

Tips and Tricks in Cardiac Surgical Anesthesia

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Received date: November 22, 2021; Accepted date: December 08, 2021; Published date: January 03, 2022

Citation: H Gokalp, H Degirmenci (2022). Tips and Tricks in Cardiac Surgical Anesthesia. *Cardiology Research and Reports*. 4(1); DOI: 10.31579/2692-9759/034

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Introduction

For operations including coronary artery by-pass grafting (CABG), heart valve repair or replacement, ascending aorta surgeries, heart transplantation, and surgical correction of congenital heart defects, anesthesia management shares many similar concepts. The goal of this paper is to describe the fundamental concepts of anesthetic management for adults having cardiopulmonary bypass (CPB) heart surgery, as well as some tips based on current knowledge.

Premedication and Monitorisation

Premedication with agents like midazolam-droperidol or oral clorazepate-flunitrazepam has been found to be helpful and has favorable effects on anxiety and cardiac stability [1, 2].

The ASA recommends bladder catheterization, temperature monitoring [3], intra-arterial cannulation for intermittent sampling and pressure monitoring [4], central venous catheterization, and brain monitoring [5] in addition to the standard monitoring recommended by the ASA (pulse oximetry, ECG, noninvasive blood pressure monitoring, and end tidal CO₂ monitoring) [6].

Transophageal Echocardiography (TEE)

Because it induces aerosol formation, transesophageal echocardiography should be performed with care in patients with suspected COVID-19 [7, 8]. The American Society of Anesthesiologists and the Society of Cardiovascular Anesthesiologists recommend TEE before and after by-pass surgery to confirm and assess the treatment outcome in order to confirm the diagnosis, disclose unexpected diagnoses, and manage the treatment plan [9].

Preoperative Considerations

Glucose management is critical in the days leading up to surgery. Diabetes, whether diagnosed or undiagnosed, is common in cardiac surgery patients. Because high preoperative HbA_{1c} levels are linked to wound infection, ischemic events, and increased mortality, keeping the HbA_{1c} level below 6.5 percent is suggested [10].

Albumin levels should be kept high with nutritional support, especially in malnutrition, to avoid prolonged mechanical ventilation, acute kidney injury, infection, and increased mortality [10]. Allowing clear fluids up to 2-4 hours before surgery is safe, according to the ERAS

protocol [10]. It is good to provide clear liquid carbs 2 hours before surgery to minimize insulin resistance and the need for inotropes [11].

Patients who participate in preoperative training and exercise programs recover faster, have less insulin resistance, and spend less time in the hospital [10].

Tobacco and alcohol should be avoided for at least one month prior to surgery. Tobacco and alcohol use both slow wound healing and increase the risk of bleeding, infection, and respiratory and metabolic disorders [10].

Intraoperative Considerations

In order to avoid sternotomy site infections, infection precautions are extremely crucial, and intraoperative antibiotic administration is suggested (especially with an antibiotic effective against *S. Aureus*, which is the most common causative agent) [12].

Moderate glucose control (180 mg/dL) has been proven to be more effective than strict glucose control (80-110 mg/dL), which produces hypoglycemia, in preventing sternum infection [10, 12].

Pain is one of the most serious issues, and it should be treated using multimodal analgesia strategies, which generally include opioids. Because of the increased risk of thromboembolism, NSAIDs like celecoxib should not be taken [10].

Although intraoperative high-dose heparin increases the risk of problems, neuraxial or regional procedures (pectoral block 1-2, serratus anterior plane block, erector spine block, intercostal blocks, etc.) have been shown to have good outcomes [13-15].

Normothermia should be targeted in intensive care follow-up after bypass. Hyperthermia is linked to cognitive impairment, renal damage, and infection, whereas hypothermia is linked to bleeding, infection, protracted hospital stays, and higher death [10, 16].

In cardiac surgery, bleeding is a common and serious issue. According to current guidelines, a transfusion procedure should be created and implemented. When determining the requirement for transfusions of blood products such as fresh frozen plasma, platelets, and cryoprecipitate, the Society of Cardiovascular Anesthesiologists advises using thromboelastographic (TEG) or rotational thromboelastometry (ROTEM) [10, 17].

Postoperative Considerations

Shortening the intubation time reduces mortality and length of stay in the hospital. Extubation within 6 hours following surgery has been found to be safe and shorten the time of stay in the ICU [10].

Targeted hydration treatment using cardiac index, mixed venous oxygen saturation, and urine flow monitoring has been found to shorten hospital stays and minimize complications [10-18].

Acute kidney injury (AKI) is a frequent complication of cardiac surgery with a dismal prognosis. Some markers can be used to detect AKI (metalloproteinase-2 tissue inhibitor, insulin-like growth factor binding protein -7, etc.) [10-19].

Delirium is prevalent in cardiac surgery patients and should be properly monitored since it can lead to complications including increased mortality and the requirement for re-hospitalization [10].

Thromboprophylaxis should be maintained from the first surgical day until discharge to reduce the risk of both deep vein thrombosis and pulmonary embolism [10].

Because thorax tubes regularly clog, they should be examined, and occlusions should be avoided by paying attention to the danger of infection, or new types of thorax tubes with a low risk of infection should be employed [10].

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