PREDICTORS OF OSA IN PATIENTS WITH AND WITHOUT SICKLE CELL DISEASE

Helene Dabbous, MD[1], W. Craig Kemper, MD[1], Derek Sheen, MD[2], Claire A. Abijay, MD[1], Romaine F. Johnson, MD, MPH[1,2], Ron B. Mitchell, MD[1,2]

Children's Medical Center Dallas[1], University of Texas Southwestern Medical Center[2]

INTRODUCTION

Obstructive sleep apnea (OSA) has a higher prevalence in patients with sickle cell disease (SCD), when compared to the general population.[1] Higher rates of adenotonsillar hypertrophy have also been seen in children with SCD.[2] Further studies are needed to identify predictors of OSA in patients with and without SCD.

PURPOSE

The purpose of this study was to identify predictors of pediatric OSA, severe OSA, and residual OSA in children with SCD and without SCD using a case-control study design.

METHODS

Following IRB approval, prospectively collected data in consecutive patients treated with tonsillectomy (with or without adenoidectomy) were reviewed. A total of 276 children were included in the study, 187 without SCD and 89 with SCD. Data collected on patient demographics, polysomnography data, and surgical data was analyzed to identify predictors of OSA, severe OSA, and residual OSA.

A multiple logistical regression analysis was performed to determine if SCD is associated with preoperative severe OSA and residual OSA, while controlling for potential confounding variables. The final models included variables where P < .05 and were validated with Jackknife regression. The goodness of fit was determined with visual inspection and the Pearson Chi-squared test.

	No SCD	SCD	Total	P-value
n (%)	187 (67.8)	89 (32.2)	276 (100.0)	
Age pre PSG, mean (sd)	6.8 (3.9)	7.0 (3.8)	6.9 (3.9)	.641
BMI Percentile, mean (sd)	77.3 (30.8)	50.5 (31.5)	69.0 (33.4)	<.001
Obese	97 (52.7)	11 (13.3)	108 (40.4)	<.001
OA Events, mean (sd)	51.3 (76.4)	25.0 (48.9)	42.8 (69.7)	.003
OH Events, mean (sd)	84.7 (78.1)	56.9 (69.7)	75.7 (76.5)	.005
OAI, mean (sd)	9.7 (21.5)	4.0 (9.9)	7.8 (18.8)	.020
OHI, mean (sd)	14.6 (21.8)	8.5 (10.5)	12.7 (19.1)	.013
oAHI (Obstructive), mean (sd)	24.2 (37.8)	12.6 (17.6)	20.4 (33.1)	.006
CAI (Central), mean (sd)	0.7 (1.8)	0.4 (0.5)	0.6 (1.5)	.058
Total AHI, mean (sd)	22.8 (27.2)	12.9 (17.6)	19.6 (24.9)	.002
Severe OSA	127 (67.9)	37 (41.6)	164 (59.4)	<.001

Table 1. Preoperative PSG by Sickle Cell Disease

	No SCD	SCD	Total	P-value
n (%)	73 (67.0)	36 (33.0)	109 (100.0)	
Time Surg to post PSG, mean (sd)	238.2 (205.2)	607.6 (769.9)	361.3 (502.5)	<.001
OA Events, mean (sd)	7.8 (15.8)	12.9 (45.0)	9.5 (28.9)	.388
OH Events, mean (sd)	21.3 (28.5)	19.9 (28.3)	20.9 (28.3)	.810
OAI, mean (sd)	1.5 (3.5)	3.8 (16.2)	2.2 (9.7)	.261
OHI, mean (sd)	3.4 (4.5)	4.5 (8.7)	3.8 (6.2)	.405
oAHI, mean (sd)	4.8 (7.1)	8.1 (23.7)	5.9 (14.8)	.270
CAI, mean (sd)	0.4 (0.5)	0.3 (0.6)	0.4 (0.5)	.403
Total AHI, mean (sd)	5.2 (7.0)	8.4 (24.2)	6.2 (15.0)	.302
Severe OSA	51 (70)	23 (63.9)	74 (67.9)	.530

Table 2. Postoperative PSG by Sickle Cell Disease

RESULTS

The study found that children with SCD had a lower odds of severe OSA (AHI > 10) compared to those without SCD (OR 0.33, 95% CI 0.19-0.57, P<.001). Tonsil hypertrophy was found to be a predictor of severe OSA in the preoperative group (OR 1.91, 95% CI 1.13-3.24, P=.016). Female gender was found to be a predictor of severe OSA in the postoperative group (OR 3.03, 95% CI 1.29-7.08, P=.011). No predictors were found for residual OSA (AHI < 5) after treatment.

CONCLUSIONS

This study found that children with SCD have a lower odds of severe OSA preoperatively, tonsil hypertrophy is a predictor of severe OSA preoperatively, and female gender is a predictor of severe OSA postoperatively. It also found no predictors for residual OSA after treatment. These findings can help identify children with SCD at higher risk for OSA and predict which children may have a higher risk of complications from surgery.

REFERENCES

1. Rosen CL, Debaun MR, Strunk RC, et al. Obstructive sleep apnea and sickle cell anemia. Pediatrics. 2014;134(2):273-281.

2. Salles C, Ramos RT, Daltro C, Nascimento VM, Matos MA. Association between adenotonsillar hypertrophy, tonsillitis and painful crises in sickle cell disease. J Pediatr. 2009;85(3):249-253.

Contact: william.kemper@bcm.edu