Welcome to Today’s
Expert Webinar for the 2019 MQii Learning Collaborative:
“Improving Nutrition Care for Surgical Patients: Pre-Admission through Inpatient Stay Recommendations”
Tuesday, July 16, 2019

We will get started promptly at
2:00PM ET
(1:00PM CT; 12:00PM MT; 11:00AM PT)

All phone lines have been muted
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The Malnutrition Quality Improvement Initiative (MQii) is a project of the Academy of Nutrition and Dietetics, Avera Health, and other stakeholders who provided guidance and expertise through a collaborative partnership. Support provided by Abbott.
### Today’s Agenda

<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome and introduction to the webinar</td>
<td>Kelsey Jones</td>
</tr>
<tr>
<td>Guidelines and benefits for nutrition care in surgical patients: One hospital’s experience using Enhanced Recovery After Surgery (ERAS) protocols</td>
<td>Ashley L. Matthews, MS, RDN, LD, CNSC, PMP, <em>One WellStar Clinical Nutrition Lead</em></td>
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<tr>
<td>A surgeon’s perspective: Increased risk of malnutrition in surgical patients and best practices to support nutritional care and partner with surgical leaders</td>
<td>Ken Nepple, MD, FACS, <em>Clinical Associate Professor in the Department of Urology at the University of Iowa Hospitals and Clinics</em></td>
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<td>Questions – 15 mins</td>
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</table>
Define malnutrition and briefly describe the current state of affairs

Review ERAS & ASER related nutrition guidelines & recommendations

Discuss the benefits of pre-operative carbohydrate loading and immunonutrition

Offer advice on nutrition product procurement & delivery to patients

Highlight experiences in hospital ERAS pilots & healthcare system/multiple service line deployment of ERAS protocols
No Disclosures
Malnutrition

Malnutrition is defined as the inadequate intake of nutrients, particularly protein, over time and can occur in people who are both underweight or overweight.

Malnutrition: Prevalence in Acute Care

- **Re-Admission & LOS**
  - Malnourished, hospitalized adults have a 54% higher likelihood of hospital 30-day readmission than those who are well-nourished

- **Hospital Acquired Infection**
  - Disease-associated malnutrition can lead to slower wound healing and increased infection rate

- **LOS**
  - Malnourished surgical patients are two - three times more likely to experience post-op complications
Nutrition & Surgery

• Immunonutrition and Preoperative Carbohydrate Loading are complementary practices.

• Society recommendations include perioperative immunonutrition and preoperative carbohydrate loading.
The Impact of Surgical Nutrition

Reduce Surgical Site Infections\(^5\)  
Decrease Complications\(^4,6\)  
Shorten Length of Stay\(^6,7,8\)  
Decrease Cost of Care\(^9\)

Surgical Nutrition is Associated with Reductions in Length of Stay

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Length of Stay Reduction</th>
<th>Cost Savings Associated with Length of Stay Reduction</th>
</tr>
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<tbody>
<tr>
<td>Preoperative Complex Carbohydrate Loading</td>
<td>0.2 Days(^{10*})</td>
<td>$843(^{11*})</td>
</tr>
<tr>
<td>Immunonutrition</td>
<td>2.5 Days(^{5,12,13\dagger})</td>
<td>$10,537(^{11*})</td>
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</tbody>
</table>

Nutrition: Preoperative Carbohydrate Loading
ERAS & ASA Fasting Guidelines

Background

ERAS Evidenced-Based Practice

Nutritional aspects of ERAS

- Abandoning NPO from Midnight
- Pre-operative carbohydrate loading
- Appropriate intraoperative fluids and volumes
- Early postoperative nutrition

1999 ASA Fasting Guidelines

- Clear Liquids = 2 hours minimum fast
  - i.e. water, fruit juice without pulp, carbonated beverages, clear tea, black coffee

2011 Updates of the ASA Fasting Guidelines

Clear Liquids

- #1 Findings: Meta-analysis of randomized fasting time of 2-4 h versus more than 4 h report smaller gastric volume and higher pH in adult patients given clear liquids 2-4 h before a procedure
- #1 Recommendation for Clear Liquids: It is appropriate to fast from intake of clear liquids at least 2 h before elective procedures requiring general anesthesia, regional anesthesia or sedation/analgesia (i.e., monitored anesthesia care [or MAC]).” (Anesthesiol. 2011;114:495-511)
Guidelines & Recommendations - Preoperative Carbohydrate Loading

