Respiratory/Sleep Disordered Breathing

William Walker, MD, Chair
Iris Perez, MD
Definitions

“SDB is highly prevalent, under recognized, under reported and under treated”

Central
• Central sleep apnea (CSA) is defined by the cessation of air flow without respiratory effort. CSA is relatively uncommon, as compared with OSA. However, considerable overlap exists between CSA and OSA, from the standpoint of pathogenesis as well as disease manifestations. (Respir Care. 2010 Sep; 55(9): 1168–1178.)

Obstructive:
• OSA is defined by the American Thoracic Society (ATS) as “a disorder of breathing during sleep characterized by prolonged partial upper airway obstruction and/or intermittent complete obstruction (obstructive apnea) that disrupts normal ventilation during sleep and normal sleep patterns.” (Epi of Ped OSA)
Outcomes

- **Primary**: Improve recognition of signs and symptoms of sleep disordered breathing across the lifespan, recognizing that symptoms important for its recognition in infants will be different than in adults.

- **Secondary**: Implement a strategy to identify sleep disordered (SDB) in the clinical setting through a reliable screening method (not currently available) that improves appropriate referral for additional appropriate assessment (polysomnography).

- **Tertiary**: Minimize the adverse impact of unrecognized SDB on physical well-being (including sudden, unexplained death) and neurocognitive function.
Clinical Questions

1. Is there any predictable sequence to cranial nerve dysfunction (is eating affected before facial weakness and/or respiratory regulation), and each child different?

2. Is there any anatomic (imaging) or physiologic marker that identifies children at greatest risk for SDB?

3. Does any observed sign/symptom predict a greater need for specific interventions (shunting, foramen decompressions)?
Prenatal/Infancy (through age 1 year)

Guidelines

1. Have a low threshold for assessment of SDB in infants with evidence of other cranial nerve dysfunction - poor feeding, respiratory distress, facial weakness / tongue fasciculations

2. There is insufficient evidence to support routine sleep studies on every infant with a NTD (I think there are, however, centers doing this)

3. There is not sufficient evidence to suggest that the need for a specific intervention being required or not being required (shunt, decompression) that can be based solely the results of a sleep study.

4. Do not presume that specific MR findings either confirm or rule out SDB as a diagnosis in the individual child.

5. Discuss sleep disordered breathing with parents and care providers so they can better observe for early symptoms or changes
Toddler (1-3 years)

Same as infant
Preschool (3-5 years)

Clinical Questions

1. Is there a sufficiently sensitive and specific method (questionnaire, test before polysomnography) that would support routine screening of children with NTD for SDB?

2. Is there a clinical profile (signs, symptoms, other risk factors like obesity, hypertension) that would warrant a higher priority referral?
Preschool (3-5 years)

Guidelines:

1. Recognize the symptoms of SDB in children (mouth breathing, a history of delayed growth, features of inattention and hyperactivity) are different compared to adults (snoring nor excessive daytime sleepiness).

2. Providers should ask about questions related to sleep quality, quantity and other possible symptoms at every visit (at least annually) Screening questionnaires for SDB in children may not be sensitive or specific enough for clinical settings (have been used in research settings with some success) Changes in respiratory status / function should be evaluated further as NTD is not a progressive disorder.

3. Discuss sleep disordered breathing with parents and care providers so they can better observe for early symptoms or changes
School Age

Same as Preschool
Clinical Questions:
1. Are asymptomatic individuals with NTD really asymptomatic or are they only unrecognized?
2. What is the effect of SDB on morbidity and mortality?
Teenage

Guidelines

1. Because patients are unlikely to discuss sleep related symptoms spontaneously with a primary care provider, these should be queried at each visit (at least annually)

2. Recognize clinical findings that may either contribute to or be the result of sleep disordered breathing: hypertension, obesity.

3. Improve patients’ awareness of this condition, its presentation and its adverse impact on quality of life.
Adult

Same as Teenage
Research Gaps

1. Is the frequency of or reasons for sleep disorders in the NTD population truly greater / different than the general population?
2. Are these differences related to the Chiari malformation and / or brain stem dysfunction?
3. Does unrecognized sleep disordered breathing contribute to the neurocognitive profile / decline in individuals with a NTD?
References

- Respir Care. 2010 Sep; 55(9): 1168–1178
- Epi of Ped OSA
- Survey of Sleep Disturbances in Children (Gen Ped Clinics J Peds 2002)
- PSQ Sleep Medicine 2000
- Rx of SDB in MM Ped Pulm 2000
- Developmental Medicine & Child Neurology 1999, 41: 40–43
- Hays / McLaughlin DMCN
- Patel JNS
- J PEDIATR 1986;109:631-4
- J PEDIAIR 1989;115:898-903
References

• Developmental Medicine & Child Neurology 2010, 52:749–753
• Developmental Medicine & Child Neurology 1999, 41: 40–43
• Sleep Medicine 1 (2000) 21-32
• Peds Int
• Peterson Wolraich
• Pediatrics 2001 (Objective Sleep Measures)
• Recent publication by USPSTF (JAMA 2017)