

Surface guided radiotherapy in Deep Inspiration Breath Hold for toxicity management in left-sided breast cancer irradiation: implementation and first clinical experience in Iran

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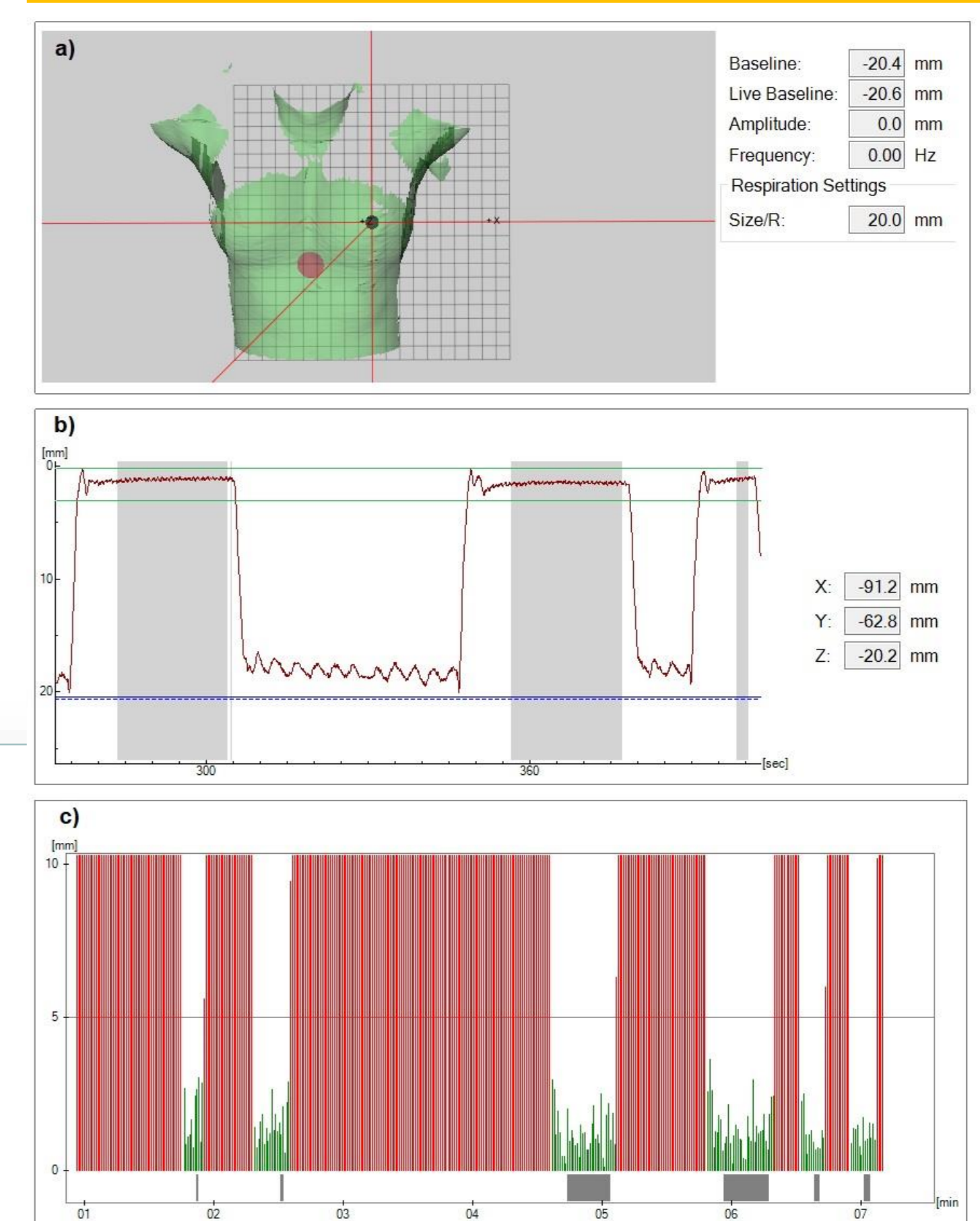
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Introduction & Objective

The aim of the study is to evaluate the overall accuracy of the surface guided radiotherapy (SGRT) workflow through a comprehensive commissioning and quality assurance procedures and assess the potential benefits of deep inspiration breath-hold (DIBH) radiotherapy as a cardiac and lung dose reduction approach for left-sided breast cancer irradiation. Creating and maintaining a quality culture for motion management workflow is the other purpose of the current research.