Drink 2 bottles the night before surgery and

Drink 1 bottle the morning of surgery
Nutrition Benefits - Preoperative Carbohydrate Loading

- Avoids dehydration
- Reduces preoperative thirst, hunger, anxiety, nausea
- Decreased catabolism/preserves muscle mass
- Decreased post-op insulin resistance
- Decreased hyperglycemia
- Enhances patient comfort
- Facilitates IV access
- Reduces IV fluid requirements (current shortage)
- Avoids sodium overload
- Improved grip strength
- Decreased LOS

*It is well documented that surgical trauma is associated with postoperative hyperglycaemia, protein losses and insulin resistance.*
Additional Benefits

Additional Reasons to Consider Preoperative Carb Loading

• Beneficial to anyone undergoing elective surgery
• Prolonged preoperative fast is likely harmful
• Beyond 12 hours of fasting, normal metabolism shifts to a “starved” state
• Water, tea or coffee hydrate but do not nourish effectively, the patient is “metabolically starved”
• Clear liquids with protein are not ideal 2 hours pre-op because they slow digestion/gastric emptying
Timeline & Type of CHO

Timeline, Type of Carbohydrate & Osmolarity

Timeline
• ASA Guidelines - Single serving 2 hours prior to surgery
• ERAS Recommendation - 2 servings 8-12 hours prior to surgery & 1 serving 2 hours prior to surgery

Type of Carbohydrate
• Maltodextrin - complex carb that is absorbed quickly & released slowly

Osmolarity
• Normal osmolarity of the tissue, cells & fluids of the human body is 280-300 mosm
• A clear liquid that is close to the osmolarity of the human body will help nourish & hydrate the body without causing dehydration
Nutrition: Immunonutrition
Guidelines & Recommendations - Immunonutrition

- Immunonutrition is a blend of protein, arginine and fish oil to support recovery and modulate inflammation.

- Benefits
  - 71% less risk of surgical site infections
  - 62% less risk of infectious complications
  - 45% less risk of complications

PRE-OPERATIVE NUTRITION CARE PATHWAY

Low Nutrition Risk

1. Scheduled for Surgery
2. PONS Assessment and Albumin
3. Low Nutrition Risk
4. PAT Testing/Intervention Oral IMN 5 d pre-op Ready for SURGERY
5. SURGERY Oral IMN 7 d post-op

Nutrition Products: Procurement & Delivery to Patients
Nutrition Product Selection

Considerations

- Nutrition content
- Does evidence-based research support the use of the product for the intended use?

Primary Vendor Contracts for Nutrition Products

Cost
  - Financial Implications to the hospital/hospital system
  - Inpatient vs Outpatient Contract Obligations
  - Can the cost be passed on to the patient?

Does your contract allow for product to be sent home with patients?

What stakeholders or committees must approve the product?
Nutrition Product Procurement

Considerations

- Where will the centralized storage of your product be located?
- Do you have data to support appropriate PAR levels of your product?
- Who will be responsible for ordering the product and stocking the product for inpatient and/or outpatient use?
- How will costs of the product be handled? Will the cost be passed on to the patient?
Nutrition Product Delivery to Patients

Considerations

- Pre-Op & Post-Op
  - MD Office vs PATT vs Inpatient
- Will the product be available for order in the Electronic Health Record for inpatients? If so, on the MAR or as a Nutrition Supplement order?
- Physician Orders Sets
Hospital Pilots & Healthcare System/Service Line Expansion Opportunities

- Enterprise Project Management Model
  - Data Collection
  - Stakeholder Analysis
  - Patient, Provider & other stakeholder education
  - Outcomes
  - Lessons Learned
  - Duplication
References

- MQii Toolkit, accessed at: http://mqii-member.defeatmalnutrition.today/
• Identify the increased risk of malnutrition or nutritional decline for surgical patients

• Highlight best practices to support nutritional care for surgical patients from pre-admission through discharge

• Discuss opportunities to partner with surgical leaders in your facility for better nutrition care
Disclosures

• No personal disclosures
University of Iowa Hospitals and Clinics

*Iowa’s Only Comprehensive Academic Medical Center*

• 3 Hospitals
  UIHC, Children’s, Psychiatric
    – 761 beds
    – Inpatient Admissions 34,900
    – Emergency Department 58,607
    – Operative Procedures 30,877

