

Enhanced Recovery after Cardiac Surgery: Is it Just about Putting the Bundles Together?

To the Editor,

Perioperative medicine continues to evolve to incorporate enhanced recovery principles for an improved outcome after high-risk surgical interventions. Enhanced recovery after surgery (ERAS) represents a global initiative centered around an efficient standardized perioperative care aiming at accelerated recovery, reduced complication rate, improved patient experience, and efficient healthcare resource utilization. ERAS protocols constitute multidisciplinary, multimodal, evidence-based approaches usually delivered in the form of *Bundles* at the stages of patient care. ERAS is gaining popularity across the surgical specialities, promoted by an initial encouraging application in colorectal surgery.^[1]

The heightened rates of morbidity, mortality, and resource expenditure attributable to cardiac surgical practice present a colossal opportunity for inculcating ERAS protocols in cardiac surgery. However, the consequences

of cardiopulmonary bypass, hypothermia, and the heterogeneity in patient characteristics and institutional practices present peculiar impediments to the universal implementation of an ERAS program in cardiac surgical subset. Although fast tracking after cardiac surgery has been extensively evaluated in the past two decades,^[2] the literature on the ERAS protocols after cardiac surgery is relatively scarce, yet promising.^[3-5]

Fleming *et al.* assessed the feasibility of a perioperative bundle of interventions for enhanced recovery after cardiac surgery (ERACS) in a prospective observational pilot study.^[4] The bundle was formulated in accordance with the recommendations emanating from a consensus review in colorectal surgery. The perioperative care bundle comprised meticulous preoperative assessment, avoidance of prolonged preoperative fasting, preoperative

Table 1: Potential perioperative interventions aimed at promoting enhanced recovery after cardiac surgery

Preoperative	Intraoperative	Postoperative
Patient education	Minimally invasive surgery	Early removal of catheters
Counselling	Short-acting anesthetic agents	Early extubation
Nutrition	Meticulous temperature management	Early mobilization
Incentive spirometry	Multimodal analgesia	Multimodal analgesia
Anemia correction	Avoidance of high-dose opioids	PONV treatment
Avoid prolonged fasting	Avoidance of volume overload	Early enteral nutrition
Antibiotic prophylaxis	Goal-directed therapy	Bowel regimen
Avoid long-acting sedatives	Judicious transfusion protocols	Incentive spirometry
Preoperative gabapentinoids	Lung protective ventilation	Delirium prevention

PONV: Postoperative nausea and vomiting

gabapentin, avoiding long-acting opioids, multimodal analgesic regimen, prophylaxis and treatment of postoperative nausea and vomiting, early enteral nutrition, and early mobilization postoperatively. They demonstrated a significant reduction in the number of patients presenting with one or more postoperative complications (hospital-acquired infections, acute kidney injury, respiratory failure, atrial fibrillation, stroke, postoperative myocardial infarction, and death) in the ERACS group. The postoperative pain scores also improved significantly after ERACS protocols. It is noteworthy that the length of stay in the hospital (LOS-H) did not reduce with the application of ERACS in their study. However, a much larger study involving 932 patients conducted by Williams *et al.* described a considerable reduction in LOS-ICU with the ERACS implementation.^[5]

The ERACS protocols essentially span the entire perioperative course of management. The proposed perioperative care bundles are enlisted in Table 1, with the focus on targeting the routine aspects of perioperative care for intervention and resultant optimization. Generating an efficient ERACS program mandates the following steps: (1) identifying bundles presenting viable targets likely to influence recovery after cardiac surgery, (2) inculcating knowledge of the incidence of postoperative complications within the bundle-based approach, (3) proposing effective measures to minimize the complication rate, (4) formulating standardized care protocols, and (5) audit to evaluate the compliance and effectiveness of the interventional protocols.

Although a number of ERACS principles are widely accepted, certain others may appear less intuitive. Interestingly, most of the recovery programs perform several individual principles without a formal operationalization as an “ERACS protocol.” However, the present evidence bases do not assist in the comparative evaluation of their individual components. The identification of the component measures that could prove more beneficial

in a protocol aims to streamline the ERACS process and acceptance by the opponents to this approach.

All in all, the transition from an existing system of care to a perioperative bundle of enhanced recovery protocols is not straightforward. At present, there are no consensus guidelines on ERACS from any of the eminent societies dealing with the perioperative management of cardiac surgical patients. Well-directed research in the future can only expedite the development of a pragmatic ERACS design. Moreover, a successful ERACS program necessitates a multidisciplinary team effort with a sound organizational support in the form of adequate staffing, training, resource allocation, and thorough compliance with the norms of enhanced recovery by all the care providers. An ERACS program should be developed based on the Deming cycle, illustrating the fundamental rule of an on-going improvement with the incorporation of the four stages of “Plan-Do-Check-Act.” In conclusion, with the increasing embracement of the core ERAS principles, it would be prudent to evaluate novel ERAS protocols for cardiac surgical cohort to ensure logistic feasibility and clinical utility of ERAS after cardiac surgery in the current era of an evidence-based practice.

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Conflicts of interest

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