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Home Sleep Testing : It Is Not About the Test

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Home Sleep Testing

It Is Not About the Test

In this issue of *CHEST* (see page 257), another study from Canada by Skomro et al[1] shows that home-based limited-channel diagnostic testing for obstructive sleep apnea has equivalent short-term outcomes compared with in-laboratory polysomnography. This study is consistent with three other studies that were conducted similarly.[2-4] There are similar themes with these studies: All were performed at a single tertiary-care center, the patients were evaluated by physicians trained in sleep medicine, patients were at significant risk for obstructive sleep apnea, and those with comorbidities were excluded. This particular study is unique in that all patients underwent both home testing and laboratory testing but were treated according to the primary randomization (home testing with autotitrating positive airway pressure [autoPAP] or laboratory testing with continuous positive airway pressure [CPAP] titration); in the other studies, patients only got one test instead of both. All of these outcome studies demonstrated that, for this specific population of patients, it did not matter how their apnea was diagnosed; they used their CPAP device about the same amount of time and received about the same improvement from its use.

With yet another validation of the equivalency of unattended limited-channel testing (ULCT), this must mean that this form of diagnostic testing should be available for widespread use in the United States. Well, I am still somewhat skeptical. I do believe that there is a role for ULCT in the diagnosis of obstructive sleep apnea; these studies clearly show the feasibility and potential success. However, these studies were all done by physicians who are familiar with the care of patients with obstructive sleep apnea and who are presumably facile in interpretation of both polysomnography and ULCT. These studies were done on patients who were adequately screened for the signs and symptoms of sleep apnea and who did not have confounding sleep or medical disorders that may reduce the sensitivity and specificity of the ULCT. Within these parameters, ULCT *is* a viable option.

However, in the US health-care system, the use of ULCT cannot be as controlled as it was in these studies. Since Centers for Medicare and Medicaid Services approved ULCT as a viable diagnostic option for the use of CPAP, several companies have sprung up to market this technology. The business model I have seen most often is to offer it to primary care providers (PCPs) as a simple and easy way to diagnose sleep apnea "without the hassle" of using a sleep center. The patient undergoes the testing, the study is "interpreted" by a physician who presumably has some expertise in such interpretations but usually does not ever see the patient, and the report is sent to the ordering physician. He can then order a CPAP device, send the patient to a surgeon or dentist, or recommend some other form of therapy. The decision about which patient to perform this testing on is made by the PCP, and little is known currently about how they are making that determination. Indeed, it may be that this is a very reasonable approach and that most patients will be adequately diagnosed and treated. One could argue that with CPAP adherence being 50% in the best hands, why should sleep specialists think that PCPs will do any worse?

Past investigations have shown that sleep and sleep disorders are rarely covered for more than 1 to 2 h in a medical school curriculum. And although little data are available, there is not thought to be much substantial coverage of the subject in most residency or fellowship programs either.[5] Therefore, most physicians have little training in the diagnosis and treatment of sleep disorders. Therefore, I still worry about the patient. Do most physicians know enough about sleep apnea to do this correctly? For instance, if the ULCT is negative, is that adequate verification that the patient does not have sleep apnea, even if he has symptoms? Will the ordering physician know what to do next? Quite often patients come to my sleep clinic after having undergone a polysomnography study at an outside sleep center that was "negative for sleep apnea." They are told they do not have sleep apnea, and that is the end of the evaluation. There are many other things that can cause sleep complaints, such as narcolepsy, depression, and restless legs syndrome. A negative test for sleep apnea may not rule out another sleep disorder.

What about the opposite end of the spectrum? If the patient has severe apnea and CPAP is initiated, do we know enough about the initial use of CPAP in an unobserved setting to feel comfortable that it is set correctly without direct observation? Although

autoPAP is often touted as "equivalent" to a CPAP titration study, most physicians without sleep medicine training are unaware of its pitfalls. Likewise, the machines themselves are more expensive than a CPAP machine, and there is no "extra" reimbursement for this device or for the added expense of getting it to and from the patient if one decides to use it for a few weeks and then switch to a fixed CPAP level. There is no reimbursement to the durable medical equipment companies for their added time and expense. And what of patients who have comorbid disorders of heart failure, COPD, or hypoventilation; will the ordering physician know that the results may be less accurate in these settings? Moreover, some patients will have complex disordered breathing syndromes with Cheyne-Stokes breathing, narcotic-induced central apneas, or sleep-induced hypoxemia. Will these be recognized and referred or treated appropriately?

In conclusion, these studies show that ULCT can work in selected patients cared for by sleep specialists. We do not know how well it will work when there are no controls on who can use it. It is really not about the technology; it is about the initial and then chronic care of the patient through our healthcare system. Thoughtful and pragmatic initiation of ULCT through accredited sleep centers with trained physicians has the potential to expand the number of patients being diagnosed and treated for obstructive sleep apnea. Unfortunately, in the United States market forces often control how these new technologies are used; only time will tell how this will play out for our patients in the long run.

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Right-to-Left Shunts and Saline Contrast Echocardiography

Right-to-left shunting, occurring primarily with intracardiac lesions such as patent foramen ovale (PFO) and to a lesser extent via pulmonary arteriovenous malformations (PAVM), has been associated with a variety of common disease processes.[1,2] Thus, identification of right-to-left shunting is a frequently requested evaluation in busy echocardiography laboratories. Since the initial report by Gramiak et al,[3] saline contrast echocardiography has been the method of choice to identify these shunts. By agitating a small amount of air with solutions such as saline or 5% dextrose/water, microcavitations ("bubbles") are produced that, when injected into the venous circulation, appear only in the left side of the heart when a permissive right-to-left pathway is present. Even one bubble appearing in the left side of the heart has been proposed as a diagnostic criterion to identify right-to-left shunting.[4] Transthoracic echocardiography is the usual starting point; however, some patients may require transesophageal echocardiography (TEE) for detection. Transcranial Doppler can identify right-to-left shunts but cannot specify their location precisely. In general, "early appearance" of microcavitations in the left side of the heart (within three beats of right-sided heart opacification) is considered indicative of atrial level shunting, whereas later-appearing bubbles represent extracardiac shunting.[2]

The most common cause of right-to-left shunting is the PFO. A PFO is an obligate component of the fetal circulation that closes by fusion of the septum primum and septum secundum shortly after birth. Although this communication closes in the majority, it remains patent in about 30% of individuals.[1,5] Disease states most commonly associated with PFO include cryptogenic stroke and migraine headache, and closure of this tunnel-like communication has been associated with symptom relief.[6] The prevalence of extracardiac shunting via PAVM in the general population is not well studied, and its presence has been believed to be uncommon. With conditions such as hereditary