Routine Utilization Of Esophageal Pressure Monitoring (Pes) Can Be Done Reliably With Good Patient Acceptance And Can Enhance The Quality Of In-Lab NPSG Sleep Testing

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Introduction

The gold standard of monitoring respiratory effort for PSG testing is stated by most sources to be esophageal pressure monitoring (Pes). However, Pes monitoring is rarely implemented by sleep centers, often due to lack of commitment to gain the necessary experience. There is a bias within the field of sleep medicine that Pes monitoring is impractical because of patient discomfort and technical difficulties. This has resulted in avoidance of implementing Pes monitoring by almost all sleep testing facilities. Despite changes in the healthcare system toward home sleep testing, most facilities have not enhanced the sophistication of in-lab sleep centers to improve the sensitivity of the PSG for those patients in whom HSAT is not diagnostic.

The authors have been routinely performing Pes monitoring in appropriate patients, with experience dating back to 1991. In our current program (CSMA) we have been routinely performing the Pes since 2006. We provide data here to support that routine Pes monitoring can be performed successfully.

Methods

We consecutively tracked NPSG studies ordered to be done with Pes monitoring from 1/1/2015 through 12/13/2016. Pes failures were tabulated and categorized as to the cause, including patient refusal, technical failure and patient discomfort.

Results

Pes monitoring was ordered on 1365 studies, during the period of this study. Of these, 187 were not attempted because of patient refusal. Of the 1178 Pes studies attempted, 191 were not successful as a result of patient discomfort or from technical issues. This resulted in 987 NPSG studies done successfully with the Pes, which represents a 16.2% failure rate or otherwise stated as a 83.8 % success rate.

Discussion

Our experience clearly demonstrates that Pes monitoring can be successfully performed and incorporated into an in-lab sleep center. This is in contrast with the biases within the field that Pes monitoring is impractical and cannot be implemented on a routine basis. The Pes is the only truly quantifiable respiratory parameter measuring the effort or workload of breathing. Clinical benefits from the Pes become obvious after reviewing multiple studies done in this fashion. It provides more objective assessments of patients in whom routine respiratory parameters on PSG studies provide obscure results. The more common indications for adding the Pes include 1) no witnessed respiratory pauses during sleep in a patient with excessive sleepiness, 2) negative prior sleep study, 3) PAP re-titration study in a patient with persistent sleepiness, 4) possible central Apnea, 5) nocturnal GERD and 6) cardiac issues or refractory hypertension in patients already on PAP treatment. We have provided a few examples of Pes studies on the right side of this presentation.

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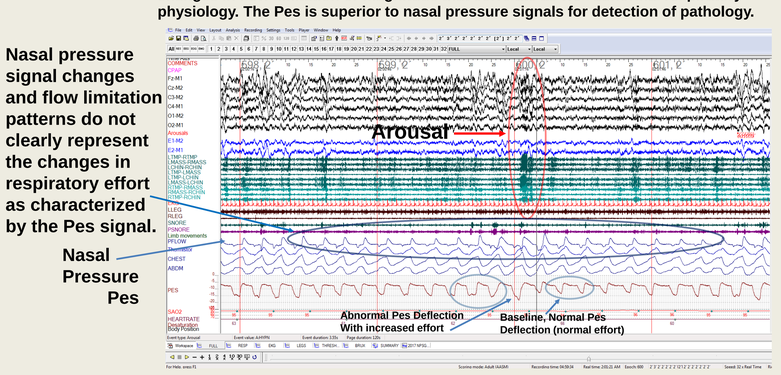
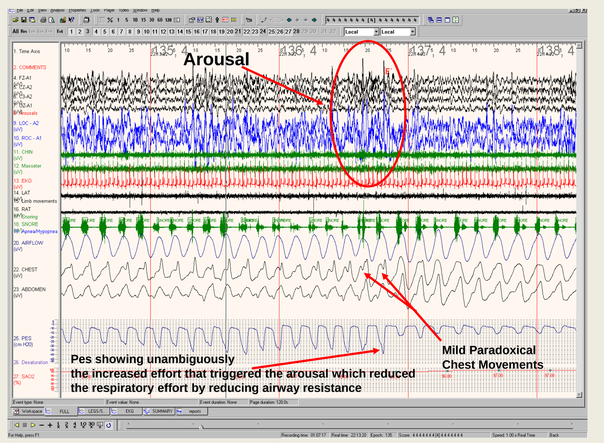
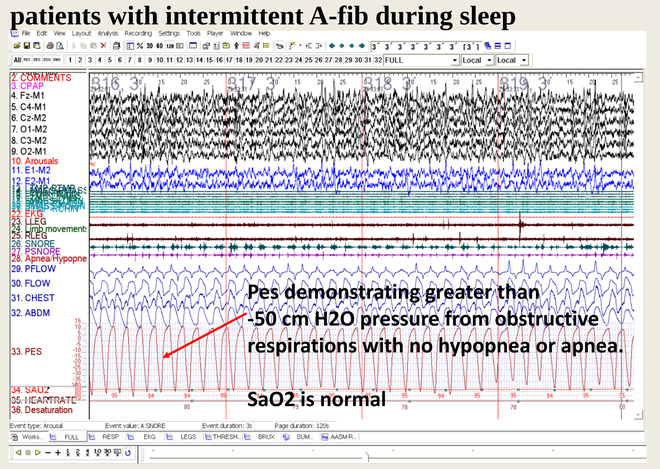
Pes Examples

Example - Pes signal increases from a baseline of about -5 cm H2O to about -12 cm H2O which precipitates an arousal. The nasal pressure air flow signal does not provide changes in flow limitation or magnitude that correlate as well abnormal respiratory physiology. The Pes is superior to nasal pressure signals for detection of pathology.





Prolonged periods of high intra-thoracic pressure in a patients with intermittent A-fib during sleep



This NPSG with the Pes added to the paper recording, is from Stanford University Sleep Center, done in 1991. This 21 y/o patient of Dr. Simmons was the first UARS patient identified who did not snore.