Virginia Academy of Sleep Medicine Position Statement Regarding the use of Portable Monitoring for the Diagnosis of Obstructive Sleep Apnea

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Introduction

Since its inception in 2008, the Virginia Academy of Sleep Medicine (VASM) has strived to provide up to date standards for diagnostic testing. Indispensable for the diagnosis of obstructive sleep apnea (OSA) is portable home sleep testing (HST). Despite its limitations, HST allows for an expedited and efficient means to diagnose OSA. As such, in 2011 the VASM published the evidence-based document "VASM position regarding use of Portable Monitoring (PM) in diagnosis of obstructive sleep apnea (OSA)". Since then with the widespread utilization of HST, there were two significant developments. First, the indications and contraindications for HST have been refined. Second, specific national AASM guidelines

have been published[1,4]. To that end, this document is an update of the 2011 VASM position on portable monitoring.

Classification of Sleep Testing

After the Centers for Medicare and Medicaid Services (CMS) approved the use of portable HST for the diagnosis of OSA in 2008[2], there have been advances in technology with a plethora of devices being offered by various vendors. The physiologic parameters being measured with each type of device can vary. Nasal pressure changes or thermal variation with respiration are surrogate measures of airflow. Changes in peripheral arterial tone is an indirect manifestation of breathing events associated with sleep apnea. Sleep staging and electrocardiography may or may not be facets for a particular type of testing. Equally salient is the level of technologist supervision while the test is being performed. In light of all of these variations, it is therefore useful to categorize portable HST in the broader context of sleep testing platforms that include attended and unattended studies. The classification of sleep testing based on established criteria is as follows:

Type I: An attended sleep study that includes continuous monitoring of electroencephalogram (EEG), electrooculogram (EOG), electrocardiogram (EKG), electromyogram (EMG), oxygen saturation, respiratory effort, and airflow. An in-lab polysomnogram (PSG) is a type I study conducted within a Sleep Center with technologist supervision throughout the study.

Type II: A portable unattended sleep study with continuous monitoring of EEG, EOG, EKG, EMG, oxygen saturation, respiratory effort, and airflow. Type II and type I studies are similar except that the former is conducted out of center without technologist supervision.

Type III: A portable unattended sleep study conducted with a minimum of four channels: 2 respiratory movement/airflow, 1 ECG/heart rate and 1 oxygen saturation. The studies are performed out of center and lack sleep staging.

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Type IV: A portable unattended sleep study conducted with three or fewer physiological parameters only one of which is airflow. The studies are performed out of center and lack sleep staging.

Type III and IV are the most common home based portable studies. Compared with the type I studies, they are less expensive and mitigate patient constraints such as travel and overnight stays at a Sleep Center. They also provide improved access with reduced wait time for testing. With advances in disposable devices, recorded data is uploaded to cloud based platforms allowing for immediate physician interpretation. This eliminates the burden of retrieving portable HST devices that are mailed out and reduces the turn-around time. To that end, type III and IV studies have substantially improved access to care.

However, the type I study is the gold standard to assess for obstructive sleep apnea. Compared with PSG, the accuracy ranges from 84 to 91% for type III studies and 81 to 93% for type IV studies in the high risk population. For low risk patients, the accuracy ranges from 70 to 78%[1]. Thus, given the potential for

significant false negative rates with portable HST, this is a major limitation that should weigh in on the medical decision making in the management of sleep disordered breathing.

Indications and Contraindications for Portable Monitoring

The utilization of portable monitoring for sleep apnea continues to evolve. With future developments, the indications and contraindications for HST will be further refined. Already there are published studies that may show diagnostic utility of HST among patients with co-morbidities such as congestive heart failure (CHF)[3]. However, until there is a follow-up comprehensive evidence-based systematic review of the literature, the VASM will adhere to the most recently published national practice guidelines[1,4].

Indications for HST

Suspected moderate to severe OSA in an uncomplicated adult patient with excessive daytime sleepiness and at least 2 of the following criteria:

1. Habitual loud snoring
2. Witnessed apneas, gasping or choking
3. Diagnosis of hypertension

Contraindications for HST

1. Previous non-diagnostic HST
2. Age 18 years or younger
3. Non-obstructive sleep disordered breathing leading to hypoventilation and/or sleep related hypoxemia:
    a. Significant cardiopulmonary disease (eg. CHF, COPD)
    b. Respiratory muscle weakness due to neuromuscular conditions
    c. Obesity-hypoventilation syndrome
    d. Chronic opiate medication use
4. Conditions that cause central sleep apnea
5. History of stroke
6. Severe insomnia
7. Disorders of central hypersomnolence (eg. narcolepsy, idiopathic hypersomnia)
8. Parasomnias
9. Sleep related movement disorders
10. Environmental or personal factors that may interfere with HST data retrieval and/or interpretation

HSTs for continued management of obstructive sleep apnea:

As obstructive sleep apnea is a chronic disease, it is important to understand when follow-up testing is necessary after the initial diagnosis. This section will focus on the appropriate usage of home sleep tests in the assessment and continued management of obstructive sleep apnea.

Per the 2021 published clinical guidance by the AASM[5], the following statements apply to home sleep testing recommendations in established patients with obstructive sleep apnea:

Retesting is appropriate in the following circumstances-

1) If there is re-emergence of symptoms despite good adherence to treatment.
2) Assess the response to non-PAP interventions including oral appliance therapy, nasal expiratory positive airway pressure, oral negative pressure therapy, significant weight change, and upper airway surgery.
3) New development or worsening of hypertension while on OSA therapy.

Retesting is not appropriate in the following situation-

1) Patients that are already responding well to therapy and have good symptom control.

Ultimately the clinician should determine, on a case-by-case basis, whether a HST (versus in-lab PSG) would be the appropriate testing modality.

Ordering and interpretation of home sleep tests:

The portability of HSTs should not be a reason to use it inordinately. Additionally, it's use should not be considered lightly given its limited accuracy and specificity. To this end, the AASM has published guidance in regards to the ordering and interpretation of home sleep tests[6]. A critical criterion is that a licensed medical provider must perform an appropriate medical assessment prior to the ordering of a home sleep test, which may be ordered for the initial diagnosis or longitudinal management of OSA. Furthermore, the diagnosis, longitudinal management, and/or treatment decisions cannot be based on automated scored HST data – this must be reviewed or overseen by a board-certified sleep provider. Lastly, HSTs should not be used as a general screening tool in an asymptomatic population.

Summary

Portable HST is a useful diagnostic tool for the diagnosis and management of OSA. It is important that the Sleep provider understand the various available HST devices along with their limitations as compared with the gold standard of polysomnography. Knowledge of the indications and contraindications for HST is vital during the diagnostic assessment of OSA. And equally relevant, the provider should understand the role of HST in the long term management of OSA and acknowledge the established criteria regarding ordering and interpreting studies. To that end, portable HST will be utilized appropriately towards the optimal care of patients with OSA.

References:

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