• 300 Clinics
  – UI Clinic Visits 803,539
  – Outreach and UI Community Medical Services Visits 158,391

• 9,297 Staff
  – Nurses 2,141
  – Physicians and Dentists 1,663
Urologist = Surgeon who Likes Technology
Malnutrition
The Skeleton in the Hospital Closet

As awareness of the role of nutrition in recovery from disease increases, physicians are becoming alarmed by the frequency with which patients in our hospitals are being malnourished and even starved. One authority regards physician-induced malnutrition as one of the most serious nutritional problems of our time.

by CHARLES E. BUTTERWORTH, Jr., M.D.

In recent years there has been growing concern over the rapidly mounting costs of hospitalization. In 1968, for example, short- and long-term hospital care costs were $20,751,000,000 in a total national health expenditure of $57,103,000,000, according to the Office of Research and Statistics of the Social Security Administration. Ob-
The Joint Commission requires nutrition risk assessment be identified in all patients within 24 hours in all patients.

PC.2.20 (AHC, HAP, LTC, OME only) the organization defines in writing the data and information gathered during assessment and reassessment.

EP.4 (HAP and AHC only) The information defined by the hospital to be gathered during the initial assessment includes the following, as relevant to the care, treatment, and services: physical assessment, psychological assessment, social assessment, each patient’s nutrition and hydration status, each patient’s functional status, for patients receiving end-of-life care, the social spiritual, and cultural variables that influence the perceptions and expressions of grief by the patient, family members, or significant others.
Malnutrition Diagnosis during Adult Inpatient Hospitalizations: Analysis of a Multi-Institutional Collaborative Database of Academic Medical Centers

Conrad M. Tobert, MD; Sarah L. Mott, MS; Kenneth G. Nepple, MD, FACS

ARTICLE INFORMATION
Article history:
Submitted 18 August 2016
Accepted 29 December 2016
Available online 14 April 2017

Keywords:
Malnutrition
Diagnosis
Clinical documentation
Patient satisfaction
Quality improvement

ABSTRACT
Background Malnutrition is a significant problem for hospitalized patients. However, the true prevalence of reported malnutrition diagnosis in real-world clinical practice is largely unknown. Using a large collaborative multi-institutional database, the rate of malnutrition diagnosis was assessed and used to assess institutional variables associated with higher rates of malnutrition diagnosis.

Objective The aim of this study was to define the prevalence of malnutrition diagnosis reported among inpatient hospitalizations.

Design The University Health System Consortium (Vizient) database was retrospectively reviewed for reported rates of malnutrition diagnosis.

Participants/setting All adult inpatient hospitalization at 105 member institutions during fiscal years 2014 and 2015 were evaluated.

Main outcome measures Malnutrition diagnosis based on the presence of an International Classification of Diseases-Ninth Revision diagnosis code.

Statistical analysis Hospital volume and publicly available hospital rankings and patient satisfaction scores were obtained. Multiple regression analysis was performed to assess the association between these variables and reported rates of malnutrition.

Results A total of 5,896,792 hospitalizations were identified from 105 institutions during the 2-year period. It was found that 292,754 patients (5.0%) had a malnutrition diagnosis during their hospital stay. By institution, median rate of malnutrition diagnosis during hospitalization was 4.0%, whereas the rate of severe malnutrition diagnosis was 0.9%. There was a statistically significant increase in malnutrition diagnosis from 4.0% to 4.5% between 2014 and 2015 (P<0.01). Institutional factors associated with increased diagnosis of malnutrition were higher hospital volume, hospital ranking, and patient satisfaction scores (P<0.01).

Conclusions Missing a malnutrition diagnosis appears to be a universal issue because the rate of malnutrition diagnosis was consistently low across academic medical centers. Institutional variables were associated with the prevalence of malnutrition diagnosis, which suggests that institutional culture influences malnutrition diagnosis. Quality improvement efforts aimed at improved structure and process appear to be needed to improve the identification of malnutrition.

