



## SUB-SPECIALTIES IN SLEEP MEDICINE

by (the late) Steven Grenard RRT, RPSGT

The organized study of sleep, as well as the earliest academic and commercial sleep laboratories, were fostered mainly by the interest of psychologists and psychiatrists. Sleep problems have a long history of being involved with a variety of psychiatric problems, and it was Sigmund Freud himself who postulated that dreaming was the key to most of these.

It wasn't long before the field evolved, mainly targeting obstructive sleep apnea (OSA) as an extremely common and often overlooked reason why people don't get the sleep they need. This revelation provoked interest in sleep medicine by other medical specialists, particularly pulmonologists and otorhinolaryngologists. As widespread a problem as OSA was, it was soon obvious that sleep problems also had an impact on cardiovascular disease such as heart failure and hypertension. This, of course, started to corral many cardiologists into the field.

The fact that OSA is common in the morbidly obese then piqued the interest of bariatricians and bariatric surgeons. It was inevitable that Type II diabetes and insulin resistance, which are common in both young and old overweight people, might be exacerbated by a sleep disorder. Clearly that has been the case. Enter now endocrinologists who don't want to skip ruling out sleep-disordered breathing as a precipitating factor in difficult to control diabetics.

In some diabetics, it has been revealed that even after an insulin dose at bedtime coupled with fasting while asleep for six to eight hours, such patients still had elevated blood glucose levels upon awakening. Some even had higher levels than when they had gone to sleep. This required another dose of medication, even though there was no apparent reason why this should happen. However, plenty of theories have been put to the test. It turns out that new studies on such patients clearly implicate OSA and stressful nocturnal awakenings as cause and effect in resistant diabetics.

What do all these sleep sub-specialties mean for the sleep testing field? In short, they mean that regardless of competition and regardless of loss of lab patients through the use of home sleep testing, there probably will never be a shortage of patients who require diagnosis and treatment for a sleep disorder. The numbers are staggering, so let's have a look at them.

According to the National Institutes of Health, 23.5 million people in the U.S. ages 20 and older had diabetes as of 2007. Of

these, 12.5 million were 60 or older. From 2003 to 2006, 25.9 percent of U.S. adults ages 20 years and older had impaired fasting glucose (IFG); 35.4 percent were ages 60 years and older. Applying this percentage to the entire U.S. population in 2007 yields an estimated 57 million American adults ages 20 years and older with IFG, suggesting that at least 57 million American adults had pre-diabetes in 2007.

The key item of interest is elevated fasting glucose levels. This is a phenomenon practitioners have seen when testing patients who fast overnight in the sleep lab. It's difficult to speculate how many of these patients have IFG due to sleep disorders, but predictably, the research, which is simple enough to perform, will be forthcoming and interesting to review, to be sure.

The evidence of an impact on cardiac arrhythmias and sudden cardiac death while asleep is well-established in numerous studies to date. Individuals with severe sleep-disordered breathing have been found to two- to fourfold higher odds of complex arrhythmias than

those without sleep-disordered breathing even after adjustment for potential confounders. Clearly there are many millions of Americans with undiagnosed OSAHS who are at risk of heart failure.

And while obesity as a disorder has been linked with heart disease, hypertension and diabetes, it also shares the distinction of being a major clinical factor in OSA. There are few, if any, individuals who can be termed markedly obese (BMI  $\geq 30$ ) who probably do not have OSA. According to the Centers for Disease Control and Prevention, more than one-third of U.S. adults — more than 72 million people — were obese from 2005 to 2006. This includes 33.3 percent of men and 35.3 percent of women. The figures show no statistically significant change from 2003 to 2004, when 31.1 percent of men were obese and 33.2 percent of women were obese.

Adults ages 40 to 59 had the highest obesity prevalence compared with other age groups.

Approximately 40 percent of men in this age group were obese, compared with 28 percent of men ages 20 to 39, and 32 percent of men ages 60 and older. Among women, 41 percent of those ages 40 to 59 were obese compared with 30.5 percent of women ages 20 to 39. Women ages 65 and older had obesity prevalence rates comparable with women in the 20 to 39 age group.

