

Understanding sleep disordered breathing in newborns and toddlers

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Association Between Referral Reason and Central Sleep Apnea

| Reason for Referral | Central Sleep Apnea (N = 15) | P-Value |
|----------------------------------|------------------------------|---------|
| Suspected Sleep Apnea (N=12) | 9 (75%) | 0.400 |
| No Suspected Sleep Apnea (N=11) | 6 (54.5%) | |
| Large Tonsils (N=1) | 1 (100%) | 1.000 |
| Normal Tonsils (N=22) | 14 (63.5%) | |
| Snoring (N=6) | 3 (50%) | 0.621 |
| No Snoring (N=17) | 12 (70.6%) | |
| GERD (N=2) | 1 (50%) | 1.000 |
| No GERD (N=21) | 14 (66.7%) | |
| Pulmonary Hypertension (N=3) | 3 (100%) | 0.526 |
| No Pulmonary Hypertension (N=20) | 12 (60%) | |

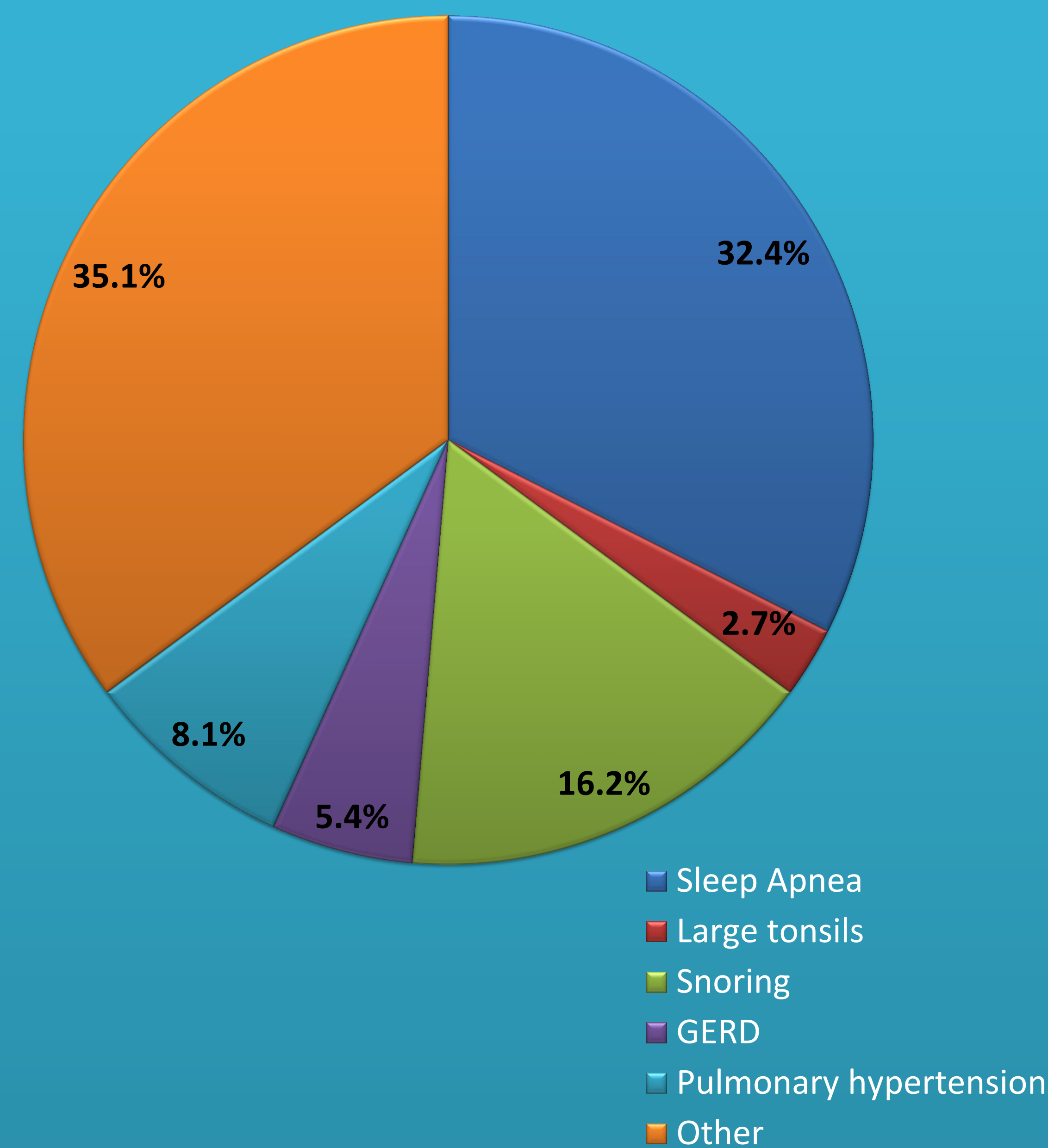
Introduction

While sleep disordered breathing (SDB) is well understood in children older than 3 years of age, little is known about the prevalence of SDB in children less than 2 years of age. Usually, SDB coincides with enlarged adenoids and tonsils. However, children less than 2 years of age are less likely to suffer from SDB due to adenotonsillar hypertrophy. It is hypothesized that craniofacial conditions and other genetic syndromes, including Downs Syndrome, are the most common factors that lead to SDB in newborns and toddlers. To properly assess the reasons for referral, the etiologies of SDB, and the patterns of SDB among children under 2 years of age, we will conduct a retrospective chart review of all the children that are referred to a polysomnography laboratory at CHEO.

Association Between Referral Reason and Obstructive Sleep Apnea

| Reason for Referral | Obs. Sleep Apnea (N = 13) | P-Value |
|----------------------------------|---------------------------|---------|
| Suspected sleep Apnea (N=12) | 6 (50%) | 0.680 |
| No Suspected Sleep Apnea (N=11) | 7 (63.6%) | |
| Large Tonsils (N=1) | 0 (0.0%) | 0.435 |
| Normal Tonsils (N=22) | 13 (56.5%) | |
| Snoring (N=6) | 3 (50%) | 1.000 |
| No Snoring (N=17) | 10 (58.8%) | |
| GERD (N=2) | 2 (100%) | 0.486 |
| No GERD (N=21) | 11 (52.4%) | |
| Pulmonary Hypertension (N=3) | 1 (33.3%) | 0.560 |
| No Pulmonary Hypertension (N=20) | 12 (60%) | |

Reasons of Referral for Sleep Study



Other specified indications included the percentage of respiratory pauses, hypoventilation, congestion, high AHI, laboured breathing, chronic lung disease, laryngomalacia, nocturnal desaturations, periodic breathing and short pauses in breathing followed by arousals.

Conclusion

Although specific symptoms do not distinguish the type of sleep apnea (obstructive vs. central), children referred for evaluation of SDB all had sleep apnea. A polysomnography is, therefore, warranted for any child < 2 years with symptoms that are suspicious for SDB.