CONCLUSIONS

Missing malnutrition diagnosis appears to be a universal and systematic issue because the rate of malnutrition diagnosis was consistently low across academic medical centers. Institutional variables were associated with the prevalence of malnutrition diagnosis, which suggests that institutional culture influences malnutrition diagnosis. Quality improvement efforts aimed at improved structure and process appear to be needed to improve the identification of malnutrition.
Inattentional blindness, also known as perceptual blindness, is a psychological lack of attention and is not associated with any vision defects or deficits. It may be further defined as the event in which an individual fails to recognize an unexpected stimulus that is in plain sight.
Importance of Malnutrition
Malnutrition is a comorbidity that matters

- Malnutrition is common in hospitalized patients (30-50%)
- Malnutrition is associated with decreased response to therapy and increased mortality
  - Increased length of stay, hospital costs, risk for readmission
  - 3x the risk for surgical site infection and 2x more likely to develop pressure ulcers

Reference: MQii
mqii.defeatmalnutrition.today
Thank you for your interest in Strong for Surgery.

The American College of Surgeons (ACS) is now the new home for Strong for Surgery, a quality initiative aimed at identifying and evaluating evidence for perioperative care. The goal of Strong for Surgery is to empower hospitals and clinics to integrate evidence-based practices into their operations. The checklists are used to screen patients for complications, and to provide appropriate interventions to assure good outcomes, known to be highly influential determinants of surgical outcomes.

Access the Toolkit

Strong for Surgery empowers hospitals and clinics to integrate evidence-based practices into their operations. The checklists are used to screen patients for complications, and to provide appropriate interventions to ensure good outcomes, known to be highly influential determinants of surgical outcomes.

Guidelines
Clinical Guidelines
Best Practices Statements
Position Statements
Policy Statements
White Papers
Other Clinical Guidance

NEW - Optimizing Outcomes in Urologic Surgery: Postoperative

Published 2018

Workgroup Members
Angela Smith, MD, MS, FACS, (Chair), Megan Anders, MD, Gregory Auffenberg, MD, Siamak Daneshmand, MD, Chad Ellimootil, MD, Jane Fellows, MSN, CWOCN, Scott Gilbert, MD, John L. Gore, MD, Suzanne Merrill, MD, Kenneth Nepple, MD, Leanne Richbourg, MSN, APRN-BC, CWON-AP, CCON, GCSN-BC, Charlene Vollmer, BSN, RN-BC

AUA Staff and Consultants
Heddy Hubbard, PhD, MPH, RN, FAAN, Suzanne Pope, MBA, Jennifer Bertsch, Margaret Hoogland (Medical Librarian)

The American Urological Association gratefully acknowledges the assistance of the American Society of Anesthesiologists and Society of Urologic Nurses and Associates in the creation of the white paper.

Unabridged version of this white paper [pdf]

Introduction

Understanding best practices in perioperative care is critical for quality of care for our urologic patients. In the third part of this white paper series, we provide a summary of key elements to optimize perioperative care in adult urologic surgery. Optimal postoperative care includes minimizing postoperative complications, optimizing postoperative recovery and improving patients’ post-surgical outcomes. The assembled white paper multidisciplinary writing team includes experts in a number of different areas (urologists, nurses, anesthesiologists) to address a comprehensive set of topics that urologic providers face when caring for postoperative patients.

The importance of improving postoperative care has grown out of the Enhanced Recovery After Surgery (ERAS) movement, which emphasizes the importance of standardizing elements of postoperative care. Lessons learned from ERAS protocols suggest that compiling and using the best evidence-based medicine can improve the surgical outcomes of our patients. However, assembling these resources is challenging, and we recognized a distinct need from our membership to compile a single, concise resource that provides this information in one place. Postoperative considerations include a number of relevant topics, which will be reviewed and synthesized to create a standard set of recommendations for optimal care. Herein, we present our recommendations for optimizing postoperative outcomes in adult patients by addressing three broad topics:
Malnutrition Pilot

Multidisciplinary team (Clinicians, Nursing, DRG, Nutrition, HCIS...)

