Implementation of Deep Inspiration Breath Hold for Left-Sided Breast Radiation Treatment Using Halcyon and Surface Guidance Systems AlignRT and Identify

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Introduction:
Radiotherapy for left-sided breast cancer carries a risk of cardiac exposure. Deep Inspiration Breath Hold (DIBH) is a technique that increases the separation between the heart and chest wall, reducing cardiac dose. This study outlines the clinical implementation of DIBH using the Halcyon linear accelerator with surface guidance systems AlignRT and Identify.

Aim:
To evaluate the feasibility, workflow integration, and benefits of DIBH for left-sided breast cancer patients treated on Halcyon with AlignRT and Identify.

Materials and Methods:

- **Study Design:** Clinical experience study

- **Setting and Sampling:** Multi-centre study involving patients with left-sided breast cancer treated using either the AlignRT or Identify surface guidance systems

- **Inclusion Criteria:** Patients eligible for adjuvant radiotherapy, able to perform and maintain DIBH

- **Exclusion Criteria:** Inability to comply with breath-hold instructions or contraindications to DIBH

Implementation Parameters Evaluated:

- Setup reproducibility and Breath-hold stability and monitoring

- Workflow efficiency

- Integration of surface guidance systems in clinical operations

- Ethical approval was obtained and all patients provided informed consent.

Results:

All patients completed treatment using the DIBH technique without interruption. Smooth integration of surface guidance systems were integral to clinical success. The AlignRT and Identity systems enabled accurate, reproducible patient positioning and continuous monitoring throughout the breath-hold phases, ensuring treatment delivery within defined motion thresholds. Halcyons on board daily CBCT image guidance improved workflow efficiency by automating patient verification and alignment seamlessly.

Conclusions:

The clinical implementation of DIBH for left-sided breast cancer radiotherapy using the Halcyon platform with AlignRT and Identify is both feasible and efficient. Surface guidance technologies enhance treatment precision, patient safety, and workflow consistency. These findings support the routine clinical use of DIBH in modern radiotherapy practice for breast cancer.