The Close but Mysterious Ties between Obstructive Sleep Apnea and the Obesity-Hypoventilation Syndrome

Obstructive sleep apnea and the obesity-hypoventilation syndrome are closely related. Since obesity, excessive somnolence, and loud snoring commonly occur in both groups of patients, the clinical description of these two disorders often overlap. One of the initial reports of obstructive sleep apnea was made in patients with the obesity-hypoventilation syndrome. In addition, one of the first reports of the obesity-hypoventilation syndrome was described in a patient who had apneas and loud snoring during sleep.

Though sleep apnea is not an essential feature of the obesity-hypoventilation syndrome, most of these patients have obstructive sleep apnea. Finally, the treatment of these two disorders may be similar; weight loss is often an effective therapy in both disorders, and successful treatment of obstructive sleep apnea can correct hypercapnia in certain patients with the obesity-hypoventilation syndrome.

The article in this issue of *Chest* by Leech and colleagues (see page 807) increases our knowledge of the relationship between obstructive sleep apnea and the obesity-hypoventilation syndrome. This study summarizes the clinical and laboratory findings significantly associated with awake hypercapnia in patients with obstructive sleep apnea. This well done, prospective study demonstrates statistically significant relationships among awake PCO₂, obesity, hypoxemia (daytime and nocturnal), and restrictive lung volumes in a large and heterogeneous patient population. These findings support the authors' conclusions that chronic hypoxemia, mechanical impairment of the ventilatory system, and the degree of sleep-induced respiratory abnormalities are important in the pathogenesis of the obesity-hypoventilation syndrome.

The study by Leece and colleagues helps clarify the place of obstructive airways disease in the obesity-hypoventilation syndrome. In a recent investigation of 50 patients with sleep apnea, all seven hypercapnic patients had airways obstruction; the authors concluded that obstructive airways disease is an important predisposing factor to the development of chronic hypercapnia in patients with sleep apnea. In contrast, measures of obstructive airways disease are less closely related to daytime hypercapnia in the larger population of the study by Leece et al. The similar degree of airways obstruction in the normocapnic and hypercapnic patients demonstrates that chronic airway obstruction is not a prerequisite for the obesity-hypoventilation syndrome. This finding is supported by many previous studies in obesity-hypoventilation patients with and without documented sleep apnea.
daytime hypercapnia in certain patients with obstructive sleep apnea. The second question: Which pathologic events during sleep apnea affect awake ventilation? Sleep deprivation can decrease the ventilatory drive in normal humans, and severe hypoxemia and hypercapnia during sleep can produce reversible awake hypercapnia in man. Therefore, nocturnal hypoxemia, nocturnal hypercapnia, and sleep disturbances all may be important mediators of daytime hypercapnia in patients with sleep apnea. The third question: What mechanisms underlie the effect of apnea and its associated hypoxemia upon central ventilatory control? Preliminary studies suggest that severe hypoxemia during sleep apnea may greatly increase the production of adenosine and other adenosine triphosphate metabolites. Since adenosine and its analogues inhibit neuronal transmission, induce hypoventilation in experimental animals, and may modulate ventilatory depression during hypoxemia, adenosine may mediate some effects of severe hypoxemia upon the ventilatory control centers of the brain in patients with sleep apnea. Answers to these three clinically important questions may clarify the close but mysterious ties between sleep apnea and the obesity-hypventilation syndrome.

Larry J. Findley, M.D.
Charlottesville, Virginia

REFERENCES


Advances in Prospective Payment for Pulmonary Patients

On May 19, 1987, the Health Care Financing Administration (HCFA) published changes to the Diagnosis-Related Group (DRG) classification system proposed for Federal fiscal year 1988. Two new DRGs for ventilator patients were proposed among the changes. One DRG would be for patients who have tracheostomy procedure codes and would be considered a surgical classification. The other DRG would be for nonsurgical patients ventilated through endotracheal tubes. Only patients with a primary diagnosis of respiratory disease would be covered. The relative payment for these new DRGs would be great since the HCFA’s analysis of 1985 billing data indicated that for all respiratory patients the average charge for those on ventilators was two to ten times greater than for other patients in the same DRGs.

At Rush-Presbyterian-St. Luke’s Medical Center we reviewed the annual costs of 446 Medicare patients who received care in our medical intensive care unit and determined they exceeded by over $4.7 million the actual reimbursements for similar patients under the Medicare Prospective Payment System. Each day on a ventilator added $439 for respiratory-related...