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<p>Obesity has reached epidemic proportions in the United States, with 35.1% of adults being classified as obese. Obesity affects every segment of the US population and continues to increase steadily, especially in children. Obesity increases the risk for many other chronic diseases, including diabetes mellitus, cardiovascular disease, and nonalcoholic fatty liver disease, and decreases overall quality of life. The current US generation may have a shorter life expectancy than their parents if the obesity epidemic is not controlled, and there is no indication that the prevalence of obesity is decreasing. Because of the complexity of obesity, it is likely to be one of the most difficult public health issues our society has faced.</p>	
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<p>Obstructive sleep apnea is a common disorder, and obesity is a known risk factor for its development. The prevalence of obesity is increasing worldwide, and a corresponding increase in the prevalence of obstructive sleep apnea and its cardiovascular and noncardiovascular consequences is likely. This article reviews the established evidence supporting obesity as a risk factor for obstructive sleep apnea and discusses the evidence suggesting that obesity is also a consequence of obstructive sleep apnea. There is evidence that treating obesity reduces the severity of obstructive sleep apnea and that treating obstructive sleep apnea decreases obesity. However, the evidence does not support a sustained correlation between weight loss and improvement in sleep-disordered breathing.</p>	
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<p>Obesity-hypoventilation syndrome (OHS), also historically described as the Pickwickian syndrome, consists of the triad of obesity, sleep disordered breathing, and chronic hypercapnia during wakefulness in the absence of other known causes of hypercapnia. Its exact prevalence is unknown, but it has been estimated that</p>	

10% to 20% of obese patients with obstructive sleep apnea have hypercapnia. OHS often remains undiagnosed until late in the course of the disease. Early recognition is important because these patients have significant morbidity and mortality. Effective treatment can lead to significant improvement in patient outcomes, underscoring the importance of early diagnosis. The authors review the definition and epidemiology of OHS, in addition to the current multifaceted understanding of the pathophysiology, and provide useful clinical approaches to diagnosis and treatment.

Obesity and Asthma

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David A. Beuther

Population-based studies have defined a significant, bidirectional, dose-dependent association between obesity and asthma. Obesity does not cause airflow obstruction, but can result in pulmonary restriction and a reduction in airway diameter, and that could contribute to airway hyper-responsiveness. Mouse models of asthma have demonstrated that obesity and adipokines can enhance airway hyper-responsiveness, airway inflammation, and allergic responses, but it is unclear whether obesity-associated inflammatory mechanisms are relevant in human asthma. Shared environmental and genetic factors are incompletely understood, but very likely to be relevant. Obese asthma appears to be a distinct and novel phenotype of asthma, associated with a reduction in lung volumes, lack of eosinophilic inflammation, altered response to asthma controller therapy, glucocorticoid resistance, and poor asthma control.

Obesity and Thromboembolic Disease

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Paul D. Stein and Jose Goldman

Various abnormalities of hemostasis have been described in obesity, mainly concerning increased levels of plasminogen activator inhibitor-1, but other abnormalities of coagulation and platelet activation have been reported as well. Circulating microparticles have also been observed in obese patients. These suggest that obesity would be a risk factor for venous thromboembolism (VTE). Analysis of the database of the National Hospital Discharge Survey showed compelling evidence that obesity is, in fact, a risk factor for VTE. Obesity is also a risk factor for recurrent VTE. A synergistic effect of oral contraceptives with obesity has been shown.

Obesity and Acute Lung Injury

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Jennifer W. McCallister, Eric J. Adkins, and James M. O'Brien, Jr

Acute lung injury (ALI) and the acute respiratory distress syndrome (ARDS) are common indications for ICU admission and mechanical ventilation. ALI/ARDS also consumes significant health care resources and is a common cause of death in ICU patients. Obesity produces changes in respiratory system physiology that could affect outcomes for ALI/ARDS patients and their response to treatment. Additionally, the biochemical alterations seen in obese patients, such as increased inflammation and altered metabolism, could affect the risk of developing ALI/ARDS in patients with another risk factor (eg, sepsis). The few studies that have examined the influence of obesity on the outcomes from ALI/ARDS are inconclusive. Furthermore, observed results could be biased by disparities in provided care.

Role of Obesity in Cardiomyopathy and Pulmonary Hypertension 509

Charles S. Dela Cruz and Richard A. Matthay

Obesity is becoming a worldwide problem of epidemic proportions, and its effect on the heart is increasingly being recognized. Obesity is often associated with an increased risk for heart failure. In this article, the authors review the evidence for obesity-related cardiomyopathy. The importance of metabolic disturbances in the development of cardiomyopathy in obese patients is highlighted. The authors also briefly explore whether obesity plays a role in the development of pulmonary hypertension. Better recognition and understanding of both obesity cardiomyopathy and pulmonary hypertension are needed in the obese patient population.

