer stage II-III. All patients received RT to the LS breast or chest wall, SupraClavicular (SC), InfraClavicular (IC) and Internal Mammary Nodes (IMN). Each patient was her own case-control and underwent 2 dosimetry CT scans, one in FB and the other one in DIBH. The technique used was a monoisocentric 3DCRT with field-in-field using 5 fields or a 3 fields, according to the conformation of the patient. Dose Volume Histograms (DVH) were calculated for the heart, LS and bilateral lungs, right-sided breast, and IMN, SC, IC, LS breast or chest wall Clinical Target Volume (CTV). The main objective was the heart V35 (percentage of heart receiving more than 35 Gy).

Results

The mean heart parameters were all improved with DIBH ($p < .0001$). The mean heart V35 value was reduced from 7.6 % with FB to 1.1 % with DIBH ($p < .0001$), resulting in an 85.5% absolute reduction. The average heart mean dose and maximum dose respectively decreased from 9 Gy to 3.7 Gy and from 44.9 Gy to 24.7 Gy, ($p < .0001$). The mean of each lung parameter was also reduced with DIBH ($p < .0001$).

Conclusions

As compared to conventional FB technique, the DIBH significantly spared heart and lungs in patients treated to Left-Sided breast or chest wall and locoregional lymph nodes using a monoisocentric 3DCRT with field-in-field technique.

Keywords: Respiratory training;Patient preparation;CT simulation protocols;