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LARYNGOMALACIA AND OBSTRUCTIVE SLEEP APNEA IN INFANTS WITH PWS

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Introduction: Growth hormone (GH) improves tone, body composition, development, and growth in infants with Prader-Willi Syndrome (PWS). Concerns about sudden death following GH initiation and worsening obstructive sleep apnea (OSA) in children with PWS resulted in guidelines for polysomnography (PSG) evaluation before and after starting GH. We review novel evidence of laryngomalacia as a mechanism for this worsening of OSA and describe the incidence of laryngomalacia in this patient population.

Methods: A retrospective review of infants and children seen at the Seattle Children's PWS clinic between October 2014 and May 2020 who had undergone polysomnography (PSG) before and after growth hormone initiation was performed. Findings on otolaryngology evaluation via flexible fiberoptic laryngoscopy (FFL) or drug-induced sleep endoscopy were reviewed to characterize obstruction, diagnosis of laryngomalacia, and response to surgical intervention.

Results: A total of 28 cases were identified. 12 (41%) were evaluated with FFL between ages 4 and 21 months old (median 5) for noisy breathing, worsening or persistent OSA, or dysphagia. Out of these, 9 (75% of FFL, 31% of total) were diagnosed with laryngomalacia. Children with laryngomalacia were more likely to have worsening of OSA after GH initiation. Surgical interventions including supraglottoplasty or adenotonsillectomy led to improvement in OSA in 86% of children who had worsening after GH initiation.

Conclusion: Worsening OSA after GH initiation is seen in 38% of patients with PWS. Laryngomalacia is a common comorbid condition and more frequent in those with worsening OSA after GH initiation that is amenable to targeted surgical intervention.

Support (if any):

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OUTCOMES OF SICKLE CELL CRISIS IN RELATION TO PEDIATRIC OBSTRUCTIVE SLEEP APNEA IN THE UNITED STATES: A US POPULATION COHORT STUDY

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Introduction: This study aimed to quantify the impact of obstructive sleep apnea (OSA) on the mortality, morbidity, and resources utilization among children admitted with Sickle cell crisis (SCC)

Methods: This is a retrospective analysis using the 2016 and 2017 National Inpatient Sample Database. The Inclusion Criteria was a principal Diagnosis of SCC and age <18 years. OSA, as a Secondary Diagnosis, was identified using the appropriate ICD-10 CM codes. The Primary Outcomes were Inpatient Mortality, and secondary outcomes were: In-Hospital Length of Stay (LOS), Total hospitalization Cost, Blood transfusion (BT) requirement, and a requirement for Invasive mechanical ventilation (IMV). We used Multivariate Linear/ logistic regression to adjust for confounders including age and sex.

Results: Out of 36,484 children with SCC included in the study, 1450 children had OSA (SCC+OSA). SCC-OSA and SCC+OSA groups did not differ in gender, household income, and hospital characteristics, but did so in age (11.3 vs 12.4; $p < 0.001$). OSA was most common in the age group of 13–18 (54%) and lowest in 0–4 (2.4%). Compared to SCC-OSA, the SCC+OSA cohort had significantly higher odds of mortality

(adjusted OR= 11.9, [95% Confidence Interval: 1.02- 138.8], $p=0.04$). Additionally, SSC+OSA cohort was associated with increased odds of IMV (aOR=5.24 [CI: 1.84 – 14.8], $p=0.002$), longer LOS (adjusted mean difference (aMD)=0.67 [CI-0.32 – 1.02], $p < 0.001$), and higher hospitalization Cost (aMD=2818.76 [CI-1680- 4157], $p < 0.001$). No difference in BT (aOR=0.94 [CI: 0.68 – 1.29], $p=0.71$) was noted.

Conclusion: This study demonstrates that the presence of OSA is associated with detrimental outcomes in SSC with higher in-hospital mortality, higher morbidity (Invasive mechanical ventilation rate), and higher resource utilization (LOS, total hospitalization cost). More attention to the screening, early diagnosis, and appropriate treatment of OSA is imperative to improve health outcomes in children with sickle cell disease.

