A Single-Centre Audit of High-flow Oxygen Use During DIBH Lung Radiotherapy

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Introduction

Deep inspiration breath hold (DIBH) is increasingly used in high dose lung radiotherapy(RT), to enable reduced treatment volume and lower doses to organs at risk.Patients can have difficulties achieving or sustaining consistent breath holds due to respiratory symptoms, co-morbidities and anxiety, limiting the use of this approach. High-Flow oxygen (HFO) may be used as a potential supplementary supportive measure to improve respiratory comfort, prolong breath hold time and increase the number of patients able to utilise DIBH. To better understand the role of HFO in clinical practice, frequency of use and context, our center conducted a retrospective audit of HFO with DIBH for lung RT delivery.

Aim

This audit aimed to evaluate the implementation of HFO during DIBH lung radiotherapy specifically evaluating, Frequency of HFO use, identify barriers to its use and to describe practical considerations and workflows associated with integration of HFO

Materials and Methods

A retrospective review was conducted of all patients receiving DIBH lung RT over 2 years, January 2024 to December 2025. Patient records, treatment images, and staff notes were examined to determine which patients received HFO in DIBH, the frequency of use in respect to total lung workload, and documented reasons for non-use. Additional data included patient demographics and any reported treatment challenges or adverse events related to the use of oxygen. Descriptive statistics were used to summarize findings.

Results

DIBH lung radiotherapy delivery was achieved in 48 of 73 (65%) patients referred for DIBH. 9 of 73 (12%) patients achieved this through the addition of HFO. HFO enabled improvements to duration of DIBH, breath hold consistency and easier between breath hold recovery. 18 of 73 (24%) patients could not achieve DIBH even with HFO. Predominant barrier to DIBH with HFO was the inability to hold breath consistently or for >20 seconds.

	No. of patients	COPD
Attempted DIBH	73	41%
Successful DIBH	49	37%
With oxygen	9	55%
Unsuccessful - Tried oxygen	18	55%
Unsuccessful - No oxygen	6	50%

Reasons for unsuccessful DIBH	Tried oxygen
Unable to hold breath	10
Difficulty breathing - Co-morbidity	3
Patient could not tolerate	4
Equipment limitations	1

Barriers to initial set up included governance structures for oxygen prescriptions, procurement and availability of suitable masks and logistics of oxygen use in the LINAC rooms with no piped gases.

Conclusion

The use of HFO has provided a well-tolerated, easy-to-implement intervention, enabling 12% more patients to proceed to DIBH in a population with high rates of co-morbidity and COPD. A larger group (24%) of patients were unsuccessful with HFO DIBH and required a different approach to motion management. A further evaluation of HFO is planned for patients who are able to achieve DIBH without HFO to assess the duration and stability of DIBH and impact on machine capacity.