Immunonutrition and Carbohydrate Loading are complementary practices. Society recommendations include perioperative immunonutrition and preoperative carbohydrate loading.1

**Immunonutrition with IMPACT® Formulas**
- Shown to improve outcomes with or without the addition of carbohydrate loading2,3
- Improved clinical outcomes associated with use of immunonutrition (arginine, omega-3 fatty acids from fish oil, and nucleotides), do not require the adoptions of ERPs2, but may be enhanced by them3-5

**Carbohydrate Loading**
- Shown to improve clinical outcomes when an ERP bundle6 of protocols are in place7
- Limited clinical benefit as a separate intervention8
- No difference in length of stay (LOS) when compared to water or placebo9

ENHANCED RECOVERY PROTOCOLS (ERPs): IMMUNONUTRITION & CARBOHYDRATE LOADING

**Complementary Protocols for Major Elective Surgery**

**PREOPERATIVE IMMUNONUTRITION**

- **ORAL:** 3 cartons/day for 5 days
- **TUBE FED:** 1 UltraPak®/day* for 5 days

**POSTOPERATIVE IMMUNONUTRITION**

- **ORAL:** 3 cartons/day for 5 days
- **TUBE FED:** 1 UltraPak®/day* for 5 days

**Surgery**

- Clear Liquid Beverage
  - 100 grams carbohydrate
  - 50 grams carbohydrate

- **and/or**
  - 12 hours before surgery
  - 2 hours before surgery

**Notes:**
- *Initiate IMPACT® tube feeding and advance to ≥1000 calories/day to meet nutritional needs for 5 days. Also available in open system.
- **Carbohydrate loading not appropriate for patients with Type 1 Diabetes.**1
- These are suggested guidelines based on clinical references and should not be construed as a substitute for medical advice or existing facility protocols.
What are Enhanced Recovery Protocols (ERPs)?

Protocol components implemented Pre-, Intra- and Postoperatively

- Mid-thoracic epidural anesthesia/analgesia
- No nasogastric tubes
- Prevention of nausea and vomiting
- Avoidance of salt and water overload
- Early removal of catheter
- EARLY ORAL NUTRITION
  - Non-opioid oral analgesia/NSAIDs
  - Early mobilization
  - Stimulation of gut motility
  - Audit of compliance and outcomes
- Preadmission counseling
- FLUID AND CARBOHYDRATE LOADING
  - No prolonged fasting
  - No/selective bowel preparation
  - Antibiotic prophylaxis
  - Thromboprophylaxis
  - No premedication
- Short-acting anesthetic agents
- Mid-thoracic epidural anesthetic/analgesia
- No drains
- Avoidance of salt and water overload
- Maintenance of normothermia (body warmer/warm intravenous fluids)

- ERPs may have 17+ types of interventions across multiple functions.
- Institutions may customize which interventions to implement.
- Immunonutrition and carbohydrate loading protocols can be included as complementary nutrition interventions.
- ERPs that include IMPACT Advanced Recovery® drink have shown:
  - Reductions in length of stay (LOS)
  - Reductions in 90-day readmissions
  - Reductions in infection rates
  - Reductions in postoperative CRP values
  - Improved diet advancement
  - Improved time to flatus/bowel movements


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