A Rude Awakening — The Perioperative Sleep Apnea Epidemic

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According to the Centers for Disease Control and Prevention, the rate of sleep disorders is reaching epidemic proportions, with as many as 70 million people in the United States affected by these conditions. It is estimated that 1 in 4 men and 1 in 10 women in this country have obstructive sleep apnea (OSA).[1] This disease complex places a burden on society and the health care system because of its association with adverse events ranging from loss of productivity to increased risk of cardiopulmonary illness and related death. OSA may also increase the risk of perioperative complications and is more prevalent among candidates for surgery than in the general population — which means that with more than 40 million surgical procedures performed annually, hospitals and health care facilities must increasingly confront OSA's economic implications. Physicians and hospitals treating patients with OSA may feel compelled to employ expensive but unproven interventions in an attempt to reduce the risk of adverse events.

Although sleep apnea's long-term adverse effects on health-related outcomes are well documented, its effects on perioperative risks have only recently been evaluated through population-based and institutional studies. These studies are limited by a number of factors, such as the inability to identify patients in the control group with potentially undiagnosed OSA and the fact that no or limited adjustment is made for body-mass index. However, since no large randomized, prospective studies to evaluate the impact of OSA and related interventions are available, the available studies represent a rare source of much-needed information. In these studies, patients with sleep apnea undergoing orthopedic or general surgery appeared to be at increased risk for pulmonary complications and need for intensive care services, which significantly increase health care costs.[2,3]

In addition, the prevalence of OSA is estimated to be 25% among candidates for elective surgery and may be as high as 80% in high-risk populations such as patients undergoing bariatric surgery. Further complicating matters is a high prevalence of associated conditions such as obesity, hypoventilation syndrome, and chronic hypercapnia. Disturbingly, OSA remains undiagnosed in 80% of patients at the time of surgery, which means that many patients may unknowingly be placed at risk partially because of the untreated nature of their disease, and outcomes data for such patients are necessarily incomplete.

Thanks to the availability and propagation of simple perioperative screening tools[4] for assessing the risk for OSA, many patients now first receive a suggested diagnosis of OSA when they present for surgery. Although this step may be viewed as positive for the long-term health of a patient, who can then be referred for further workup and treatment, it presents a dilemma in the perioperative setting to the treating physician, who must decide either to cancel the surgery and refer the patient for possible positive airway pressure (PAP) therapy or to proceed, knowing that the risk of complications may be increased. If the former path is chosen, many unknowns remain, including how long to treat a patient with PAP before rescheduling the surgery and, more important, whether the patient will adhere to treatment, given that reports suggest that noncompliance rates are high.

Finally, a further economic and logistic burden is placed on health care providers and institutions when patients with OSA do undergo surgery. Despite the lack of scientific evidence, organizations concerned with perioperative safety, such as the American Society of Anesthesiologists, have put forth recommendations for the perioperative care of patients with OSA.[5] In these guidelines, the expert panel suggests that patients with OSA be observed for prolonged periods after surgery and receive routine PAP with the goal of reducing the risk of respiratory compromise related to surgical insults and the administration of respiratory-depressant drugs such as anesthetics and opioids. Some institutions also recommend that certain populations of patients with OSA be admitted overnight for operations that would normally be done in an ambulatory setting, because of concern about the increased risk of adverse events.

Although the concern about patient safety is understandable, the cost of implementing these programs may increasingly become prohibitive, given the high

prevalence of OSA among candidates for surgery, the paucity of data demonstrating the efficacy of perioperative, acute use of PAP therapy in improving outcomes, and the usefulness of postoperative observation. Therefore, it is not surprising that adherence to the aforementioned guidelines appears to remain low. Indeed, a recent analysis of population-based data from hundreds of hospitals participating in Premier Inc.'s database of comprehensive, clinically relevant administrative and billing data suggests that less than 20% of patients with a diagnosis of OSA indeed receive PAP therapy, are observed in advanced care settings, or both. Furthermore, surveys suggest that less than 25% of health care institutions in the United States and Canada have hospital policies regarding the perioperative treatment of patients with OSA.

Although patient safety is of utmost importance, the combination of the increasing prevalence and diagnosis of OSA, a proposed perioperative management approach based on insufficient scientific evidence and associated with high costs, and concerns about potential medicolegal implications has increased the need for objective assessment of the health and economic effects of performing surgery in patients with OSA. In a time of rising costs and renewed attempts to bring accountability to health care, the OSA epidemic and its effect on perioperative medicine are prime targets for collaborations among researchers, clinicians, policymakers, and administrators.

Certainly success will depend on the involvement of all perioperative disciplines in the wider discussion of OSA and its effects on public health beyond the perioperative period. To return to the dilemma presented above, one wonders whether surgeons or anesthesiologists encountering a patient with a high risk for OSA would do their best to chaperone the patient through elective surgery, possibly using interventions of uncertain efficacy to reduce the related risks, or would delay the procedure to refer the patient for evaluation and therapy with proven long-term benefits before surgery. Optimizing a patient's health status for surgery has become an accepted approach for other coexisting conditions such as coronary artery disease and diabetes mellitus. The answer, however, will require more research and will depend on how we as a profession interpret our role in the health care system and society as a whole. Until we can better identify patients who are at risk and evidence-based interventions that improve outcomes — probably by way of practice-based studies rather than traditional randomized, controlled trials — institutions should, at the very least, address the issue of OSA and develop protocols that take into account the need for heightened awareness as well as locally available resources.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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1. Young T, Peppard PE, Gottlieb DJ. Epidemiology of obstructive sleep apnea: a population health perspective. Am J Respir Crit Care Med 2002;165:1217-39.
2. Memtsoudis S, Liu SS, Ma Y, et al. Perioperative pulmonary outcomes in patients with sleep apnea after noncardiac surgery. Anesth Analg 2011;112:113-21.
3. Kaw R, Pasupuleti V, Walker E, Ramaswamy A, Foldvary-Schafer N. Postoperative complications in patients with obstructive sleep apnea. Chest 2012;141:436-41.
4. Chung F, Subramanyam R, Liao P, Sasaki E, Shapiro C, Sun Y. High STOP-Bang score indicates a high probability of obstructive sleep apnoea. Br J Anaesth 2012;108:768-75.
5. Gross JB, Bachenberg KL, Benumof JL, et al. Practice guidelines for the perioperative management of patients with obstructive sleep apnea: a report by the American Society of Anesthesiologists Task Force on Perioperative Management of patients with obstructive sleep apnea. Anesthesiology 2006;104:1081-93.

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Health Promotion and the State

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Some major U.S. public health problems are perpetuated and exacerbated at least in part by lifestyle choices and individual behavior. Policymakers at all levels of government are struggling to find ways of intervening to promote wellness and reduce unhealthy behaviors without overstepping the limits of their authority or infringing on personal liberties. What can and should government do to reduce obesity and tobacco use? On May 17, 2013, experts Thomas Farley, Steven Gortmaker, and Cass Sunstein addressed these and other questions about health promotion and the state in a roundtable discussion moderated by Meredith Rosenthal.