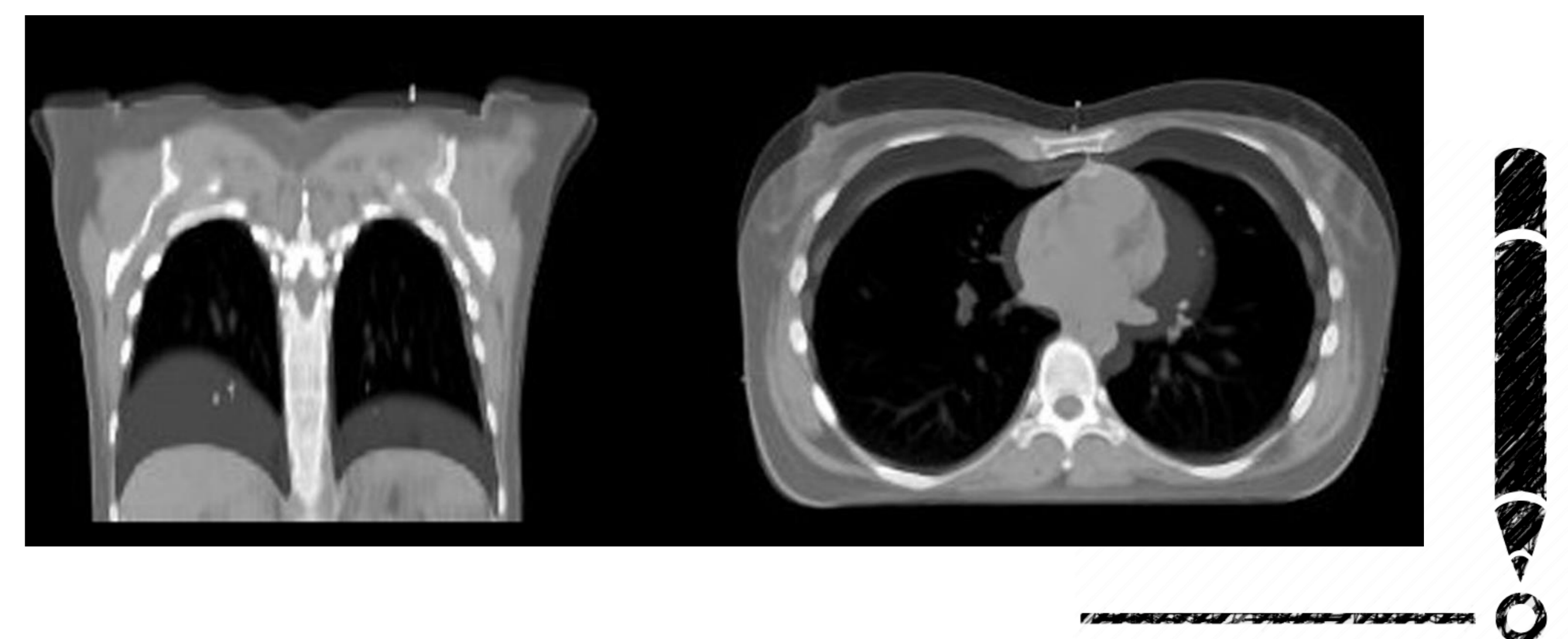
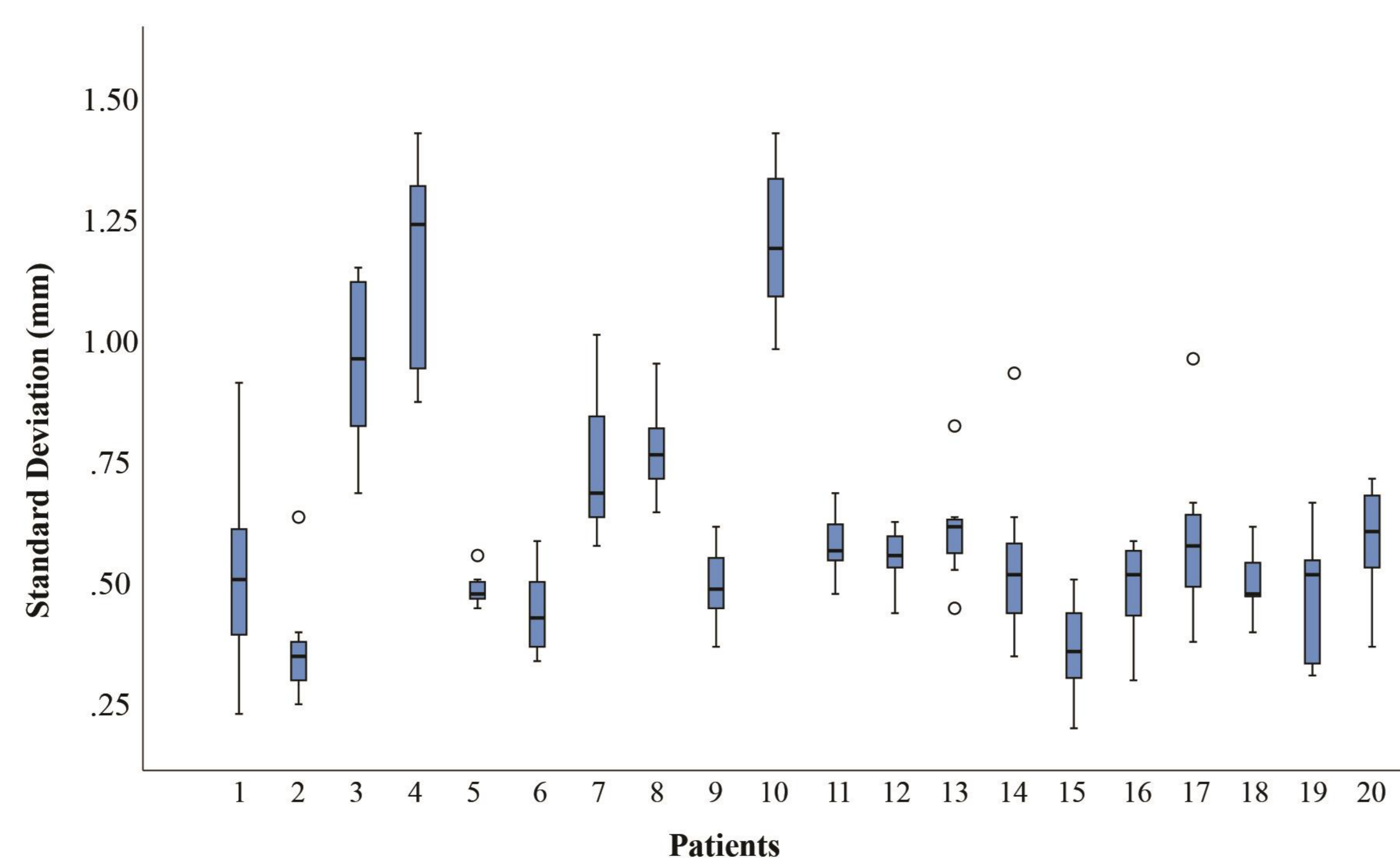
Methods:

