INTRODUCTION

Altered respiratory physiology occurs in patients after they undergo operations and anesthesia, especially following upper-abdominal or thoracic procedures, and in patients with preexisting pulmonary disease. These changes include: impairment of upper-airway function; altered mucociliary function; changes in lung-thorax-abdominal compliance relationships; decreases in vital capacity, functional residual capacity, total lung capacity, tidal volume, expiratory reserve volume relative to closing volume; and increases in respiratory rate, intrapulmonary shunt, and alveolar-to-arterial oxygen gradient.

While many of these changes can be measured postoperatively, specific preoperative pulmonary-function tests do not necessarily predict postoperative pulmonary complications. However, some factors are known to prolong respiratory abnormalities and increase the incidence of postoperative pulmonary complications. These factors include: operations requiring general anesthesia for more than 4 hours; the supine position; the use of restrictive bandages; suboptimal pain control; opioid overuse; and persistent postoperative pneumoperitoneum or abdominal distention.

Preoperative pulmonary-function evaluation that yields the most information at the lowest cost includes a thorough functional assessment through clinical history and physical examination and, when indicated, spirometry and blood-gas analysis.

Improving the abnormalities that occur after the operation and anesthesia enhances postoperative outcome. Efforts to minimize decreases in

postoperative lung volume are complicated by postoperative pain. Patients experiencing pain are unable to cough effectively, breathe deeply, or clear secretions; these maneuvers are essential to reclaiming diminished lung volume and improving pulmonary function. Thus, adequate pain control allows the patient to sustain maximal inspirations that reverse alveolar collapse, increase lung volume and oxygenation, and return ventilatory patterns to normal. The use of patient-controlled analgesia and epidural analgesia, early ambulation, deep-breathing exercises, incentive spirometry, continuous positive airway pressure via face or nasal mask, and specific drug therapy can improve postoperative pulmonary function. Uncommonly mechanical ventilation may be needed in some cases.