Obstructive Sleep Apnea (OSA)

Guideline developed by Supriya Jambhekar, MD, in collaboration with the ANGELS team. Last revised on April 12, 2017.

Key Points

- Obstructive Sleep Apnea (OSA) is characterized by upper airway obstruction of varying severity during sleep.
- OSA is associated with undesirable adverse effects include inattention and behavior issues in children.
- OSA is more common in certain populations of children e.g., obese, children with neuromuscular diseases, and craniofacial syndromes.
- Evaluation of OSA includes detailed history taking and physical examination.
- The overnight polysomnogram is the gold standard for diagnosis, but may not be necessary in children in clear-cut symptoms of OSA, if surgical options are easily available.
- Management options include medical management in mild cases without significant daytime symptoms, surgical options, positive airway therapy, and tracheostomy.
- Children with OSA should be followed clinically for resolution or recurrence of symptoms.

Preface

Obstructive sleep apnea (OSA) occurs in 1.2-5.7%[1] of children and is known to be associated with undesirable adverse effects such as poor school performance, behavior problems, and inattention. These guidelines are intended to provide a resource for healthcare providers taking care of children on a regular basis to prompt early recognition and guide evaluation, diagnosis, and treatment of OSA in order to prevent adverse effects.

Definition, Assessment, and Diagnosis

Definition

- Obstructive sleep-disordered breathing describes a spectrum of abnormal breathing patterns during sleep characterized by snoring and increased respiratory effort.[2] Depending on the severity of upper airway obstruction, these breathing patterns may range from primary snoring to upper airway resistance syndrome, obstructive hypoventilation, and obstructive sleep apnea.[2]
- Obstructive sleep apnea is defined as a disorder where breathing during sleep is abnormal either due to prolonged partial obstruction of the upper airway (obstructive hypopnea) and/ or intermittent episodes of incomplete upper airway obstruction(obstructive hypopnea) that affects ventilation or sleep quality adversely.[13]

Assessment

- History
    - The first step in evaluation is early identification of the condition. It is essential that caregivers specifically ask for presence of habitual snoring (snoring for at least 3 nights/ week) at all health maintenance visits.[2]
    - There should be a higher degree of suspicion in children who are predisposed to OSA, i.e., children with adenotonsillar hypertrophy, obesity, craniofacial anomalies, neuromuscular syndromes including Down syndrome, history of prematurity, or family history of OSA.[2]
    - If history of snoring is present, then more detailed history for presence of additional symptoms suggestive of OSA, i.e., presence of labored breathing, observed intermittent pauses, snorts, or gasps, sleeping in a seated position/ with neck hyperextended, witnessed cyanosis, and disturbed sleep, should be sought. The caregiver should also get history suggestive of possible OSA- related morbidity, i.e., daytime neurobehavioral problems, daytime sleepiness, nocturnal enuresis (especially secondary), neurocognitive impairment, learning problems, recent worsening of school performance, conduct disorder, and morning headaches.[4]
- Examination – patients should be examined carefully to look for tonsillar hypertrophy, adenoid facies, micrognathia/ retrognathia, high arched palate, failure to thrive, and hypertension.

