Administration of supplemental oxygen enables multiple DIBHs in patients with left-sided breast cancer

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[1] *Wolf, Strahlenther Onkol 2023*

Deep inspiration breath holds (DIBH)

- Radiotherapy of left sided breast cancer during DIBHs

- 5% of patients are not able to perform (repeated) DIBHs[1]
  - Radiation treatment during free breathing (FB)
  - Often resulting in less cardiac tissue sparing

➢ Solution: administration of supplemental oxygen

Aim

to evaluate the duration of room-air based DIBHs

and DIBHs based on supplemental oxygen

in patients with left-sided breast cancer

who were unable to perform 25 s DIBHs when breathing room air

Patient / Treatment characteristics

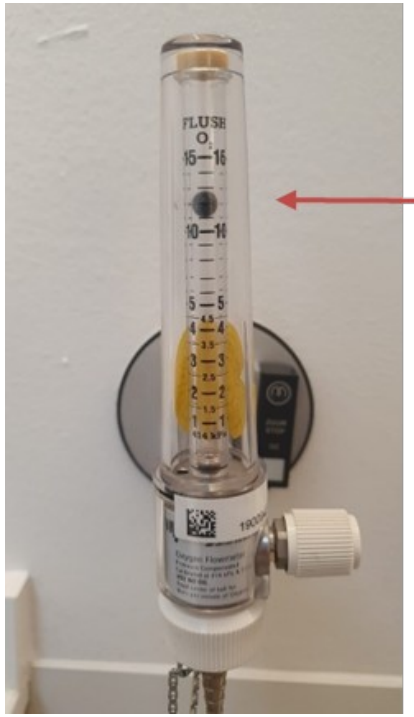
- Age (years)
- Height & weight => BMI
- Smoking status (never/previous/current)
- Karnovsky score (KFS)
- COPD (yes/no)
- (Ever) had bleomycin or amiodarone (yes/no)

100% - 80%	high function
70% - 50%	moderate dysfunction
40% - 10%	high dependency
0%	represents death

Supplemental oxygen

Protocols (planning CT & treatment)

- High concentration adult non-rebreather oxygen mask
- Flow rate 12 L/min



Intersurgical EcoLiteTM (Wokingham, UK)

DIBH durations

- DIBH durations during planning CT
- Patients with < 25 s DIBH durations were offered supplemental oxygen

Room-air based ($21\%O_2$)

DIBH durations with supplemental oxygen

DIBH durations

paired Wilcoxon test

(significance level; $p<0.05$)

Patient / Treatment characteristics

N=27 women with left-sided breast cancer included over 3.5 years

- Median age 65 years (range 47-85 years)
- Median BMI 26 (range 17-40)
- 11/27 previous or current smokers
- Median KFS 80% (range 50-100%)
- None had COPD
- None had (ever) had bleomycin / amiodaronè

100% - 80%	high function
70% - 50%	moderate dysfunction
40% - 10%	high dependency
0%	represents death

