

Preoperative Optimization & Enhanced Recovery Pathway (ERP) Practice Advisory

PART 1

February 2023

PART 1* - Preoperative Optimization

* In an effort to simplify and streamline this advisory, it has been split into 2 parts. However, both parts go hand-in-hand to improve outcomes and reduce length of stay.

Part 1 – Preoperative Optimization

Part 2 – Enhanced Recovery Pathway (ERP)

INTRODUCTION

Enhanced Recovery Pathway (ERP) protocols are clinical pathways designed to minimize the surgical stress response in major procedures, decrease perioperative complications, and shorten length of stay. Evidence supporting ERP and preoperative optimization has been demonstrated in several surgical disciplines, including colorectal, gynecology, hepatobiliary, urology, among others. Recently, reports have emerged demonstrating similar benefits for complex ventral hernia repair (VHR) and abdominal wall reconstruction (AWR). Standardization of perioperative management for AWR patients has been shown to decrease complications, shorten hospital length of stay, and decrease readmission rates.

While the optimal ERP/preoperative optimization protocol has not yet been developed for VHR, the fundamental principles have been demonstrated and should be strongly considered for major ventral hernia repairs, especially repairs requiring abdominal wall reconstruction. High-risk patients (e.g., smokers, active wound infection, loss of abdominal domain, multi-recurrent hernia, malnourished, etc.) are ideal candidates for preoperative optimization. Therefore, we recommend the use of an ERP for patients undergoing ventral hernia repair, especially those requiring abdominal wall reconstruction. Minimally-invasive surgery (MIS) hernia repairs have been shown to reduce the risk of wound morbidity and length of stay. However, given that some MIS repairs will need open conversion along with hernia-related factors, consideration should be given to optimize all patients for risk reduction, regardless of repair modality.

PREOPERATIVE OPTIMIZATION

Obesity

Extensive literature exists demonstrating increased hernia recurrence, infection and other complications in obese patients, particularly for open ventral hernia repairs. A BMI > 45-50 has been considered prohibitive for elective VHR/AWR, with many surgeons using lower BMI thresholds. Patients with obesity should be counselled and supported to help achieve appropriate weight loss, including discussions on medical and surgical weight loss strategies prior to elective VHR/AWR. While watchful waiting is a safe strategy for high-risk patients, obstructive symptoms or worrisome hernia characteristics may limit how long this strategy can be pursued, as the focus of these operations may shift from re-establishing core health to addressing acute visceral complications.

Tobacco Cessation

Complete smoking cessation for at least 4-6 weeks prior to, and 3 months after surgery is recommended. Testing for nicotine and its metabolites (such as cotinine) prior to surgery can be a useful methodology to confirm smoking abstinence. Smoking cessation is an important discussion between surgeon and patient, with careful weighing of pros and cons of wound and other morbidity risk. Educational and tobacco cessation resources should be provided to facilitate these efforts including counseling and possible nicotine replacement therapy (NRT). Of note, NRT has not been shown to increase risk of wound morbidity and may be a useful adjunct to achieve tobacco cessation. The effect of nicotine use outside of traditional tobacco use (e.g., vaping), as well as marijuana smoking, has not been well studied.

Diabetes & Glycemic Control

Perioperative hyperglycemia has been linked to increased risk of adverse outcomes after abdominal operations, including VHR. These complications include increases in mortality, myocardial injury, as well as

surgical site occurrences including infection, poor wound healing and hernia recurrence. Therefore, hyperglycemia should be managed in the preoperative setting to reduce or normalize HgA1c prior to elective VHR, with the goal of HgA1C <7-7.5. For patients with HgA1C >9 we recommend referral to a medical specialist for close monitoring and treatment (e.g., endocrinology). Furthermore, hyperglycemia in the immediate postoperative period is associated with an increased risk of surgical site infection (SSI). Target perioperative blood glucose should be between 120-160 mg/dL in all patients, regardless of diabetic status, taking care to avoid overtreatment and hypoglycemia.

Preoperative Nutritional Optimization

Nutritional assessment and support should be considered in any patient before and after major abdominal wall surgery, as nutritional status is directly associated with perioperative outcomes. In general, nutritional support should be initiated in any patient who is undernourished—with preference for enteral nutrition. Supplemental nutritional drinks enriched with immunonutrients (e.g., arginine, omega-3-fatty acids, ribonucleotides) can be considered in malnourished patients undergoing major operations, in particular if concurrent oncologic procedures are performed. Patients with severe nutritional risks (weight loss greater > 10-15%, BMI < 18.5 kg/m², serum albumin < 20 g/L) may benefit from a period of preoperative nutritional therapy.

Nutrition supplement support in advance of an operation (e.g., immune modulating protein supplementation, fish oils, arginine, nucleotides) have demonstrated benefits in multiple randomized trials, including lower perioperative complication in patients undergoing abdominal procedures and attenuating the metabolic response to surgical stress. Beyond nutritional supplementation, manipulation of the metabolome via carbohydrate loading has shown promise as an approach to reduce postoperative insulin resistance, decrease postoperative nitrogen loss, and improve postoperative muscle function. These adjuncts continue to be evaluated in a variety of surgical settings, but given the low-risk nature of these interventions, consideration should be given to further enhance outcomes in patients.

Prehabilitation

Preoperative frailty has been shown to be associated with adverse postoperative outcomes. Different assessment tools have been validated in ventral hernia repair including the 5-item modified frailty index (mFI-5) and radiologic assessment of sarcopenia. As a component of prehabilitation programs, physical exercises in the form of respiratory muscle training, cardiovascular exercises, aerobic exercises, and resistance training in the weeks leading up to surgery is advised. Abdominal core pre-habilitation strategies can focus on practicing splinting and breathing exercise to work around postoperative pain, practicing activities of daily living (ADLs; e.g., getting on/off bed, climbing stairs, squatting, using toilet, etc.), body weight resistance exercises (e.g., sit to stand, heel raises, seated knee extension, etc.).

MRSA decolonization

MRSA is associated with worse outcomes and increased SSI rates. Because the nares are the most common location of *Staphylococcus aureus*, decolonization with nasal mupirocin or a similar protocol prior to surgery can be considered in all MRSA (+) and high-risk patients without the need for MRSA testing. High-risk patients include previous MRSA infection, co-habitant with MRSA, recently hospitalized within 6 months, living in a nursing facility or prison, or patients currently on broad-spectrum antibiotics. These patients are treated with mupirocin ointment applied in each nostril twice daily, with or without chlorhexidine showers daily, for 5 days prior to surgery. More recently, an iodine-based preparation for use in this setting has been manufactured, and may offer a single treatment option.

Preoperative Skin Preparation

Appropriate surgical field disinfection with a variety of skin preparations has been well described. Multiple studies have shown that both iodine-based and/or chlorhexidine-based skin preparations are equally effective, provided alcohol is a principal ingredient. The data on skin sealants and surgical site barriers (e.g., loban) are too inconsistent to be formally recommended. Showering with antiseptic agents such as chlorhexidine or Betadine, when compared to soap, have not shown significant benefit in lowering SSI, and may alter the normal protective skin flora (microbiome) and actually increase the risk of wound infections.