1. Preadmission
2. Nursing Screen
3. Nutrition Consult
4. Clinical Documentation
5. DRG Assessment
The Health Resources and Services Administration (HRSA) notes that the quality improvement model includes four key principles to support successful initiatives:

1. Focus on delivery system and processes
   - Organizational resources and processes must be addressed together to impact outputs and outcomes of quality improvement efforts

2. Focus on patients
   - Quality improvement efforts should address the needs of the patient by targeting patient access, safety, and promoting patient engagement

3. Focus on a team-based process
   - Successful quality improvement efforts usually incorporate a team-based approach to achieve long-term, meaningful improvements

4. Focus on the use of data
   - Both quantitative and qualitative data are essential to assessing the success of quality improvement efforts and providing guidance for initiative modification

Figure 4: Key Principles to Support Successful Quality Improvement Initiatives

MQii toolkit.
http://mqii.defeatmalnutrition.today/
EMERGING IMPACT OF MALNUTRITION ON SURGICAL PATIENTS:
LITERATURE REVIEW AND POTENTIAL IMPLICATIONS FOR
CYSTECTOMY IN BLADDER CANCER

Conrad M. Tobert,¹ Jill M. Hamilton-Reeves,²,† Lyse A. Norian, Chermaine Hung, Nathan A. Brooks, Jeff M. Holzbheilerlein, Tracy M. Downs, Douglas P. Robertson, Ruth Grossman and Kenneth G. Nepple,§

From the University of Iowa, Iowa City, Iowa (CMR, CH, NH), VAMC, University of Washington, Madison, Wisconsin (TMG); and University of Alabama-Birmingham, Birmingham, Alabama (I&W).

Purpose: Malnutrition is emerging as a significant factor in patient outcomes. A contemporary review of malnutrition has not been performed for the urologist. We review the available literature and current standards of care for malnutrition screening, assessment and intervention, focusing on patients with bladder cancer treated with cystectomy.

Materials and Methods: Our multidisciplinary team searched PubMed® for available literature on malnutrition, focusing on definition and significance, importance to urologists, screening, assessment, diagnosis, immunological and economic impacts, and interventions.

Results: The prevalence of malnutrition in hospitalized patients is estimated to range from 15% to 60%, reaching upward of 71% in those with cancer. Malnutrition has been shown to increase inflammatory markers, further intensifying catabolism and weight loss. Bladder cancer is catabolic and patients undergoing cystectomy have increased resting energy expenditure postoperatively. Data are emerging on the impact of malnutrition in the cystectomy population. Recent studies have identified poor nutritional status based on low albumin or sarcopenia (loss of muscle) as having an adverse impact on length of hospitalization, complications and survival. The current standard of care malnutrition assessment tool, the 2012 consensus statement of the Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition, has not been evaluated in the urological literature. Perioperative immunonutrition in patients undergoing colorectal surgery has been associated with significant decreases in postoperative complications, and recent pilot work has identified the potential for immunonutrition to positively impact the cystectomy population.

OPTIMIZING NUTRITION PRIOR TO RADICAL CYSTECTOMY

Anthony D. Oberle¹ · Jeremy M. West¹ · Conrad M. Tobert¹ · Gabriel L. Conley¹ · Kenneth G. Nepple¹

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Abstract

Purpose of Review: Malnutrition is a prevalent problem in patients undergoing radical cystectomy. Prophylactic malnutrition has been shown to contribute to increased rates of postoperative complications. Given the significant mortality and morbidity of the procedure of radical cystectomy, there is potential for improvement in patient outcomes by nutritional intervention.

Recent Findings: Prospective studies have demonstrated a reduction in postoperative infection rates in patients who receive supplemental immunonutrition prior to major surgery including radical cystectomy. These initial evaluations of nutritional optimization show significant potential for improved outcomes. Additionally, several studies using enhanced recovery after surgery protocols, which include a prooperative nutritional component, have shown a benefit in reducing lengths of stay.

Summary: Emerging literature has shown the benefits of preoperative immunonutrition in improving postoperative outcomes of radical cystectomy. However, further work is needed to determine the best mechanism to optimize nutrition prior to radical cystectomy.
Muscle invasive bladder cancer
Radical cystectomy
Neobladder

Lateral and Posterior dissection
Can open and palpate to give a target for dissection (anterior and pelvic fascia with nerves (VERTICALLY) and develop with digital dissection) as for the fibrous adventitious attachments to improve mobility into the peristomal reflection of the bladder. Place Allis clamps on the reflection and sweep the plane with a Kittner bone to expose the right anterior dissection while the Dissector protects the bladder from the top of the pocket with digital dissection, will be held up by Dissector and the Ligature if necessary to fix any other posterior attachments.

