

# The Pros and Cons of Split-Night PSG Testing

by Todd Eiken, RPSGT

**S**plit-night polysomnogram (PSG) testing, typically applied to patients to rule out obstructive sleep apnea (OSA), has existed for quite some time. It allows for the initiation of nasal continuous positive airway pressure (NCPAP) titration to occur during the initial, first night of study in the sleep lab, thereby eliminating the need for a second night of testing.

In some areas of the United States, the split-night protocol is used as a means of emergency intervention for patients who have severe arterial oxygen saturation (SAO<sub>2</sub>) desaturations or electrocardiogram (ECG) arrhythmias associated with sleep-disordered breathing. In other areas, split-night PSG testing is the routine protocol performed on all OSA patients.

Often dictated by the local reimbursement community, the split-night test method is thought to be more cost effective. Perhaps as an indication of the growing acceptance of split-night PSG testing, many auto-titrating NCPAP devices have recently incorporated “split-night” operating modes that allow for pre- and post-therapy initiation comparisons in an unattended setting.

## Testing for severity of the sleep disorder

A critical objective when successfully performing a split-night study is to document as much polysomnographic information as possible that will demonstrate the severity of the patient’s sleep disordered breathing as well as the physiological impact the sleep-dis-

ordered breathing is having on the patient before initiating NCPAP therapy. Ideally, documentation of an entire sleep cycle should be achieved as well as a “worst case scenario” that would include the presence of rapid eye movement (REM) sleep and OSA occurring while the patient is sleeping in the supine position.

## NCPAP and titration

Once pre-titration data has been acquired, (which, depending on the degree of sleep disruption, may take two-thirds of the testing period), NCPAP is then applied to the patient. In order to avoid unfavorable “panicked” reactions of the patient, as well as to minimize the amount of time he is awake while the mask is applied, it is critical to educate the patient in NCPAP usage so he will be

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desensitized to the device. The clinician must also be sure that correct nasal mask and headgear sizes have been chosen before beginning the test.

Once the clinician has applied the NCPAP mask and the patient has gone to sleep, titration is initiated. Most often, the titration is performed rapidly due to the split-night protocol time limitations. As mentioned earlier, documentation of NCPAP efficacy in the supine position during REM sleep is the ultimate goal. Therefore, it is wise to instruct patients to remain on their back during the titration process.

### Benefits versus concerns

It has clearly been shown that performing split-night studies on OSA patients instead of a two-night protocol, will double the number of OSA patients tested in a laboratory and reduce the lab's scheduling backlog. Additionally, a standard two-night protocol will typically involve a period of time between the initial baseline test and the second-night test when treatment is initiated. This period of time is eliminated in the split-night scenario, which is certainly beneficial to the patient as well as the testing center from a liability perspective.

Patients who are allowed an entire night to be titrated on NCPAP clearly have the additional time and benefit to discover potential problems and issues while in the presence of sleep lab personnel who are able to intervene. In comparison, the entire titration phase of a split-night test is usually no longer than three to four hours. In light of this, the two-night protocol may increase initial compliance to therapy.

As REM sleep is most plentiful during later stages of the sleep period, the more severe apnea-related desaturations and/or ECG arrhythmias com-



monly associated with REM sleep are not typically documented due to the NCPAP titration process. Often this data can be useful in convincing an otherwise unwilling patient to begin NCPAP therapy; and unfortunately, it is unavailable in a split-night scenario. However, the often striking impact of NCPAP therapy initiation on sleep disordered breathing and SAO<sub>2</sub> desaturations can be easily displayed in a pre/post NCPAP graphic format that can help convince the patient to comply with treatment.

Due to the time restraints imposed by the split-night protocol, occasionally there will be unsuccessful titrations. A sleep lab must be prepared to perform repeat split-night testing, often with no reimbursement, in order to objectively document the efficacy of NCPAP. The most common issues that may result in an unsuccessful split-night test are:

- Inability to document REM sleep in the supine position during NCPAP titration.
- Unfavorable patient reaction (such as claustrophobia and anxiety).
- Co-existing central respiratory component that does not respond to conventional NCPAP.
- Patient inability to return to sleep following NCPAP mask application.
- Patient readiness to get up for the day and end the test prior to successful titration.

### **Reimbursement and other issues**

Actual PSG charges (as well as reimbursement amounts) vary greatly across the United States. However, it has been shown that

although there are some sleep centers that actually charge a lower amount (\$800 to \$1,000 for each night of the two-night procedure), there are also many labs performing split-night studies that will charge the equivalent of two nights of testing (\$1,600 to \$2,000 for one night in the lab), thereby eliminating any cost savings to the patient.

When measuring and comparing patient outcomes, the quality of testing derived from a split-night PSG protocol is not always compromised. However, the classic OSA patient is becoming more and more rare as the field of clinical sleep disorders medicine grows. Patients with co-existing diseases, hypoventilation, as well as psychiatric disorders, make the art of split-night PSG testing more difficult.

In this light, the PSG technologist who successfully performs these studies must be highly trained not only in the general tasks required for split-night studies but also must anticipate a patient's physiological events, analyze information, and make critical decisions.

Although there are a number of disadvantages associated with split-night testing as compared to a two-night testing protocol, correctly performed split-night PSG testing is a reasonable and valid approach to reaching more patients in need of sleep disorders testing while maintaining outcomes comparable to those achieved with a two-night protocol. •

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