Supplemental oxygen

- Flow rate 5 to 12 L/min
- Estimated delivered oxygen concentration

  60% to 100%

- Oxygen was supplied within standard treatment time slots

- RTTs did not experience additional workload

DIBH durations

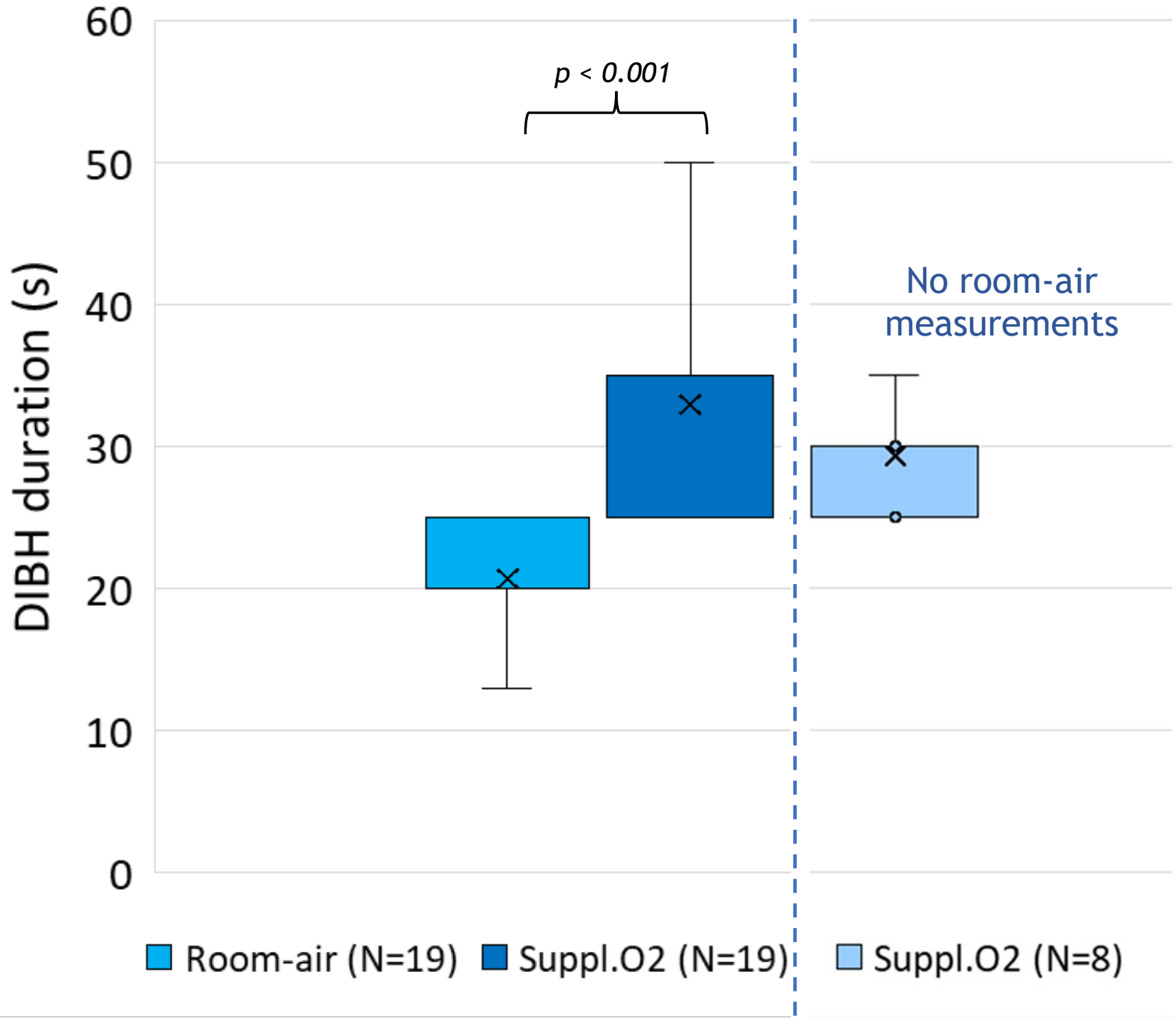
N = 19 / 27
- Room-air based

Median 20 s (range 13-25 s)
- With supplemental oxygen

Median 35 s (range 25-50 s)

N = 8 / 27
- No room-air measurements
- With supplemental oxygen

Median 30 s (range 25-35 s)



Discussion

- Risk of administration high oxygen concentrations (up to 100%) ?
  - Severe COPD (stage ‘GOLD IV’)
  - In combination with current/previous treatment with bleomycin or amiodarone

  when administered for > 6 hours (also at a few minutes a day?)

