MECHANICAL VENTILATION
AFTER CARDIAC SURGERY

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Impaired pulmonary function including atelectasis and intra-pulmonary shunt is a common problem after cardiac surgery with cardiopulmonary bypass. CPB exposes blood to large areas of synthetic materials that trigger the production and release of numerous chemotactic and vasoactive substances. Activation of neutrophils, with subsequent trapping in the pulmonary circulation, causes profound pulmonary endothelial, epithelial, and interstitial damage. This damage may contribute to increases in pulmonary capillary endothelial permeability, decreases in lung compliance, and impaired gas exchange. However, CPB may not be the sole reason behind pulmonary dysfunction after cardiac surgery. Other factors exist including general anesthesia, sternotomy, and breach of the pleura. Whatever the etiology, some degree of lung injury is noted in most patients undergoing cardiac surgery.

Based on the previous data, it is recommended that mechanical ventilation of patients after cardiac surgery should take a lung-protective pathway. This strategy should aim at limitation of peak airway pressure (and hence alveolar overdistension) thereby avoiding mechanical alveolar damage and the overdistension-induced release of inflammatory mediators. It should also target use of enough PEEP to maintain integrity of the lung units, without causing hemodynamic compromise or pressure on newly placed grafts. These goals are best achieved using pressure-targeted ventilatory modes, which also tend to offer more patient-ventilator synchrony, and therefore less use of sedation, leading to a smoother extubation process.

It is also important to identify patients who are at higher risk of difficulty in liberation from mechanical ventilation postoperatively. Previous studies have shown that risk factors of delayed extubation can include: increased age, female gender, postoperative use of intraaortic balloon pump, inotropes, bleeding, and atrial arrhythmia. Whenever a higher risk of weaning failure exists, it becomes more and more crucial to adhere to the policy of lung protection.

References:
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