Ideal Neobladder Diversion (Beam Wrench or P-Wrench)
Nipple
See Cystectomy for opening

Urethral Anastomosis
Place a single layer of 4-0 chromic gut sutures. Secure the end of the thread with a slipknot, bring it through the bladder and knot in the usual manner, ensuring the knots are well away from the urethra.

Create the Neobladder-neck and Urethral Neobladder Anastomosis
Locate the most dependent portion of the neobladder as the previous suture line. Evacuate the neobladder and with interrupted 4-0 Chromic.
Place a 20F Foley as an SP, bring out a separate neobladder incision, and secure with a purse-string 2-0 Chromic. Close the majority of the anastomotic wall of the neobladder with a single layer 3-0 Vicryl, lock every third throw leaving a 2-3 mm opening to facilitate placement of the anastomotic sutures and positioning in the Place the posterior urethral anastomotic sutures into their respective location in the neobladder. Place the 20F Foley through the catheter after placing the three posterior sutures using the balloon with saline and place the remaining anterior sutures. Remove the Foley from the urethra.

Close the remaining anterior wall of the neobladder. Check for leaks by instilling fluid into the neobladder through the locking ring. Close the remaining anterior wall of the neobladder by tying the loop on the catheter using 2-0 Vicryl. Secure the SP to the neobladder wall using 4-0 Vicryl in interrupted triangular stitch.

The Foley stays for 3 weeks
SP tube stays for 4 weeks
Neoadjuvant chemotherapy followed by cystectomy is a grueling therapeutic course

- Hematuria → TURBT → Recovery → Neoadjuvant chemotherapy → Recovery → Cystectomy → Recovery

- Treatment is a marathon, not a sprint
- Are most of our patients marathoners?
Pre-op (and during hospitalization)

- Dietitian Assessment and Counseling
Where we wanted to be: Academy/ASPEN 2012 Consensus Statement

<table>
<thead>
<tr>
<th>ACADEMY/ASPEN clinical characteristics</th>
<th>Malnutrition of acute illness/injury</th>
<th>Malnutrition of chronic illness (&gt; 3 months)</th>
<th>Impaired social/environmental circumstances</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of malnutrition</strong></td>
<td>Non-severe malnutrition</td>
<td>Non-severe malnutrition</td>
<td>Non-severe malnutrition</td>
</tr>
<tr>
<td>Energy intake</td>
<td>Severe malnutrition</td>
<td>Severe malnutrition</td>
<td>Severe malnutrition</td>
</tr>
<tr>
<td><strong>&lt; 75% intake of estimated energy</strong></td>
<td>≤ 50% intake of estimated energy</td>
<td>≤ 75% intake of estimated energy</td>
<td>≤ 75% intake of estimated energy</td>
</tr>
<tr>
<td>needs for &gt; 7 days</td>
<td>needs for ≥ 5 days</td>
<td>needs for ≥ 1 month</td>
<td>needs for ≥ 3 months</td>
</tr>
<tr>
<td><strong>1–2% in 1 week</strong></td>
<td>&gt; 2% in 1 week</td>
<td>&gt; 5% in 1 month</td>
<td>&gt; 5% in 1 month</td>
</tr>
<tr>
<td><strong>5% in 1 month</strong></td>
<td>&gt; 5% in 1 month</td>
<td>5% in 1 month</td>
<td>5% in 1 month</td>
</tr>
<tr>
<td><strong>7.5% in 3 months</strong></td>
<td>&gt; 7.5% in 3 months</td>
<td>7.5% in 3 months</td>
<td>7.5% in 3 months</td>
</tr>
<tr>
<td><strong>10% in 6 months</strong></td>
<td>&gt; 10% in 6 months</td>
<td>10% in 6 months</td>
<td>10% in 6 months</td>
</tr>
<tr>
<td><strong>20% in 1 year</strong></td>
<td>&gt;20% in 1 year</td>
<td>&gt;20% in 1 year</td>
<td>&gt;20% in 1 year</td>
</tr>
<tr>
<td><strong>Subcutaneous fat loss</strong></td>
<td>Mild</td>
<td>Mild</td>
<td>Severe</td>
</tr>
<tr>
<td><strong>Muscle loss</strong></td>
<td>Moderate</td>
<td>Mild</td>
<td>Mild</td>
</tr>
<tr>
<td><strong>Fluid accumulation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grip strength</strong></td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td><strong>Reduced</strong></td>
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The Challenge