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IMPACT OF ADENOTONSILLECTOMY ON GROWTH TRAJECTORIES IN PRESCHOOL CHILDREN WITH MILD OBSTRUCTIVE SLEEP APNEA

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Introduction: Adenotonsillectomy forms part of first-line management for pediatric obstructive sleep apnea (OSA). In nonrandomized studies of preschool-aged children, it is associated with postoperative weight gain. Being overweight or obese in childhood is a predictor of cardiovascular and metabolic disease in later life. Using longitudinal data from a multicenter randomised controlled trial, we assessed the impact of adenotonsillectomy on growth trajectory in preschool-aged children with mild-moderate OSA. Secondary aims were to assess the influence of social factors and baseline polysomnography parameters on growth trajectory.

Methods: A total of 190 children (aged 3–5 years) with obstructive apnea hypopnea index ≤ 10 were randomly assigned to early (within 2 months) or routine (12-month wait) adenotonsillectomy. Anthropometry and polysomnography were performed at baseline, 12-month and 24-month timepoints for 126 children. Social risk factors were recorded using a questionnaire. Baseline characteristics were compared using a Mann-Whitney or t-test for continuous variables, and Fisher's exact test for categorical variables. Data were analyzed using linear mixed modelling.

Results: Demographic and polysomnographic parameters were similar between groups at baseline. Baseline body mass index (BMI) z-score was 0.52 for both groups. For BMI z-score, there was a significant increase in the early surgery group between 0 and 12 months (0.4, 95%CI 0.1–0.8) but not from 12–24 months. For the routine surgery group, there was a significant BMI z-score increase following surgery between 12 and 24 months (0.45, 95%CI 0.1–0.8), but not from 0–12 months. Final BMI z-score was similar between the two groups. Findings for weight-for-age z-score were similar to the abovementioned findings for BMI z-score. Height-for-age z-score was not significantly different between different timepoints or intervention groups. Children with an unemployed primary income earner had a higher BMI z-score than those with a full-time employed income earner. No other social risk or polysomnography parameters were statistically significant.

Conclusion: This study provides randomized controlled trial evidence of notable weight increase in preschool children with milder spectrum OSA that occurs in the months immediately following adenotonsillectomy. For children undergoing adenotonsillectomy, counselling regarding nutritional intake and exercise alongside weight

monitoring should be considered, especially for those already at risk of becoming overweight or obese.

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ASSESSMENT OF SLEEP DISORDERS IN CHILDREN AND ADOLESCENTS WITH OBESITY

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Introduction: When studying the inherent aspects of sleep it is important to assess how the quality and quantity of sleep in the last two decades may be one of the reasons for the increase in childhood obesity, which has been growing rapidly worldwide. This study aims to assess the presence of sleep disorders in overweight children and adolescents. **Methods:** A descriptive study was conducted with data collection from 43 patients between 6 and 13 years old diagnosed as overweight. They were patients of a specialized service for children and adolescents with obesity that is part of the Hospital de Clínicas of the Federal University of Paraná, located in Curitiba, Brazil. To investigate the presence of sleep disorders, the Sleep Disturbance Scale for Children (SDSC) questionnaire was administered. The factors assessed were: Disorders of Initiating and Maintaining Sleep, Sleep Breathing Disorders, Disorders of Arousal/nightmares, Sleep Wake Transition Disorders, Disorders of Excessive Somnolence and Sleep Hyperhydrosis.

Results: The mean age of the patients that took part in the research was 10 years and 7 months (± 1.95). The mean BMI of the participants was 29.57 kg/m² (± 4.38), the majority being diagnosed with obesity. The sum of all SDSC factors demonstrated the presence of pathological sleep in 58.1% (25) of the sample, whereas 51.2% (22) of the patients had Sleep Breathing Disorders and 58.1% (25) had the Sleep Wake Transition Disorder.

Conclusion: The present study demonstrated the presence of sleep disorders in overweight children and adolescents. As for Sleep Respiratory Disorder, a situation has already been advocated in the current literature for this audience. In relation to the Sleep-Wake Transition Disorder and pathological sleep, further research is needed to prove the presence of the disorder in other groups studied. Here is the suggestion that future research be done with subjective and objective data collection on sleep within a larger sample, in order to confirm the association between sleep disorders and childhood obesity.