Knowledge of the type of SDB, whether obstructive or central, is crucial for choosing the correct treatment option. Children with obstructive sleep apnea are more likely to be treated with surgery, whereas, children with central sleep apnea are more likely to be treated with oxygen. Thus, although it may be difficult to determine the type of SDB by solely analyzing symptoms, using a polysomnography test will provide definitive results.

The data from this study is, however, preliminary data that will be further analysed with more patients. The use of a larger sample size may provide different conclusions or it may further strengthen and verify the conclusions of the preliminary results.

Methods

This study is a retrospective chart review of the population of children that have been referred to the polysomnography laboratory at CHEO. Subjects were identified through sleep laboratory records and included in the study if they were 2 years old or younger at the time of referral, between 2010 to 2012. Variables measured included detailed sleep study results, anthropometry, and parental severity and symptoms. Children were considered to have obstructive sleep apnea if they had an obstructive apnea index ≥ 1 event/hour and/or obstructive apnea hypopnea index > 2 events/hour. Those with a central apnea index ≥ 5 events per hour were considered to have central sleep apnea. Data was stored on the RedCAP database. Results are provided for 23 out of 170 patients as preliminary results.

Summary Statistics

| | Obstructive Sleep Apnea N = 13 (56.5% out of 23) | Central Sleep Apnea N = 15 (65.2% out of 23) |
|--|---|---|
| Apnea-Hypopnea Index(events/hour); median (IQR) | 3.0 (0.40, 14.3) | 3.0 (1.0, 13.7) |
| Lowest O ₂ saturation (%); median (IQR) | 84.1 (80.0, 89.5) | 80.5 (71.8, 84.1) |
| Highest CO ₂ (mmHg); median (IQR) | 46.0 (40.0, 58.5) | 43.0 (38.4, 60.0) |

Results

Significant preliminary results are listed below:

- 23/23 (100%) of children undergoing a polysomnography have sleep disordered breathing
- 13/23 (56.5%) of children have obstructive sleep apnea
- 15/23 (65.2%) of children have central sleep apnea
- 5/23 (21.7%) of children have both obstructive and central sleep apnea

It was found that all children who were referred for a PSG had sleep disordered breathing. More children had central sleep apnea, compared to obstructive sleep apnea. In addition, it was found that five children in the study had both forms of sleep apnea.

Acknowledgements and Reference



Acknowledgements

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References

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