

Patient Safety Tip of the Week

July 17, 2018 OSA Screening in Stroke Patients

It's well known that patients with obstructive sleep apnea (OSA) are at risk for cerebrovascular and cardiovascular events. But patients who suffer strokes are also particularly at high risk for OSA, and this has implications for both morbidity and mortality in these patients.

Sharma and Culebras ([Sharma 2016](#)) note that about 50-70% of patients with stroke have sleep-disordered breathing (SDB) as defined by $AHI \geq 10$ /hour, with OSA being the most common pathology though some studies show that during the first 5 days poststroke central sleep apnea predominates. Males had a higher percentage of SDB ($AHI > 10$) than females (65% vs 48%) and patients with recurrent strokes had higher percentage of SDB than patients with first stroke (74% vs 57%). Worsening of OSA may also be found after acute stroke due to impairment of respiratory muscle coordination and the presence of dysphagia may predict the development of OSA in patients with acute stroke. Traditional risk factors for OSA, such as a high BMI and large neck circumference, also predict OSA in acute stroke patients.

A recent meta-analysis ([Seiler 2018](#)) identified 54 studies performed in the acute phase after stroke (<1 month after stroke), 23 studies in the subacute phase (after 1–3 months) and 12 studies in the chronic phase (> 3 months). An $AHI > 5/h$ and $>30/h$ was found in 71% and 30% of patients, respectively. The severity of SDB was similar in all phases after stroke; however, only three studies assessed the same patients over time. The authors conclude that almost 1/3 of stroke patients present severe SDB, which appears to persist over time. Another recent study ([Chakraborty 2017](#)) found that the risk of OSA, as assessed by the STOP-BANG OSA risk tool, remains high at one month following discharge from hospitalization for acute stroke.

Of course, many of the risk factors for OSA are also risk factors for stroke. So, it should not be surprising that the occurrence of OSA is high in stroke patients. But it is also likely that mechanisms related to stroke may cause or accentuate OSA. For example, those strokes that lead to dysphagia or dysphonia have likely impacted pharyngeal musculature that is important in keeping the airway open. Patients with bilateral strokes are also more likely to have pharyngeal dysfunction (“pseudobulbar”), which may explain why some studies have shown OSA is more frequent in patients with recurrent strokes.

So, it is important to recognize which stroke patients are at risk for OSA acutely in the hospital because we may accentuate their risk with medications like opioids or sedative/hypnotic drugs. But OSA in the acute stroke patient may also lead to neurological deterioration, as has been noted in some observational studies. Davis and colleagues ([Davis 2013](#)) discussed some potential mechanisms of OSA contributing to

poor neurologic recovery. These include direct effects of reduced cerebral blood flow and modulation of blood pressure and oxygen saturation associated with apneic episodes, resulting in further neurologic injury due to a compromise in perfusion to the ischemic penumbra.

But we need to recognize they may also be at risk for complications of OSA after discharge. A study recently presented at the SLEEP 2018 conference (the Annual Meeting of the Associated Professional Sleep Societies) illustrates how Hennepin County Medical Center used a quality improvement project to substantially increase recognition of OSA in their acute stroke or transient ischemic attack (TIA) patients ([Metzler 2018](#)). They implemented two sets of interventions (in July 2015 and March 2016), including an education session for resident physicians, an electronic stroke discharge note template, and email reminders. They then did retrospective chart review on ischemic stroke and TIA patients discharged over two consecutive months to collect OSA screening and referral data before and after each intervention, as well as a year later, to assess retention. The rate of OSA screening in ischemic stroke and TIA patients at discharge increased from baseline 2.4% in 2014 to 24.1% in 2015 following the first intervention. It further increased to 66.0% in 2016 after continued efforts for implementation. After reiteration, in 2017, the OSA screening rate improved to 69.4%. Moreover, all patients (100%) who screened positive had a sleep referral ordered at discharge. Physician survey before and after interventions found increase in self-reported screening rate (69% to 100%) and increase in satisfaction with the discharge template.