- Use *Venturi* mask to ensure exact and predictable oxygen concentrations

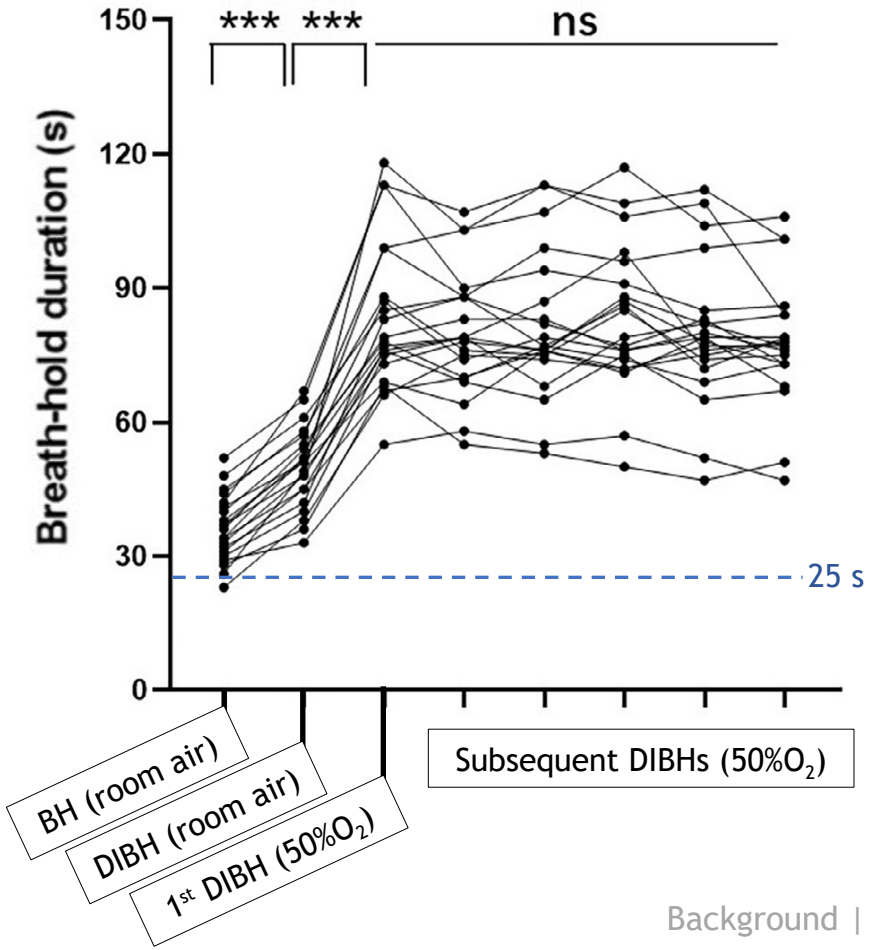
- Supplemental oxygen concentrations of 35% to 50% might be sufficient to enable (repeated) DIBHs

[2] Zhao, Pract Radiat Oncol 2024

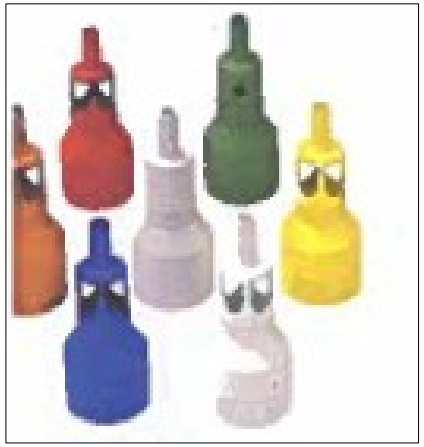
Information derived from Flexicare Intersurgical EcoLiteTM

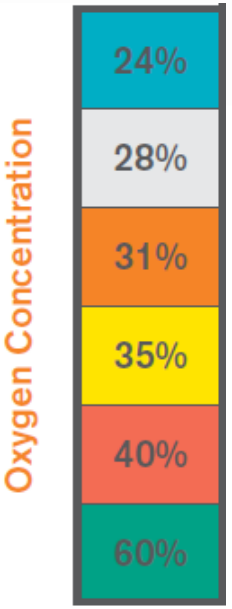
DIBH with 50%O_2 using a Venturi mask

Breath-hold duration of 21 patients undergoing RT[2]



As in previous talks
- Birmingham
- San Francisco





Conclusion

Administration of supplemental oxygen to patients with left-sided breast cancer:

- enabled them to repeatedly breath-hold for the required duration of 25 s
- even doubled DIBH durations
- did not extend treatment time slots
- did not increase the workload of RTTs
- potentially prevents treatment during free breathing

- should be administered via a Venturi mask to patients who are not able to breath-hold