CARDIAC RESPONSE TO VOLITIONAL APNEA IN UNTREATED OBSTRUCTIVE SLEEP APNEA.

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RATIONALE

- There is evidence of augmented chemoreflex activity, elevated peripheral sympathetic activity and an increased risk of arrhythmia in OSA patients (2).
- The chemoreflex plays an important role in the sympathetic and parasympathetic responses to voluntary breath-holding (1).
- Voluntary wakeful breath-holding during chronic hypoxia (elevated chemoreflex activity) results in significant bradycardia and bradyarrhythmias in healthy individuals.
- It is unclear whether voluntary breath-holding would elicit similar responses in patients with untreated OSA

We sought to investigate if:

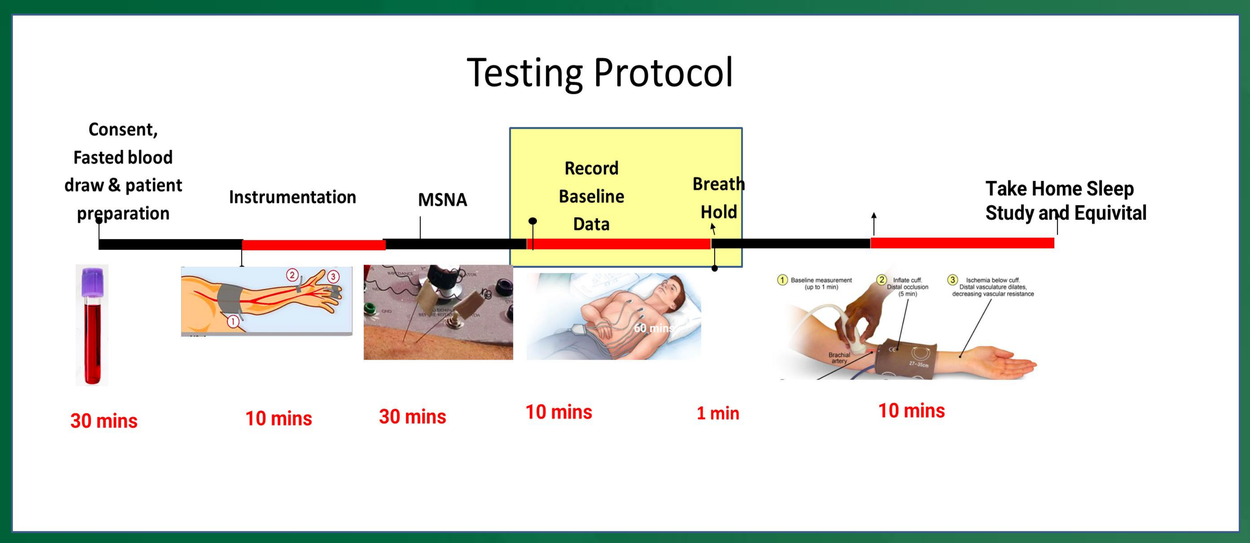
a) Voluntary, wakeful breath-holding would cause bradycardia and bradyarrhythmias in untreated OSA patients.

We hypothesized that during voluntary apnea, patients with OSA will show bradyarrhythmia and bradycardia as opposed to healthy-matched individuals.

METHODS

Participants: An observational cohort included 10 (5M/5F) untreated OSA patients and 5 (3M/2F) healthy controls with similar age, sex, and, BMI. The mean AHI for the OSA group was 13 ± 6 and & 2.4 ± 1.1 in the Control group.

Protocol: After a 10 min baseline recording, participants performed a maximal apnea at functional residual capacity. No hyperventilation or preparation was performed prior to apneas.
Heart rate and rhythm (Lead II ECG), blood pressure (photoplethysmography) were measured continuously.



