The Importance of Nutrition for Healing After an Injury

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All About Orthopedics
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Program Goals:

• Learn how nutrition interventions can benefit the surgical patient
• Review research
• Energy and protein needs
• How can dietitians help
• Options at CHI Health
Malnutrition

• Up to 50% of patients are malnourished at the time of hospitalization
• Only 20% of patients get a nutrition consult while in the hospital, according to a Johns Hopkins Study
• Older adults are highly vulnerable to malnutrition
• Obese patients are at risk
Malnutrition

- Energy intake
- Weight loss
- Body fat wasting
- Muscle wasting
- Presence of edema
- Grip Strength
Diabetes

• An estimated 34.2 million people or 10.5% of the population have diabetes
• 88 million people age 18 years or older have pre-diabetes (34.5%)
• 24.2 million people age 65 years or older have pre-diabetes
Research Review

- Enhanced Recovery After Surgery Protocols (ERAS)
- Pre & Post Operative nutrition
- Diabetes management
Enhanced Recovery After Surgery Protocols

- Goal to improve surgical outcomes by applying evidenced-based practices before, during and after surgery
- Nutrition assessment and intervention is a piece of the ERAS puzzle
Pre-surgery
- Patient education and pre-surgery counseling
- Meeting with a surgeon or nurse
- Carbohydrate drink prior to surgery
- Use of epidurals for pain control

During Surgery
- Goal-directed fluid management
- Judicious use of opioid pain medications
- Shorter incisions and use of laparoscopic approach when possible
- Careful consideration of blood transfusions

Post-Surgery
- Early post procedure mobilization
- Early removal of tubes and drains
- Early transition to oral pain medications
- Early allowance of food intake

Better Outcomes
- Increased patient satisfaction with care
- Decreased perioperative complications
- Decreased length of hospital stay
- Improved use of hospital resources
ERAS Protocols for Nutrition

• Oral Nutrition Supplements (ONS) and Immunonutrition
• Pre/Probiotics
• Fasting Protocols
• Fluid and diet initiation after surgery
Research Review

• Study: An Enhanced Recovery After Surgery Program in Orthopedic Surgery: a Systematic Review and Meta-analysis

• 15 studies were reviewed for outcomes
  • ERAS vs. no protocol

Zhi-Chao, et al.
Included studies:

- Required surgery education class and specific identified care companion
- Preoperative factors: oral multimodal analgesia, scopolamine patch, and short-acting spinal (preferred) or general anesthetic
- Intraoperative factors: intravenous dexamethasone, 2 L of lactated Ringer’s, and tranexamic acid
- Postoperative factors: continuous adductor canal block for 48 h, physical therapy session on day of surgery, scheduled acetaminophen, NSAIDs, gabapentin, oxycodone PRN
Research Review

Findings:

• ERAS had a significant association with lower incidence of postoperative complications
• ERAS showed association with decline in 30 day mortality rate and Oswestry Disability Index
• Methodology of ERAS within each study reviewed was not standardized

Zhi-Chao, et al.
Research Review


• Narrative review of nutrition screening and therapy within surgical enhanced recovery pathway

Wischmeyer, et al.
Research Review

- Perioperative Nutrition Screen (PONS) determines risk based on:
  - BMI
  - Recent weight changes
  - Reported decrease in dietary intake
  - Preoperative albumin

Wischmeyer, et al.
Step 1
BMI
BMI < 18.5 (<20 if age > 65)

Step 2
Weight loss score
Unplanned weight loss > 10% in past 6 months

Step 3
Intake score (Modified)
Have you been eating less than 50% of your normal diet in preceding week?

Any Yes Answers

AND/OR
Albumin < 3.0

PONS Score
For Pre-Op Nutrition Screening

Pre-Op Nutrition Clinic or Dietician Intervention
Research Review

- Perioperative Nutrition Screen with 1 or more positive responses would trigger a nutrition referral to a dietitian.
- Screening 2-4 weeks ahead would be an ideal time:
  - Staffing
  - Access to dietitian
  - Patient willing to have another appointment

Wischmeyer et al.
Research Review

Findings:

• Regardless of BMI, unintentional weight loss has been associated with morbidity, functional decline and negative postoperative outcomes

• Albumin is commonly utilized in pre-op testing for determining surgical risk
  • Studies show that albumin is neither specific nor sensitive enough to be the optimal malnutrition marker

Wischmeyer, et al.
2 out of 3 patients coming for gastrointestinal surgery are malnourished at time of surgery.