Diagnosis

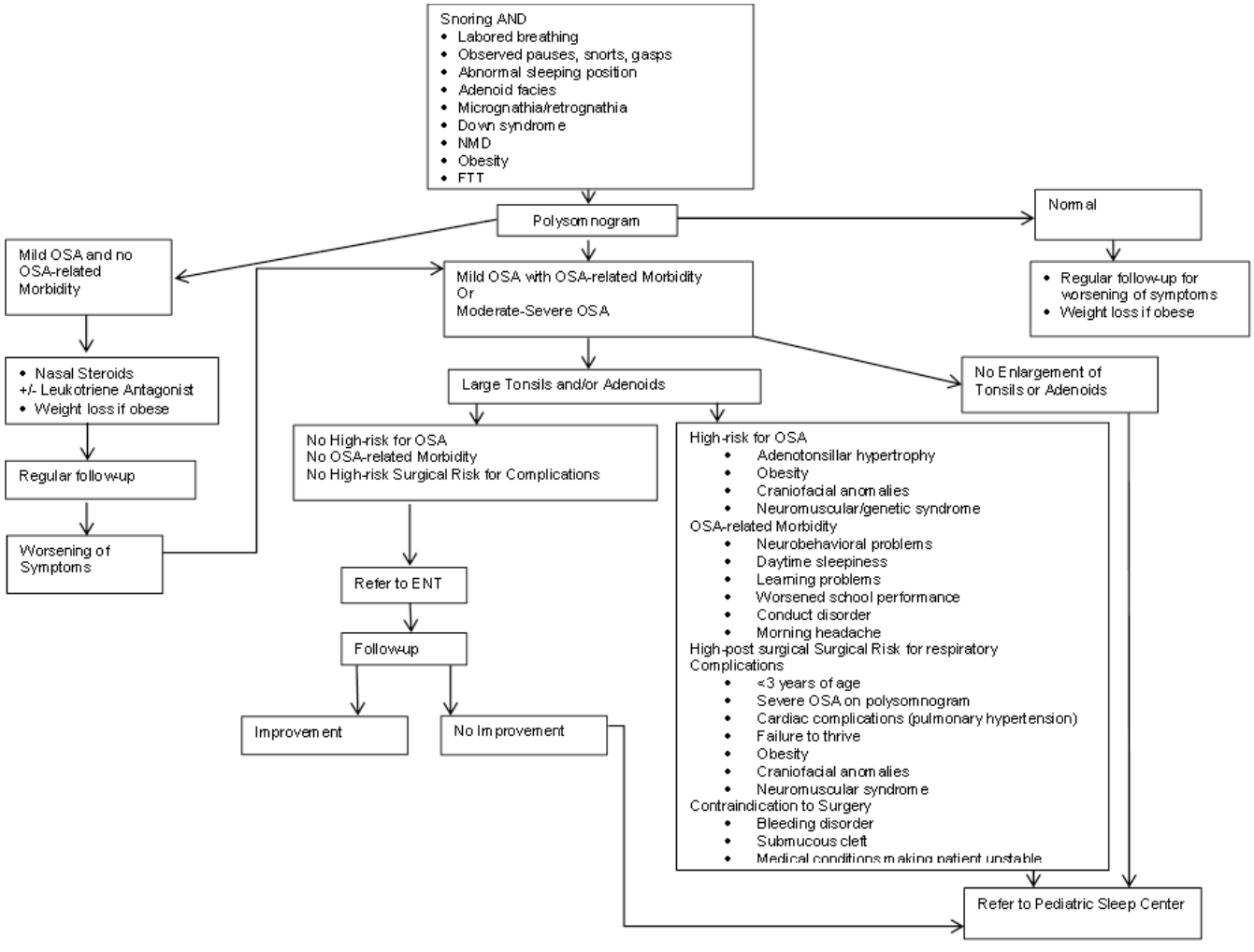
- The “gold standard” for diagnosis is the overnight polysomnography (PSG).
- The apnea–hypopnea index (mean number of central + mixed + obstructive apneas and hypopneas per hour of total sleep) (AHI) is the most frequently used PSG index for characterizing the severity of upper airway obstruction.[5]
    - This is a noninvasive test that measures multiple physiologic functions through the night, typically including EEG for sleep staging, pulse oximetry, oronasal airflow, abdominal and chest wall movements, end tidal carbon dioxide levels, and video recording.[3]
    - Specific pediatric measuring and scoring criteria should be used.[3]
    - Polysomnography will demonstrate the presence or absence of OSA as well as the severity of OSA, which is helpful in planning treatment and in postoperative short- and long-term management.[2]
    - Based on AHI in PSG, OSA can be classified as mild (AHI 1-5/hr), moderate (AHI 5-10/hr), and severe (AHI >10/hr).
- AAP recommends that all children with suspected OSA should get a PSG, and if PSG is not

available, the patient should be referred to a sleep specialist.