Let's not forget obesity among children. According to the CDC, "Obese children and adolescents are at risk for health problems during their youth and as adults. For example, during their youth, obese

### IN MEMORIAM

It is with profound sadness that FOCUS announces the passing of Steven Grenard RRT RPSGT, a veteran and pioneer in the fields of Respiratory Care and Sleep Medicine on April 6th, 2009. This issue of FOCUS Journal features what we believe to be the last two articles authored by Steve (second article found on page 42). Steve Grenard was a role model, mentor and personal friend for many years who contributed mightily to FOCUS Journal as a regularly featured columnist. Our condolences go out to his family. We can categorically say that the Respiratory Care and Sleep professions owe a tremendous amount to Steven Grenard. Rest in Peace Steve.  
Bob Miglino RRT BSRT MPS - Publisher

children and adolescents are more likely to have risk factors associated with cardiovascular disease (such as high blood pressure, high cholesterol and Type II diabetes) than are other children and adolescents.

"Obese children and adolescents are more likely to become obese as adults. For example, one study found that approximately 80 percent of children who were overweight at aged 10 to 15 years were obese adults at age 25 years. Another study found that 25 percent of obese adults were overweight as children. The latter study also found that if overweight begins before 8 years of age, obesity in adulthood is likely to be more severe."

The CDC continued to say that "the prevalence of obesity has increased for children aged 2 to 5 years, prevalence increased from 5 percent to 12.4 percent; for those aged 6 to 11 years, prevalence increased from 6.5 percent to 17 percent; and for those aged 12 to 19 years, prevalence increased from 5 percent to 17.6 percent."

Many of the overweight children we test in our sleep lab have significant OSAHS. They are a serious problem because they require diet and exercise, and some also end up on CPAP. Getting rid of the CPAP becomes an incentive for these kids to lose weight, as well as for their parents to become more stringent and actively involved in the effort.

Normally weighted children with OSA generally require tonsillectomy and adenoidectomy to solve their problem. However, when such children have both enlarged tonsils/adenoids and significant obesity, their apnea/hypopnea index levels and extent of oxygen desaturation while sleep becomes nothing short of alarming. Sleep services for such children are greatly needed.

So, here is my 2009 wish list of sub-specializations that need to come into existence for the future of sleep-related disorders.

Sleep cardiologists. Cardiologists I have spoken to generally feel they have sleep cardiological changes covered with Holter monitors. To some extent, this is true. ECG changes during sleep are readily diagnosed by these black boxes that patients are given to wear for 24 hours or more. However, what is not covered by these devices is whether the arrhythmias or ECG changes observed are associated with sleep-disordered breathing abnormalities or oxygen desaturations.

Polysomnography makers need to develop a cardiac montage, one that delivers a six-lead ECG in conjunction with the current channels used for overnight PSG.

Bariatric pediatrics, while adults have weight loss specialists, bariatric specialists and surgeons, overweight kids are often left to manage their own problems with the assistance of their parents or guardians. Often, however, there are either poor or no meaningful results. This is a field waiting to be created. Overnight sleep testing in such children should be an important part of their diagnosis and management plan. Clearly, schools, parents and many pediatric specialists have dropped the ball on such children, and this needs more than whatever resources are being thrown at the problem now. If this weren't true, we wouldn't have the epidemic of overweight kids we have.

Endocrinologists. These physicians, especially those who specialize in diabetes, recognize that a sleep disorder causing stressful nighttime arousals or awakenings may be a major contributing factor in the prognosis of poorly or difficult to control diabetics. These specialists need to refer their patients in this category for sleep testing. Once their problem is identified and treated (for example, OSAHS treated by NCPAP), they should re-evaluate the degree of control they need to keep their glucose levels in check. These doctors and diabetic educators need to incorporate some of the same screening questions we ask any potential OSAHS patient into their histories and then refer such patients for further evaluation if responses are predictive for a sleep disorder. We have come a long way since Freud, but clearly we have a long way yet to go.

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