3x greater risk of having a complication if malnourished at time of surgery and 5x more likely to die than well nourished patients.

Only 1 out of 5 hospitals have formal nutrition screening processes.

3 out of 4 surgeons believe peri-op nutrition delivery will reduce complications.

Every $1 spent on nutrition therapy in hospitalized patients saves $52 in hospital costs.

Only 1 out of 5 patients receives any pre-op Nutrition intervention.

CHI Health Clinic
ERAS: Preoperative Protein Supplementation
Preoperative Protein Supplementation

• Prior to major surgery, it is recommended to have oral nutrition supplements for at least 7 days via:
  • Immunonutrition with arginine and fish oil
  • High protein nutrition supplements 2-3 times daily (minimum 18 grams of protein)
Preoperative Protein Supplementation

- Arginine
  - Activation of T lymphocytes
  - Promotion of T helper cells, phagocytosis
  - Respiratory burst generation
  - Precursor to nitric oxide and proline, important for anastomotic and wound healing

- Omega 3 fatty acids: decosahexaenoic acid and eicosapentaenoic acid
  - Anti-inflammatory effects
  - Decrease oxidative injury
  - Down regulate arachinoic acid
Preoperative Protein Supplementation

- If patient is consuming less than 50% of protein and energy intake
  - Oral Nutrition Supplements
  - Enteral Nutrition
  - TPN
Preoperative Protein Supplementation

Outcomes

• 5-7 days of preoperative nutrition therapy can lead to a 50% reduction in postoperative morbidity in malnourished patients

• Start conversations early with patients to address these needs

Wischmeye, et al.
ERAS: Fasting Protocols
Preoperative fasting and carbohydrate loading

• Delivery of exogenous carbohydrates is considered the best method to induce a metabolically fed state
• 50 g of carbohydrates as clear liquid 2-3 hours preoperative
• Proposed benefits:
  • Improved nitrogen balance
  • Better insulin sensitivity
  • Reduced LOS (shown in abdominal surgeries)
Preoperative fasting and carbohydrate loading

Proponents note fasting can:

- Exacerbate surgical stress response
- Aggravate insulin resistance
- Exaggerate protein losses
- Impair GI function
ERAS: Postoperative Nutrition
Postoperative nutrition

- Re-establish oral feeding as early as possible after surgery
- Anabolism cannot be achieved post-operatively when glucose is administered alone without adequate protein
Postoperative nutrition

- Inadequate protein intake is associated with loss of lean body mass
  - Impairs functional recovery and physical quality of life

- Patients tolerating 50-100% of nutrition goals should receive high protein nutrition supplements 2-3 times daily

- If consuming <50% oral intake
  - Consider enteral or parenteral nutrition

Wischmeyer, et al.
Postoperative nutrition

Optimizing recovery

- Elderly patients are challenged with:
  - Decreased appetite
  - Nausea
  - Constipation
  - Lack of education
- If patients have lost weight after surgery, significant increases in calorie intake are required.
What about Diabetes Control Pre-surgery?
Diabetes Control

- The American Diabetes Association has not provided an optimal A1C for elective surgeries
- General guidelines suggest A1C < 7%
  - Average blood sugar of 154
- Patients taking diabetes medication, especially insulin should review and plan with medical team prior to surgery
Diabetes and Site Infection

• Study: Diabetes and Risk of Surgical Site Infection: A Systematic Review and Meta-analysis
• Review of 94 articles with various types of surgeries
  • Colorectal, spine, breast, gynecological, arthroplasty, cardiac and “other”
• Most of the studies were observational
• Comparative A1C and blood glucose readings with Surgical Site Infection (SSI) data was collected

Martin, et al.
Outcomes:

• Significant association between diabetes and SSI
• Association with Pre and Post-op hyperglycemia and SSI
• Increased risk SSI was not associated with gynecological and obstetrical surgeries

Martin, et al.
Diabetes and Site Infection

Elevated blood glucose associated with increased infection rates in:

