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Association of body fluid distribution with obstructive sleep apnea in pregnant women with body mass index ≥ 40 kg/m^2 – A prospective observational feasibility study

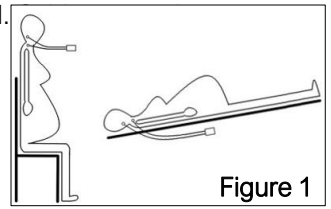
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Introduction

Obstructive Sleep Apnea (OSA) is common in women with obesity[1] and has been linked to multiple maternal and fetal morbidities[2]. Changes in segmental body water shift have been shown to be clinically relevant markers of OSA in the non –pregnant population[3]. The objective of this feasibility study was to determine the association of body fluid measurements with the severity of OSA in women with obesity.

Methods

This was a prospective, observational feasibility study of women in the third trimester of pregnancy (≥24 weeks gestation) with class III obesity (body mass index ≥ 40kg/m). Segmental neck fluid volume were measured using Bioelectrical Impedance Analysis (BIA) with electrodes placed at specific anatomical landmarks in the neck (Figure 1). The difference in neck fluid volume between sitting & Trendelenburg positions (Δ) was calculated. overnight polysomnography for diagnosis and classification of OSA. was OSA (measured by apnea-hypopnea index (AHI)). Secondary outcomes included association of OSA with rostral shift of fluid to neck with change in body position. Pearson correlation coefficient (CC) With 95% confidence interval (CI) was calculated to estimate the strength of each association.


Figure 1

Results

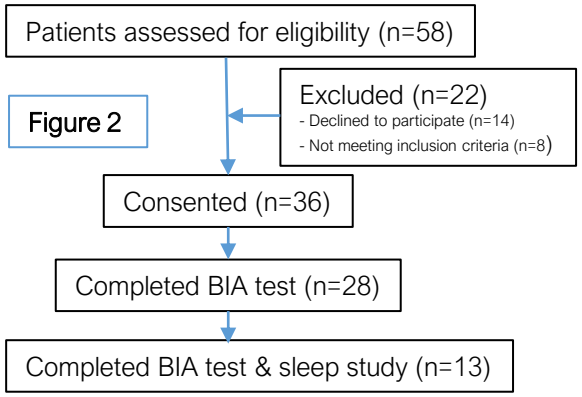


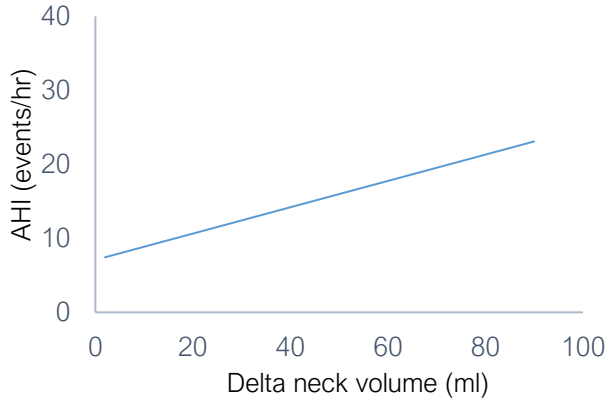
Figure 2

During a 13-week recruitment period (December 2nd 2019 to March 9th 2020), 22% (13/58) of patients assessed for eligibility completed both the BIA and sleep study (Figure 2). The mean BMI was 55.5 kg/m^2 and 77% of patients investigated were diagnosed with OSA (AHI≥5) (Table 2). There was a trend towards positive but not statistically significant association of AHI with Δ neck volume (Pearson correlation coefficient 0.344, 95% CI -0.415, 0.821, p=0.380) (Graph 1).

Table 1

Total patients	N = 13
Age (years)	34.9 (4.2)
Body Mass Index (kg/m^2)	55.5 (7.6)
Gestational Age (weeks)	27.3 (25- 28)
Δ neck volume (mL)	40.4 (25.2)
AHI (events/hour)	18.5 (21.4)
OSA (AHI ≥5)	10 (77.9%)
Mild OSA (AHI 5-14)	6 (46.2%)
Mod OSA (AHI 15-29)	1 (7.7%)
Severe OSA (AHI ≥30)	3 (23.1%)

Graph 1: Apnoea-Hypopnea Index vs. delta neck vol



Discussion

This study demonstrated the feasibility of body water assessment using BIA in women with class III obesity in the third trimester of pregnancy. We found that there is likely a positive association of the severity of OSA with rostral fluid shift into the neck. However, these results should be interpreted with caution considering our wide confidence intervals, possibly due to a small sample size. Further research is required to confirm these findings.
This is the first study to measure body water and AHI in pregnant people with class III obesity in the third trimester of pregnancy. Further studies may improve the number of patients diagnosed with OSA with early referral to sleep studies (for instance in the first trimester of pregnancy) or alternatively utilising home sleep monitors which may be used as a diagnostic workup.

References

1. Louis J et al. Perinatal outcomes associated with OSA in obese pregnant women. Obstet Gynecol. Nov 2012;120(5):1085-92.
2. Dominguez J et al. OSA in Pregnant Women: A Review of Pregnancy Outcomes and an Approach to Management. Anesth Analg. 11 2018;127(5):1167 -1177.
3. Redline S, Young T. Epidemiology and natural history of obstructive sleep apnea. Ear Nose Throat J. Jan 1993;72(1):20 -1, 24 -6.