Do nasal dilator strips impact site of obstruction and severity of sleep disordered breathing during pregnancy?

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Introduction

- A greater proportion of women are entering pregnancy with chronic conditions that are pre-existing risk factors for the development or exacerbation of sleep disordered breathing (SDB), such as obstructive sleep apnea.[1]
- The association of SDB with these chronic conditions suggests a potential role for SDB in severe maternal morbidity.[2]
- The pathogenesis and the anatomical site of obstruction are not well understood in pregnant patients with SDB and are likely different from the non-pregnant population due to pregnancy related physiologic changes.
- This limited understanding may impact the development of population-specific therapeutic options.
- Work from Dr. Bourjeily's lab has shown that the level of obstruction in SDB may be proximal, rather than pharyngeal or nasopharyngeal.[3]

Study Purpose

- This project aims to elucidate the role of nasal obstruction and resistance in SDB during pregnancy using nasal dilator strips (NDS) to mechanically reduce collapsibility of the nasal vestibule.
- The impact of NDS on both conventional measures of SDB and pulse transit time (PTT), a measure of nocturnal sympathetic activation linked to arterial stiffening, are examined in this study.
- Results aim to inform the use of NDS as an adjunctive therapy in SDB during pregnancy.

Interpretation of AHI

- AHI = (#Apneas + #Hypopneas) / Number of Sleep Hours
- The AHI will be used to asses the difference in the severity of SDB with and without the use of a NDS.

AHI Score	Severity of OSA
<5	Normal
5-15	Mild
15 – 30	Moderate
>30	Severe

Participant Recruitment

Participants are screened and recruited form local community practices on the basis of the following criteria:

- Snore 3-4 week times per week
- Age of participant ≥ 18 years
- BMI ≥ 30 kg/m^2
- Singleton pregnancy

A target sample size of 54 was calculated using a two-tailed paired T-test for an effect size of 0.5.

Home Sleep Apnea Testing

Initial medical, demographic, and qualitative sleep survey information (below) is collected from participants. Participants are then instructed on the use of home sleep apnea testing (HSAT) devices and NDS.

Nights 1 and 2 occur within 48 hours.

- Night 1 – Baseline recording (4-8 hours)
- Night 2 – Repeat recording with a NDS over their nasal bridge (4-8 hours)

The NoxT3 recordings are scored by a certified polysomnography technician.

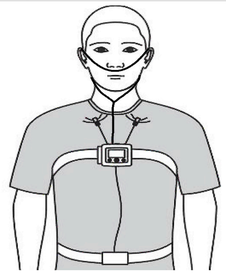

Figure 1. HSAT set-up adapted from the NoxT3 2017 User Handbook

Objective Measures

Recorded Measure	Significance
SpO2 (%)	Apnea Hypopnea Index
Nasal Flow (cmH20)	
Thorax and Abdominal RIP (μV)	Central v. Peripheral Etiology
Snore (cmH20)	Snore Index
Electrocardiogram	Pulse Transit Time (Sympathetic Activation)
Pulse	

Subjective Measures

The following surveys are used to collect information about the participant's subjective experience. Surveys also include questions assessing the bed partner's perception of their partner's sleep.

- Nasal Obstructive Symptoms Evaluation Scale (administered before and after NDS)
- Berlin Questionnaire
- Nasal Strip Trial Questionnaire

Study Progress

- A two-tailed paired T-test of all AHI's and PTT's will be run once the target sample size of 54 participants is reached.
- Qualitative data will be utilized to assess participants' perceived degree of nasal obstruction and satisfaction with the NDS. These results may allow for the validation of NDS as a placebo in future SDB studies, if no difference in AHI is found across conditions.
- If a significant difference in AHI is found across the conditions, NDS may be utilized in conjunction with CPAP for treatment of OSA during pregnancy.
- To date, 31 participants have completed the study. Preliminary AHI findings of 28 participants are shown below. 3 reports are currently being scored.

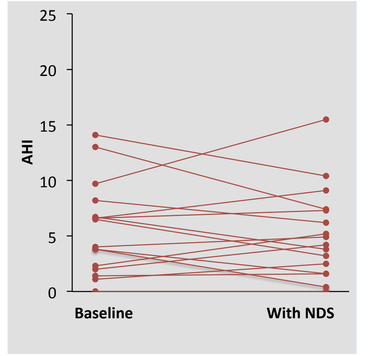

Figure 2. AHI values of 12 participants recruited in the first trimester.

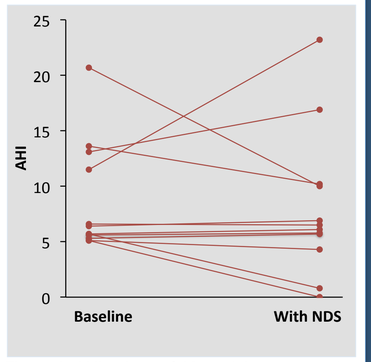

Figure 3. AHI values of 16 participants recruited in the third trimester.

References

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