- Orthopedic spine surgery
- Cardiac surgery
- Colorectal surgery
- Bariatric surgery
Does Insulin Use Matter in Surgery Outcomes?
Diabetes and Insulin Use

• Study: The Impact of Insulin Dependence on Short-term Postoperative Compilations in Diabetic Patients Undergoing Total Shoulder Arthroplasty (TSA)

• 5918 TSA cases reviewed
  • Non diabetes mellitus
  • Non-Insulin dependent diabetes mellitus (NIDDM)
  • Insulin-dependent diabetes (IDDM)

• NIDDM patients were more likely to be less than 65 years old, obese and have co-morbidities like HTN and COPD

Fu, et al.
Diabetes and Insulin Use

Outcomes:
• NIDDM was not significantly associated with increased risk for post-op complications
• IDDM was independently associated with increased odds for development of 1 or more complications
  • Stroke/CVS
  • Blood transfusion
  • Extended LOS
Diabetes and Insulin Use

- Study: Comparison of Perioperative Adverse Event Rates After Total Knee Arthroplasty in Patients with Diabetes: Insulin Dependence Makes a Difference
- American College of Surgeons National Surgical Quality Improvement database
  - Assess relative risk for adverse events up to 30 days post-op
  - 114,102 patients total included
  - Investigated 17 adverse events

Diabetes and Insulin Use

• Outcomes:
  • NIDDM were at risk for 2 adverse effects (extended LOS and MI)
  • IDDM found to be at risk for 12 adverse events
    • Sepsis
    • Myocardial infarction
    • Renal failure
    • Ventilator (>48 hours)
    • Unplanned intubation
    • Renal insufficiency
    • Return to the operating room
    • Wound dehiscence
    • Readmission
    • Pneumonia
    • Urinary tract infection
    • Extended length of stay

Protein Needs and Surgery
Protein Needs

• Protein needs for the surgical patient
  • Not clearly defined
  • RDA is .8 grams of protein / kg body weight / day

• Protein needs may be increased to 1.5 grams or 2 grams of protein / kg of body weight

Wischmeyer, et al.
Protein Needs

What type and how much?

- Several studies note 25-35 grams of protein in a single meal for maximum protein synthesis.

- Whey and casein may be the best quality proteins for protein synthesis:
  - Shown to stimulate anabolism in cancer patients
  - Often the protein source in ONS
Take home points

• ERAS nutrition protocols are being more widely utilized and showing benefit for surgical outcomes
• Nutrition screening pre-surgery can help with addressing malnutrition and poorly controlled diabetes
• Nutrition interventions like ONS may be easy additions to help improve healing
• Consult a dietitian early to maximize nutrition status
• Nutrition interventions can benefit the patient, surgeon and hospital system
POQI Nutrition Six

1. Pre-op/Post-op Nutrition Screening Essential

2. Protein more important than calories

3. Stop feeding late pre-op, restart early post-op

4. Consider Oral Nutrition Supplements for All

5. Oral before enteral before parenteral

6. Nutrition management is a team game
How Dietitians Can Help

• Provide preoperative weight loss counseling
• Work to improve A1c and glycemic control for patients with diabetes
• Identify and address malnutrition in patients preoperatively
• Educate patients on nutrition strategies to promote surgical healing
Nutrition Options at CHI Health

Outpatient Nutrition Services
  • Option for patients needing to lose weight or improve control of diabetes prior to surgery
  • Helpful for patients with other health concerns or dietary restrictions
  • Ambulatory referral to nutrition

Weight Management
  • Bariatric surgery with dietitian support and accountability throughout the process
Nutrition Options at CHI Health

Oncology dietitian
• Patients who are seen at the CHI Health Cancer Centers have access to an oncology dietitian during treatment and survivorship

Inpatient dietitians
• All hospitals have inpatient dietitians who may be consulted during admission

CHI Health Home Infusion
• Offering enteral nutrition, parenteral nutrition and hydration
• Dietitian to calculate needs, monitor labs and transition back to regular diet when able
Thank you!
Sources


Sources


https://www.med.unc.edu/anesthesiology/enhancedrecovery/overview/components-of-enhanced-recovery/
https://www.diabetes.org/
https://www.eatright.org