Deep-inspirational breath-hold (DIBH) technique in left-sided breast cancer: various aspects from single institutional study:

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**Abstract**

**Background:**

The purpose of the current study was to compare between deep inspiration breath-hold (DIBH) and free-breathing (FB) method and to study the clinical importance of deep-inspirational breath-hold (DIBH) in left breast cancer radiotherapy (RT) was aimed at focusing on cardiac and lung doses.

**Methods:**

This retrospective study was conducted from 1. june.2021 to August 2022 in our institution in patients with left-sided breast cancer who received adjuvant locoregional radiotherapy. Thirty-seven patients were recruited for the study. The respiratory cycle was monitored using four marker localizer box and the Real-time Positioning Management (RPM) software. Two sets of planning CT images were acquired, one with DIBH and the other with free breathing. Planning was done using rapid arc hybrid technique- radiotherapy plans were generated on both image sets and standard fractionation regimen of 42.5 Gy in 16 fractions over a period of 3 weeks followed by lumpectomy cavity boost(10Gy/05fractions) or scar boost (6Gy/03fractions) if indicated was prescribed. For all patients, the treatment plans were delivered with DIBH technique. The dosimetric difference between DIBH and FB technique were compared with Wilcoxon sign rank test using SPSS software version 21.0.

**Results:**

All heart dosimetric parameters of the DIBH was significantly lower than that of FB (p < 0.001), and the lung V30% of DIBH plans was significantly lower than FB plans (p = 0.03). There was no statistically significant difference between the two methods in the other organs at risk doses. All DIBH patients completed the RT, inter-fraction repositioning accuracy and radiation side-effects were similar to that of other breast RT techniques.

**Conclusions:**

Despite variation in the literature regarding the DIBH delivery method, patient coaching, visual feedback mechanisms and treatment verification, all methods of DIBH delivery reduce radiation dose to the heart and lungs. Our study showed that the DIBH technique is beneficial for left sided breast cancer patients, capable of performing consistent deep breath-hold. In view of recent **COVID pandemic**, increasing lung volumes by DIBH method gives a chance to save more lung volumes from radiation fields.