Accuracy and reproducibility of the optical surface scanner used for DIBH treatment were evaluated using different phantoms. Patient positioning accuracy and reproducibility of DIBH treatment were evaluated. Twenty patients were studied for treatment plan quality in target dose coverage and healthy organ sparing for the two different treatment techniques.



Results & Conclusion

Reproducibility tests for the surface scanner showed good stability within 1 mm in all directions. The maximum position variation between applied shifts on the couch and the scanner measured offsets is 1 mm in all directions. The clinical study of 200 fractions showed good agreement between the surface scanner and portal imaging with the isocenter position deviation of less than 3mm in each lateral, longitudinal, and vertical direction. The standard deviation of the DIBH level showed a value of < 2mm during all evaluated DIBHs. Compared to the FB technique, DIBH showed significant reduction of 48% for heart mean dose, 43% for Heart V25, and 20% for ipsilateral lung V20. Systematic and dynamic training and creating standard operating procedures will improve staff performance, decrease their anxiety in decision-making dedicated to each patient, and improve treatment quality and patient care.



Conclusion(s):

Surface-guided radiotherapy can be regarded as an accurate tool for patient positioning and monitoring in breast radiotherapy. DIBH treatment are considered to be effective techniques in heart and ipsilateral lung dose reductions for left breast radiotherapy.

Keyword(s): Motion management; Surface imaging; DIBH; Cardiac sparing