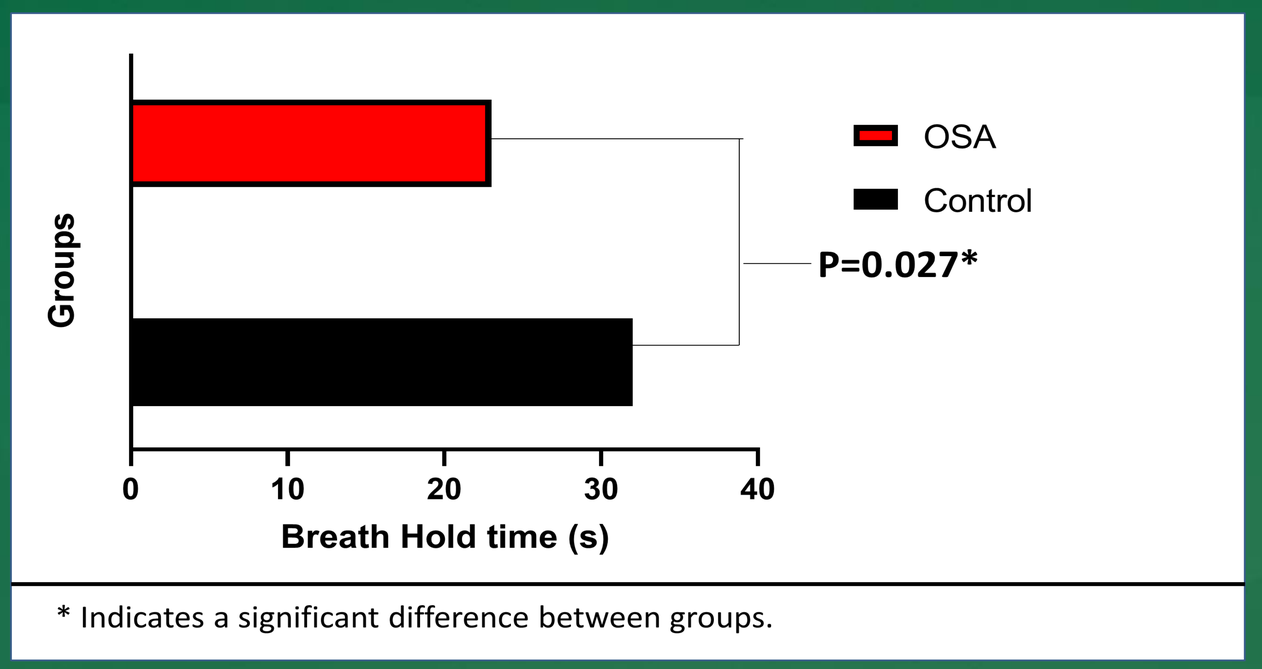
RESULTS

Table 1: Heart Rate, Blood Pressure, AHI, and, Breath Hold times in OSA and Control groups. Values presented as Mean ± SD

	OSA	*Control*
	(n=10)	**(n=5)**
AHI	13 ± 6	2.4 ± 1
Breath Hold Time (s)	23 ± 8	32 ± 7
Heart Rate (bpm) BL	70 ± 14	66 ± 15
Heart Rate (bpm) Apnea	67 ± 11	63 ± 14
Mean Arterial Pressure (mmHg) BL	96 ± 11	93 ± 3
Mean Arterial Pressure (mmHg) Apnea	102 ± 10	107 ± 17

BL- Baseline

Table 1: Heart Rate, Blood Pressure, AHI, and, Breath Hold times in OSA and Control groups.
****BL- Baseline measurements***



* Indicates a significant difference between groups.

Figure 1 Voluntary apnea durations: Apnea duration was significantly shorter in individuals with OSA when compared to individuals without OSA

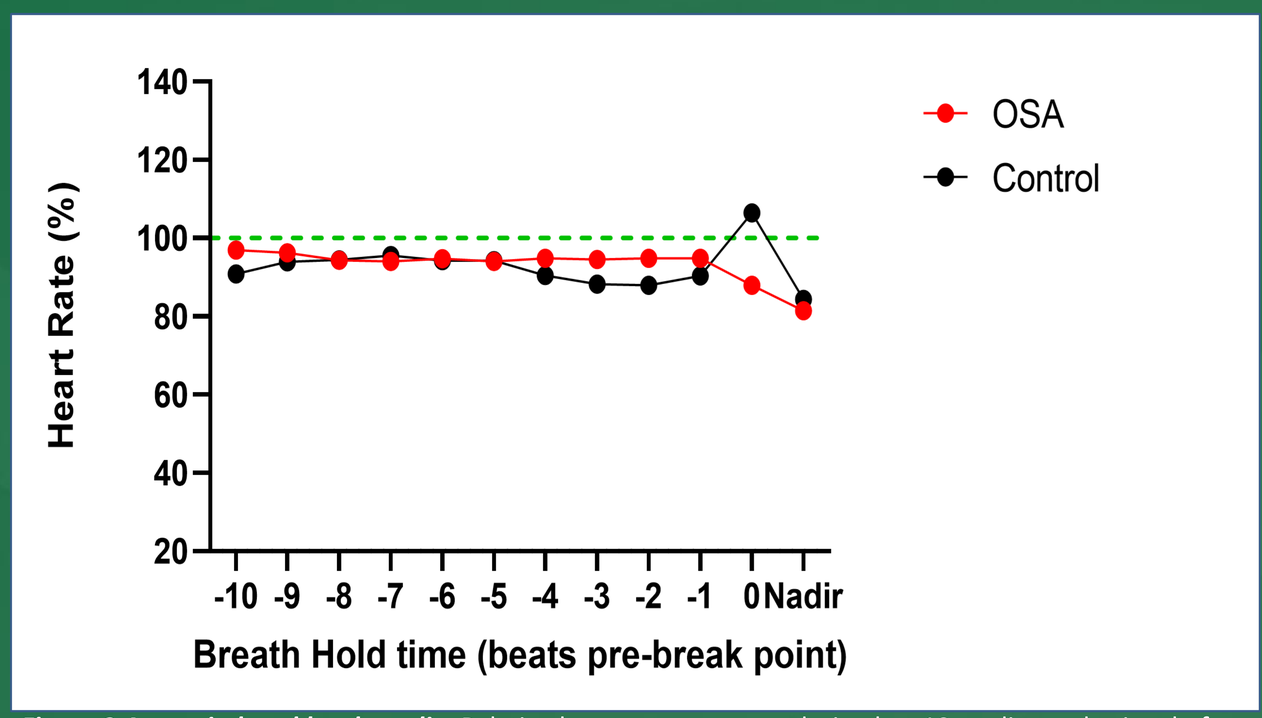


Figure 2 Apnea induced bradycardia: Relative heart rate response during last 10 cardiac cycles just before the cessation of apnea relative to free-breathing values recorded in the last minute of baseline. Nadir indicates maximal decrease in heart rate during last 10 cardiac cycles of apnea. Result were not significantly different between groups.

INTERPRETATIONS

- Volitional apnea induces a similar degree of bradycardia in individuals with OSA and in Controls.
- Our data suggest no differences in the incidence of bradyarrhythmia during volitional apnea among individuals with untreated OSA versus matched controls.
- Further participant recruitment may improve the power to detect a clinically important difference in the potentiation of bradyarrhythmia between OSA the group and the control group.
- Analyses are ongoing for MSNA and FMD outcomes.

FUNDING

This study was funded by NSERC (CDS)

LITERATURE

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