

Cardiac Surgery: Enhanced Recovery After Surgery Society Guideline Recommendations for Perioperative Care in Cardiac Surgery (2019)

About the Guideline

- Enhanced Recovery After Surgery (ERAS) is a care improvement initiative to decrease surgical complications, improve clinical outcomes, and enable a patient's earlier return to normal activities.
- The guideline panel consisted of a multidisciplinary group of 16 cardiac surgeons, anesthesiologists, and intensivists who are experts in ERAS. This group agreed on 22 recommendations divided among the preoperative, intraoperative, and postoperative phases of recovery.
- These guidelines present recommendations for the optimal perioperative management of patients undergoing cardiac surgery.

Key Clinical Considerations

Become familiar with the recommendations and best-practice statements provided in this guideline, especially if you work in an acute care setting.

Preoperative Strategies

Measurement of Hemoglobin A1c (HbA1c) for Risk Stratification

- Patients with a HbA1c level of less than 6.5% have a significantly decreased risk of developing deep sternal wound infections, ischemic events, and other complications.
- Screen all patients for diabetes preoperatively and intervene to achieve a HbA1c of less than 7%, if applicable.

Correction of Nutritional Deficiency

- Patients undergoing cardiac surgery who are malnourished, defined by a serum albumin level of less than 3 g/dL, should be started on oral nutritional supplementation 7 to 10 days preoperatively to decrease the risk of infectious complications.

Consumption of Clear Liquids before General Anesthesia

- Delayed gastric emptying due to diabetes mellitus and transesophageal echocardiography can increase aspiration risk in cardiac surgery patients.
- Based on available data, consumption of clear liquids may be continued up to 2 to 4 hours prior to cardiac surgery.

Carbohydrate Loading

- Administering a 12-oz clear beverage or a 24-g complex carbohydrate beverage 2 hours before surgery reduces insulin resistance and tissue glycosylation, improves postoperative glucose control, and improves return of gut function.
- Carbohydrate loading may improve cardiac function immediately post cardiopulmonary bypass.

Patient Engagement Tools

- Patient education should be provided preoperatively in person, through printed material or by using e-health platforms.
- Education should include an explanation of procedures and goals that helps decrease perioperative fear, fatigue, and discomfort.

Prehabilitation

- Preoperative exercise regimens should be initiated as they have been shown to decrease sympathetic overreactivity, decrease insulin resistance, and increase the proportion of lean body mass to body fat and thus improve physical and psychological readiness for surgery. Preoperative exercise regimens reduce postoperative complications and length of stay.

Smoking and Alcohol Screening

- Screening for alcohol use and cigarette smoking should be completed preoperatively.
- Cigarette smoking and high levels of alcohol consumption are associated with complications postoperatively, which can include respiratory, wound, bleeding, metabolic, and infectious complications.
- Patients should be advised to stop smoking and consuming alcohol 4 weeks prior to cardiac surgery.

Intraoperative Strategies

Surgical Site Infection Reduction

- Hair should be clipped and not shaved prior to cardiac surgery.
- Topical intranasal therapies such as mupirocin should be used to eradicate staphylococcal colonization in patients undergoing cardiac surgery. Approximately 18% to 30% of patients are carriers of *Staphylococcus aureus*, and carriers have 3 times the likelihood of developing a surgical site infection or bacteremia.
- Weight-based cephalosporins should be administered fewer than 60 minutes before the skin incision and continued for 48 hours after cardiac surgery completion. If the cardiac surgery extends longer than 4 hours, antibiotics may require redosing.
- Dressing changes and/or removal should occur every 48 hours.

Hyperthermia

- Avoid hyperthermia (core temperature greater than 37.9° C) while rewarming on cardiopulmonary bypass.
- Rewarming to normothermia should include continuous surface warming.

Rigid Sternal Fixation

- Rigid fixation is not achieved with traditional wire cerclage because it does not eliminate side by side movement.
- Rigid plate fixation should be considered in all cardiac surgery patients, especially for those patients with a high body mass index (BMI), previous chest wall radiation, severe obstructive pulmonary disorder, or steroid use.

Tranexamic Acid or Epsilon Aminocaproic Acid

- Administer a maximum total dose of 100 mg/kg of tranexamic acid or epsilon aminocaproic acid during on-pump cardiac surgery to reduce postoperative bleeding risk.

Postoperative Strategies

Perioperative Glycemic Control

- Perioperative glycemic control is recommended across all types of surgeries, not only cardiac surgery. Preoperative carbohydrate loading has resulted in reduced glucose levels after abdominal surgery and cardiac surgery.

Insulin Infusion

- Begin an insulin infusion in cardiac surgery patients when hyperglycemia is present (blood glucose greater than 160 to 180 mg/dL).

Pain Management

- Implement a multimodal opioid-sparing pain management regimen that includes the use of acetaminophen, tramadol, dexmedetomidine, and pregabalin or gabapentin, based on formulary availability.

Systematic Delirium Screening

- A delirium screening tool such as the Confusion Assessment Method for the Intensive Care Unit (ICU) or the ICU Delirium Screening Checklist should be used.
- Routine delirium monitoring should be done at least once per nursing shift.
- Nonpharmacologic strategies should be implemented as the first-line components of treatment for delirium.

Persistent Hypothermia

- Prevent hypothermia (less than or equal to 36° C) by using forced air warming blankets, raising the room temperature, and warming irrigation and intravenous fluids in the first 2 to 5 hours following ICU admission after cardiac surgery.

Chest Tube Patency

- Maintain chest tube patency without breaking sterility and without stripping tubes.

Chemical Thromboprophylaxis

- Pharmacological thromboprophylaxis should be implemented as soon as satisfactory hemostasis has been achieved, starting, most often, on postoperative day 1 and continued through discharge.

Extubation Strategies

- Initiate strategies to ensure extubation times are accomplished within 6 hours after cardiac surgery by using time-directed extubation protocols and low-dose opioid anesthesia.

Kidney Stress and Acute Kidney Injury (AKI)

- It is recommended to use urinary biomarkers, such as tissue inhibitor of metalloproteinases-2 and insulin-like growth factor-binding protein-7, to identify cardiac surgery patients at risk for AKI.
- In identified high-risk AKI patients, avoid nephrotoxic agents, discontinue angiotensin-converting enzyme (ACE) inhibitors and angiotensin II antagonists for 48 hours, closely monitor

creatinine and urine output, avoid hyperglycemia and radiocontrast agents, and closely monitor and optimize volume status and hemodynamic pressures.

Goal-Directed Fluid Therapy

- Initiate an algorithmic goal-directed fluid therapy for cardiac surgery patients to guide practitioners in the administration of fluids, vasopressors, and inotropes to avoid hypotension and low cardiac output.
- The recommended quantified goals for the algorithm include blood pressure, cardiac index, systemic venous oxygen saturation, urine output, oxygen consumption, oxygen debt, and lactate levels.

Other Important, Ungraded ERAS Elements

- Investigate all causes of preoperative anemia, if time permits.
- Increase the cardiopulmonary bypass machine flow to improve renal oxygenation during cardiac surgery and thus improve postoperative renal function.
- Initiate protective lung strategies by using low tidal volumes for mechanical ventilation during cardiac surgery.
- Initiate early enteral feedings after cardiac surgery.
- Initiate early mobility after cardiac surgery.

Reference

Engelman, D. T., et al. (2019). Guidelines for the perioperative care in cardiac surgery: Enhanced Recovery After Surgery Society recommendations. *JAMA Surgery*, 154(8), 755–766. <https://jamanetwork.com/journals/jamasurgery/fullarticle/2732511>