Medications for Obesity: Mechanisms and Applications 525

George A. Bray

Medications can significantly increase weight loss compared with placebo in most trials. In general, patients can expect a weight loss of 8% to 10% from baseline provided they adhere to the weight-loss program and take medications regularly. All medications have side effects that need to be considered before initiating treatment, however. For sibutramine, there is an increase in blood pressure and heart rate that may require discontinuation of the drug in a small percentage of patients. For orlistat, the principal side effect is gastrointestinal in origin resulting from the increased activity of the lower bowel. Cannabinoid receptor antagonists, once a promising target, are no longer under study. Other medications are in clinical trials and on their way.

Obesity and Bariatric Surgery 539

Basil M. Yurcisin, Moataz M. Gaddor, and Eric J. DeMaria

Laparoscopic Roux-en-Y gastric bypass and laparoscopic adjustable gastric banding are the most commonly performed weight reduction operations in the United States. Preoperative assessment and selection should be performed by a multidisciplinary team to obtain optimal results. The most devastating complication of bariatric surgery is leak, which can carry a high risk of mortality if not detected and treated expeditiously. New nationwide databases have been developed to monitor outcomes and facilitate better understanding of the mechanisms of bariatric surgery. New horizons for the advancement of bariatric surgery are in the realm of surgery in adolescent and geriatric populations, the use of weight-loss surgery in lower body mass index (<35 kg/m²) populations, and the use of surgery to cure the comorbidities of obesity.

Airway Management in the Obese Patient 555

Ali A. El Solh

Airway management is a major factor underlying morbidity and mortality in the obese population. The validity of anthropomorphic prediction model in assessing a difficult airway is less accurate compared with lean subjects. Preoperative evaluation and anticipation of potential complications are critical for safe and successful intubation. Application of noninvasive positive airway pressure can prevent atelectasis and improve oxygenation during the anesthetic induction as well during the postoperative period and after liberation from mechanical ventilation. When performed by trained operators, bedside percutaneous dilatation tracheostomy in obese patients has a safety profile comparable to surgical tracheostomy but provides advantages including ease of performance and lesser cost, and obviates transporting a critically ill patient outside the intensive care unit.

Anesthetic Management of Patients with Obesity with and Without Sleep Apnea 569

Anthony N. Passannante and Michael Tielborg

The global obesity epidemic presents anesthesia providers with unique and complex challenges as an increasing number of patients with elevated body mass index present for medical care. Pharmacokinetics, respiratory and cardiac physiology, positioning, regional anesthetic techniques, monitoring, and postoperative care are all profoundly affected by increased body mass. In recent years, the occult impact of undiagnosed obstructive sleep apnea on perioperative morbidity and mortality has marshaled increased attention from both patients and practitioners. A summary and discussion of the Practice Guidelines developed by the American Society of Anesthesiologists regarding the care of patients with obstructive sleep apnea is provided.

Obesity in the Intensive Care Unit 581

Shyoko Honiden and John R. McArdle

The exact prevalence of obesity among critically ill patients is not known, but some evidence suggests that in the United States one in four patients in the intensive care unit is obese. The authors review the physiologic alterations in obesity that are relevant in critical illness and highlight some common diseases associated with obesity. Various practical challenges in the care of the critically ill obese patient, including drug dosing, are also reviewed.

Obesity and Respiratory Diseases in Childhood 601

Elizabeth K. Fiorino and Lee J. Brooks

The prevalence of childhood obesity has more than tripled over the past five decades. Obesity results in low lung volumes, likely through increased loading of the chest wall and abdomen. The prevalence of asthma in children has paralleled the rise in obesity; obesity may increase the severity of asthma, but a direct link has been difficult to establish. Obesity is a risk factor for obstructive sleep apnea (OSA) in children as well as adults. Obese children may be at increased risk for persistent OSA following adenotonsillectomy treatment for OSA. Severe obesity and OSA may lead to the obesity-hypoventilation syndrome, with hypoxia, hypercapnia, and reduced ventilatory drive. Obesity can increase a child's risk for complications of anesthesia and recovery from surgery.

Obesity and Aging 609

John Harrington and Teofilo Lee-Chiong

In this article, the combined effects of aging and obesity on the respiratory system are examined. Following a concise epidemiologic overview of the prevalence of obesity among older adults, the occurrence of prospective, often variable, health consequences related to this trend are considered as well as the observed effects of the association of both aging and obesity on respiratory anatomy, physiology, and diseases. Last, findings of research related to weight loss on respiratory function in obese older adults are summarized.

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