- Alternative testing options include nocturnal video recording, nocturnal oximetry, daytime nap polysomnography, or ambulatory polysomnography. Nocturnal video recordings are limited as they give only a visual impression of respiratory difficulty and no further details of the severity of the OSA or the presence or absence of oxygenation or ventilation defects. Nocturnal oximetry is limited due to presence of motion artifacts (false positives) and non- specificity in revealing cause for the oxygenation defect. Also, sleep apnea in children is not commonly associated with oxygenation defects; hence, oximetry may miss diagnosis in majority of cases of OSA (false negatives). The positive predictive value of daytime nap PSG is good; however, as REM sleep may be absent during daytime naps, REM-related OSA may be completely missed and so can less severe cases of OSA due to the limited time of study. Ambulatory PSG has not been adequately studied in children and is not recommended at this time.
- Cine- MRI imaging of the upper airway and/ or drug induced sedation endoscopy may be used as conjunctive tests to identify site/ sites of obstruction in high-risk patients to guide treatment.
- Due to financial considerations and the difficulty in getting PSG in a timely manner, children >3 years of age without any co-morbidities that have obvious symptoms (i.e., loud nightly snoring, witnessed apneas, very disturbed sleep) and adenotonsillar hypertrophy may be referred for surgical evaluation without waiting for a PSG.

Figure 1. Snoring Child with Signs of Obstructive Sleep Apnea or at High Risk for Obstructive Sleep Apnea (OSA)

To view a larger image on your device, please click or touch the image.



Management

- Patients with mild OSA (AHI 1-5/hr) and with no possible OSA-related morbidities may be treated with intranasal steroids or leukotriene antagonists or both. It is extremely important to follow up these patients clinically on a regular basis to assess worsening of symptoms or development of any of the possible OSA-related morbidities. There are no absolute guidelines about the specific intranasal steroid, the dose, or the duration of treatment.
- Patients with mild OSA (AHI 1-5/hr) in the presence of any of the possible OSA-related morbidities and those with moderate-to-severe OSA (AHI > 5/hr) need to be considered for further treatment options and should be referred to otolaryngologists if the patients have enlarged tonsils and/or adenoids. Contraindications to surgery include very small tonsils/adenoids, morbid obesity and small tonsils/ adenoids, bleeding disorder refractory to treatment, submucous cleft palate, and other medical conditions making patient medically unstable for surgery.[2]
- In the absence of surgical options or when surgery is contraindicated, patients should be referred to sleep specialists for further evaluation and formulation of management plans.
    - Tonsilloadenoidectomy is the first line of treatment for children who have enlarged tonsils and adenoids.
        - After surgical intervention, it is extremely important to follow the patients on a regular basis with detailed history-taking for residual symptoms or symptoms of possible OSA-related morbidity.[2]
        - Patients at risk for respiratory complications following surgery include <3 years of age, severe OSA on PSG, cardiac complications of OSA (pulmonary hypertension), failure to thrive, obesity, craniofacial anomalies, neuromuscular disorders, and current respiratory infection; these patients should be monitored closely postoperatively in the hospital.[2]
- CPAP treatment may be necessary when surgical options are not available or unsuccessful in resolving the OSA.
- Other treatment options include orthodontic devices for mandibular malpositioning or narrow maxilla; myofunctional therapy: uvular/palatal surgery; lingual tonsillectomy; tongue surgery; craniofacial surgery; and tracheostomy and should be considered on a case-by-case basis by sleep specialists, otolaryngologists, or oromaxillary surgeons with expertise in caring for children with OSA.

This guideline was developed to improve health care access in Arkansas and to aid health care providers in making decisions about appropriate patient care. The needs of the individual patient, resources available, and limitations unique to the institution or type of practice may warrant variations.

References

References

1. Katz ES, D'Ambrosio CM. Pathophysiology of pediatric obstructive sleep apnea. Proc Am Thorac Soc 2008;5:253-62.
2. Marcus CL, Brooks LJ, Draper KA, Gozal D, Halbower AC, Jones J, Schechter MS, Sheldon SH, Spruyt K, Ward SD, Lehmann C, Shiffman RN, American Academy of Pediatrics. Diagnosis and management of childhood obstructive sleep apnea syndrome. Pediatrics 2012;130(3):576-84.

3. American Thoracic Society Standards and indications for cardiopulmonary sleep studies in children. Am J Respir Crit Care Med 1996;153(2):866-78.
4. Kaditis A, Kheirandish-Gozal L, Gozal D. Algorithm for the diagnosis and treatment of pediatric OSA: a proposal of two pediatric sleep centers. Sleep Med 2012;13(3):217-27.
5. Iber C, Ancoli-Israel S, Chesson A, Quan SF. The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications. 1st ed. Westchester, Illinois: American Academy of Sleep Medicine; 2007.