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Anesthetics to Prevent Lung Injury in Cardiac Surgery

Abstract

Nearly 60,000 cardiac surgical patients per year will suffer from a postoperative pulmonary complication (PPC). A subset will experience frank respiratory failure leading to extreme increases in perioperative mortality. The pulmonary ischemia-reperfusion injury known to occur during cardiopulmonary bypass is thought to be the main contributor to the excess mortality seen in patients who suffer from PPCs. Data from preclinical models and thoracic anesthesia suggests that the volatile anesthetics may be able to mitigate pulmonary ischemia-reperfusion injury, but to date the concept has yet to be investigated in cardiac surgical patients.

The proposed randomized, controlled trial endeavors to investigate the potential for the volatile anesthetic sevoflurane to reduce lung inflammation and incidence of PPCs after cardiac surgery compared to propofol. 40 Patients will be randomized to receive either sevoflurane anesthesia or total intravenous anesthesia with propofol. Degree of lung inflammation will be assessed before and after cardiopulmonary bypass in bronchoalveolar lavage fluid and serum, and the incidence of composite PPCs will be observed, and strict anesthetic and mechanical ventilation protocols will be followed in both groups.

A positive result from this proposed trial would represent attainable practice change to improve the perioperative pulmonary outcome for many thousands of cardiac surgical patients per year.

Additionally, the data gleaned from this trial will serve as background signal to design additional studies powered to detect differences in patient outcomes as well as in other populations at risk for lung injury in the operating room and intensive care unit.