The COVID-19 Pandemic Presents an Opportunity to Reassess the Value of Polysomnography

The coronavirus disease (COVID-19) pandemic has had massive effects on health systems, and the field of sleep medicine has not been immune. In adherence with social-distancing measures, sleep laboratories abruptly shut down, vastly altering sleep medicine's clinical and financial landscape. As localities prepare to reopen nonemergent medical facilities, the field of sleep medicine needs to carefully prepare for a sustainable future amid an infectious and potentially fatal pathogen (1). One question that deserves careful examination is the role of sleep laboratories moving forward.

The advent of polysomnography (PSG) allowed us to recognize and understand the pathophysiology of sleep disorders for the first time, catalyzing sleep medicine's evolution into an independent field. PSG became a central focus of sleep medicine, as we created disease definitions that required polysomnographic verification. Despite decades of routine PSG use and research at a population level demonstrating associations between PSG signals and adverse health outcomes (2–4), few PSG parameters have been identified as having sufficient predictive value to warrant changes in clinical management. The wealth of data in the PSG is summarized into just a handful of clinically actionable measures, with the dominant being the apnea–hypopnea index (AHI), a metric that can be estimated at lower cost and with lower patient burden at home. Multiple randomized trials have demonstrated that a home-based diagnostic and treatment strategy is as effective as a laboratory-based strategy for most patients (5, 6). For those patient populations for whom home testing has not demonstrated utility, it is simply because a direct comparison has not yet been made, not because PSG has demonstrated superior outcomes. Furthermore, the patients for whom laboratory testing is currently recommended (e.g., heart failure or chronic obstructive pulmonary disease) also appear to be among the patients at greatest risk for poor outcomes related to COVID-19, augmenting concerns around potential exposure as sleep laboratories reopen (5, 7).

The belief that PSG is necessary to optimally diagnose and treat patients with sleep disorders relies, at least in part, on a number of assumptions and cognitive biases. These include the untested belief that "objective" physiologic criteria are superior to clinical assessments and patient-reported measures, a worldview that is often in direct conflict with patient-centered care. Additionally, there are incentives for us to view PSG as essential that have no bearing on its utility. One cannot ignore the role of revenue from PSG, which has been instrumental in the development of sleep medicine as an independent discipline and maintaining our livelihoods. Another strong impetus is the desire to feel that one's expertise is needed. Interpreting a PSG must be of value because we have devoted so much time mastering this ability (8). Our field has had an optimistic belief that a full understanding of sleep disorders can be extracted from the vast amounts of data in the PSG. As techniques and knowledge advance, there may be new PSG metrics that are identified that do improve clinical management of patients with sleep disorders. But to date, despite the development of a vast array of metrics, this promise remains unfulfilled.

Far from an abstract thought exercise, we need to recognize the real-world consequences of a PSG-centric worldview. Our rigid belief that treatment decisions cannot be made without a PSG has impeded care for those who cannot readily access these services. Such groups include residents of rural areas, caregivers to small children and other dependents, and those lacking health insurance or reliable transportation at night (9–11). Furthermore, laboratories are often insufficiently staffed to care for those who have substantial nursing needs. Removing the obligate requirement for PSG creates an opportunity to provide much needed care to these marginalized populations.

Following the lead of sleep medicine experts, insurance companies have also prioritized physiologic measures from PSG over clinical assessments, resulting in restrictions on care based on rigid diagnostic criteria. All clinicians understand that any diagnostic test, including PSG, is never 100% accurate. Therefore, clinical judgment remains a critical tool for accurate diagnosis and therapeutic decision-making. By developing coverage criteria that are solely based on arbitrary AHI thresholds, payors have devalued the clinical assessment of sleep disorders. We all have taken care of patients who clearly would benefit from positive airway pressure (PAP) but are denied treatment because the AHI is less than 5 (12, 13). Rather than advocating for changes in the definition of hypopnea or recognition of an upper airway resistance syndrome, perhaps it is more sensible to redefine obstructive sleep apnea (OSA) so as to reduce the relative importance of the AHI and increase the importance of the clinical assessment.

Unfortunately, payor reliance on PSG criteria for treatment coverage has not only undermined healthcare professionals and restricted patient care but also has resulted in sleep studies performed simply to satisfy an insurance company requirement, serving no clinical purpose. Egregious examples are all too common. Consider the patient who has been using PAP therapy daily for 15 years with therapeutic benefit who needs to replace a malfunctioning machine but cannot produce

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their original PSG report. Also consider the patient who is trying to use PAP but did not meet the 70% adherence threshold because of poor mask fit (12, 13). Though these patients generate revenue for sleep specialists by keeping the sleep laboratory full, they ultimately undermine our field by destroying clinician morale and, even worse, create barriers for patients seeking care.

An important question that will need to be urgently addressed is how can sleep medicine as a field survive financially with markedly reduced sleep laboratory volumes? We will need to better understand where value in sleep medicine lies and realign reimbursement to support those services. With respect to OSA, evidence already suggests that time spent educating patients, providing behavioral support, and telemonitoring all lead to improved outcomes (6). Advocating for increased reimbursement for these clinical activities should be a major focus of both patient and provider advocacy groups. At the same time, technological advances are making home sleep assessments an increasingly viable strategy. Actigraphy has long been available, but home sleep monitors can increasingly provide information on sleep stage and nonrespiratory parameters. Integrating home-based assessments where it can improve clinical management and ensuring reimbursement for the value added is another important area to focus advocacy (14). Sleep problems are incredibly common in the population; it has been estimated that 80–90% of patients with OSA remain undiagnosed (15). Reducing barriers to diagnosis and treatment by, for example, embracing a home-based care pathway may allow a much larger fraction of patients suffering from poor sleep to access therapy.

This is not to say that there is no role for the sleep laboratory. There are patients with unclear diagnoses for whom sleep laboratory testing results may help guide care. There is also reason to believe that having PSG findings in hand may increase patient satisfaction, patients' understanding of their disease, and adherence with prescribed therapy. But it is high time that our field begins to empirically test and demonstrate the situations in which sleep studies do provide information that improves clinical management and demonstrate that the value of the PSG outweighs the costs and burden of this testing. The added risks to seep laboratory testing posed by COVID-19 only add to the urgency of answering these questions. ■

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