Sleep on the Cheap Revisited

The recognition of sleep apnea is increasing as is the suspicion of this disorder. Groups such as truck drivers and bus drivers are being recognized as high risk in regards to public safety and there is a movement to screen these high risk jobs. Subjective screening devices (questionnaires) for a disorder that may disqualify you from work have a built in bias. Physical examinations looking for the high risk patients would be time consuming, and costly and not include the group of people with a normal exam (normal body weight and airway appearance) who have sleep apnea. Routine sleep studies either home or facility studies would burden the existing sleep centers and it is unclear who would pay for this type of screening.

In a 1999 editorial, Thorax Bennet and Kennear called nocturnal pulse oximetry "sleep on the cheap". Nocturnal pulse oximetry generates a large amount of data and is very economical. Validated questionnaires are less expensive but have a bias when one may feel his job is threatened. In 2001 Chest Netzer wrote a review of Overnight Pulse Oximetry. His conclusion was that pulse oximetry was very accurate but the sensitivity and specificity was controversial. Now nearly ten years later pulse oximetry has improved. It is less cumbersome, more comfortable and utilizes high resolution. In 2009 Malbois in Obesity Surgery found that using a 3% desaturation index of <10 could rule out significant sleep apnea in almost a third of the preoperative bariatric patients.

Virtuox is a diagnostic facility that performs home sleep studies nationwide. It utilizes a level 3 device that incorporates high resolution pulse oximetry. In a recent retrospective study of HST deployment, the desaturation index and the respiratory disturbance index were examined during a Level III HST in a group of 798 patients aged 21 to 109 years with suspected obstructive sleep apnea syndrome. The desaturation index was compared to the respiratory disturbance index, utilizing the Resmed Apnealink Plus™, a Level III device with automatic analysis that derives apnea–hypopnea index (AHI), hypopnea index (HI), flow limitation, snoring and oxygen desaturation index (ODI). The oxygen desaturation indexes of 5 or more per hour were calculated by measuring 4% or greater desaturations within a 3 minute of onset utilizing high resolution pulse oximetry. AHI results found to be greater than or equal to 5 (CMS minimum qualification level for PAP therapy) correlated to ODI greater than or equal to 5 greater than 89% of the time. Furthermore, AHI greater than or equal to 5 (CMS minimum qualification level for PAP therapy) correlated to ODI greater than or equal to 7 approximately 95% of the time and for ODI greater than or equal to 10 over 98% of the time.

There is a high degree of correlation between the oxygen desaturation index utilizing high resolution pulse oximetry and the apnea-hypopnea index measured with a Level III device. Utilizing the ODI as measured with a high resolution oximeter will yield accurate correlation to identify patients requiring further diagnostic sleep testing and in identifying patients who are low risk candidates for sleep apnea.
The recognition of sleep apnea and its inherent morbidity and the relationship to public safety requires that an economical objective test be utilized for evaluation. Prospective studies need to be done to further validate the use of high resolution pulse oximetry as "sleep on the cheap."

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