The Davis paper mentioned above ([Davis 2013](#)) summarized many of the studies assessing the impact of CPAP in acute stroke patients with OSA. Another recent systematic review and meta-analysis was done on randomized controlled trials (RCTs) examining the effectiveness of continuous positive airway pressure (CPAP) in stroke patients with sleep disordered breathing (SDB) ([Brill 2018](#)). The combined analysis of the neurofunctional scales (NIH Stroke Scale and Canadian Neurological Scale) showed an overall neurofunctional improvement with CPAP, but with a considerable heterogeneity across the studies. However, tolerability of CPAP was an issue. Mean CPAP use across the trials was only 4.53 hours per night and the odds ratio of dropping out with CPAP was 1.83. The authors conclude that CPAP use after stroke is acceptable once the treatment is tolerated and that CPAP might be beneficial for neurologic recovery, which justifies larger RCTs.

Many of you are already aware of a recent JAMA publication that questioned the ability of CPAP to reduce cardiovascular and cerebrovascular outcomes in patients with OSA ([Yu 2017](#)). They found no significant association of PAP with major adverse cardiovascular events (RR 0.77), cardiovascular death (RR 1.15), or all-cause death (RR 1.13). The same was true for ACS (acute coronary syndrome), stroke, and heart failure. They concluded that use of PAP, compared with no treatment or sham, was not associated with reduced risks of cardiovascular outcomes or death for patients with sleep apnea. They acknowledge that there are other benefits of treatment with PAP for sleep apnea, but these findings do not support treatment with PAP with a goal of prevention of these outcomes. There have been numerous questions about the conclusions of that study,

including whether compliance with PAP was adequate in the included studies and whether the power of the studies was adequate to make any firm conclusions. The study also did not specifically look at a subgroup of patients with acute stroke.

But both the Brill study and the Yu study leave us with the understanding that larger RCT's, focusing on subsets such as the patient with acute stroke, are needed.

So, what should you be doing in the interim? We recommend that you consider all acute stroke patients at being at possible risk for OSA. We don't recommend you do polysomnography on all such patients acutely, but you should do careful monitoring, especially if such patients are receiving medications that may accentuate OSA, such as opioids or sedative/hypnotics. And, given that the persistence of OSA after discharge remains high, we recommend that screening be done, with appropriate referral to sleep specialists after discharge.

Our prior columns on obstructive sleep apnea:

June 10, 2008	“Monitoring the Postoperative COPD Patient”
August 18, 2009	“Obstructive Sleep Apnea in the Perioperative Period”
August 17, 2010	“Preoperative Consultation – Time to Change”
July 2010	“Obstructive Sleep Apnea in the General Inpatient Population”
July 13, 2010	“Postoperative Opioid-Induced Respiratory Depression”
November 2010	“More on Preoperative Screening for Obstructive Sleep Apnea”
February 22, 2011	“Rethinking Alarms”
November 22, 2011	“Perioperative Management of Sleep Apnea Disappointing”
March 2012	“Postoperative Complications with Obstructive Sleep Apnea”
May 22, 2012	“Update on Preoperative Screening for Sleep Apnea”
February 12, 2013	“CDPH: Lessons Learned from PCA Incident”
February 19, 2013	“Practical Postoperative Pain Management”
March 26, 2013	“Failure to Recognize Sleep Apnea Before Surgery”
June 2013	“Anesthesia Choice for TJR in Sleep Apnea Patients”
September 24, 2013	“Perioperative Use of CPAP in OSA”
May 13, 2014	“Perioperative Sleep Apnea: Human and Financial Impact”
March 3, 2015	“Factors Related to Postoperative Respiratory Depression”
August 18, 2015	“Missing Obstructive Sleep Apnea”
June 7, 2016	“CPAP for Hospitalized Patients at High Risk for OSA”
October 11, 2016	“New Guideline on Preop Screening and Assessment for OSA”
November 21, 2017	“OSA, Oxygen, and Alarm Fatigue”

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