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UTILIZATION OF PEDIATRIC SLEEP QUESTIONNAIRE TO SCREEN FOR OBSTRUCTIVE SLEEP APNEA IN A DIFFICULT-TO-TREAT ASTHMA COHORT

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Introduction: Early detection and management of obstructive sleep apnea (OSA) could improve asthma control in children with difficult-to-treat (DTT) asthma. The purpose of this study was to assess the effectiveness of the pediatric sleep questionnaire (PSQ) to screen for OSA in children with DTT asthma, and to compare clinical characteristics between those with positive and negative PSQ scores.

Methods: A prospective study of 81 children with DTT asthma was completed from 2015–2017. The PSQ, Epworth sleepiness scale (ESS), Pediatric Quality of Life (PQL), and the academic performance questionnaires (APQ) were administered during clinic visits. Polysomnography (PSG) was recommended for PSQ score >0.33 . Medical records were reviewed for asthma clinical characteristics. The cohort was separated into positive (PSQ >0.33) and negative PSQ score (PSQ ≤ 0.33) groups for analysis.

Results: The mean age of the cohort was 11.3 \pm 4.5 years and the mean body mass index was 22 \pm 7.6 kg/m². Sixty-two percent were male and 68% were African-American. Forty-nine (53%) subjects had positive PSQ (0.5[0.4 – 0.7]). The positive group had higher ESS score (10.5[8 – 13] vs. 6[2 – 8], $p < 0.0001$) and lower total PQL score (58.7[47.8–72.8] vs. 79.4[70.7 – 87], $p < 0.0001$) than the negative group. There was no difference between APQ scores ($p = 0.07$). The positive group had lower asthma control test (ACT) scores than the negative group (17.5[15 – 20.5] vs. 21[19 – 22], $p < 0.0001$). Furthermore, the positive group was more likely to have gastroesophageal reflux (OR: 3.97, 95%CI: 1.7 to 9.1, $p = 0.0018$). Twenty-nine (59%) subjects in the positive group had subsequent PSG, and 17 (58.6%) subjects were diagnosed with OSA (14 mild OSA, 1 moderate OSA, 2 severe OSA). The mean obstructive index in the positive group was 3 \pm 5.5 events/hour. There was 1 subject with central apnea and alveolar hypoventilation. Of the 17 subjects with OSA, all received treatment with nasal steroids, 3 were treated with non-invasive positive pressure ventilation, and 4 had surgical intervention.

Conclusion: Children with DTT asthma who have positive PSQ have higher degree of daytime sleepiness, lower quality of life and worse asthma control. The positive group was more likely to have GERD, which may suggest a relationship between nighttime asthma symptoms and OSA. Further studies are needed to evaluate the effects of OSA treatment on asthma control.

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ROLE OF X-RAY SOFT TISSUE NECK IN CHILDREN WITH OBSTRUCTIVE SLEEP APNEA WITH A PREVIOUS HISTORY OF ADENOTONSILLECTOMY

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Introduction: Adenoid recurrence in children after adenotonsillectomy can be an etiology for obstructive sleep apnea (OSA). The aim of this study was to assess the role of x-ray soft tissue neck (XR-STN) in evaluating adenoid recurrence from a sleep physician perspective and to assess the polysomnographic findings of pre and post revision adenoidectomy.

Methods: This was a single center retrospective study that included children <18 years old with a history of adenotonsillectomy who underwent sleep study that confirmed the diagnosis of OSA and had XR-STN to evaluate for adenoidal tissue recurrence at the University of Louisville/Norton Pediatric Sleep Disorders clinic from July 2012 to September 2020. XR-STN level of adenoidal obliteration, baseline and post revision adenoidectomy PSG data were analyzed.

Results: A total of 160 subjects were included in the study with a mean age of 9.71 \pm 3.5 years, 59.4% were male, 54.4% were Caucasians, and the mean z-score was 1.77 \pm 1.15. XR-STN was normal in 39.4% of the subjects and it showed mild, moderate, and complete adenoidal obliteration in 20.6%, 32.5% and 7.5% of the subjects, respectively. Multiple regression analysis showed that the total AHI, the mean for