- How to develop and implement a validated assessment across a large busy inpatient practice environment
  - No ideal workflow from EHR vendor
  - Not part of typical provider workflow
  - Dietitian documentation alone is not adequate
  - Universal provider education on malnutrition assessment is futile

- Not enough dietitians
Provider Malnutrition Diagnosis

Processes Leading to Malnutrition Intervention

<table>
<thead>
<tr>
<th>Malnutrition Screening</th>
<th>Malnutrition Assessment</th>
<th>Malnutrition Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Usually by nursing</td>
<td>- Usually by dietitian</td>
<td>- Usually by clinician</td>
</tr>
<tr>
<td>- Ideally within 24 hours of admission and using a validated tool</td>
<td>- Consensus Statement criteria (2 or more) * Insufficient energy intake * Weight loss * Muscle mass loss * Subcutaneous fat loss * Fluid accumulation * Decreased functional status as assessed by hand grip strength</td>
<td>- Informed by the dietitian assessment</td>
</tr>
<tr>
<td>- At risk patients referred to dietitian for assessment</td>
<td></td>
<td>- Clinical diagnosis and documentation of malnutrition severity (mid, moderate, severe)</td>
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Define
Diagnose
Document
in the
EHR
using leverage
• Definition: American Society for Parenteral and Enteral Nutrition (ASPEN) consensus evidence-based guidelines defines malnutrition as a non-severe or severe condition based on the presence of:

• Two or more of these six characteristics:
  – Insufficient energy intake
  – Weight loss
  – Loss of muscle mass
  – Loss of subcutaneous fat
  – Localized or generalized fluid accumulation that can mask weight loss
  – Decreased functional status as measured by hand dynamometer

When two or more criteria are present in any of the three contexts the patient is considered to have malnutrition

• Clinicians need not know all the specifics of malnutrition diagnosis -> Nutrition consult can be a resource
Dietitian Documentation

* Discrete data
Malnutrition Pilot Specifics

- Multidisciplinary team (Clinicians, Nursing, DRG, Nutrition, HCIS…)
- Enhanced Admission Nursing Nutrition Screen

Evaluation of 100% of 5 adult populations (plus others via standard referral) on two units:
  - Inpatient chemotherapy
  - Cystectomy
  - Esophagectomy
  - Pancreatectomy/Whipple
  - Hip fractures

- Changed Dietitian Assessment and Chart Note Format
  - New assessments will list a recommended malnutrition diagnosis based on ASPEN criteria. Possible conditions are as follows:
    - Mild (non-severe) malnutrition (ICD10: First degree)
    - Moderate (non-severe) malnutrition (ICD10: Second degree)
    - Severe protein calorie malnutrition (ICD10: Third degree)

- Improve Workflow using Epic
  - Epic dot phrase can be used to insert the diagnosis and Present on Admission status from the dietitian assessment into progress notes.
    - .malnutritiontext
Multidisciplinary group refined the process of inpatient evaluation, with a focus on communication and accurate malnutrition assessment in the EHR (electronic health record) using the Academy/ASPEN Consensus Statement.

Malnutrition pilot of the new workflow on two inpatient units during a four-month period (no added FTEs).

Malnutrition was then identified in 42% of patients on the two pilot units.

Favorable impact on allowable length of stay

Hospital administration almost immediately added 6FTEs (from 25 to 31 FTEs to 33 to 37)

The pilot malnutrition workflow was implemented hospital-wide.
Improvement in Hospital Malnutrition Diagnosis

% of Acute Inpatients with Malnutrition

<table>
<thead>
<tr>
<th>Year</th>
<th>Malnutrition Rate</th>
</tr>
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<tbody>
<tr>
<td>FY 2012</td>
<td>3.6%</td>
</tr>
<tr>
<td>FY 2013</td>
<td>4.6%</td>
</tr>
<tr>
<td>FY 2014</td>
<td>5.6%</td>
</tr>
<tr>
<td>FY 2015</td>
<td>8.2%</td>
</tr>
<tr>
<td>FY 2016</td>
<td>9.1%</td>
</tr>
<tr>
<td>FY 2017</td>
<td>9.9%</td>
</tr>
<tr>
<td>FY 2018 YTD</td>
<td>11.2%</td>
</tr>
</tbody>
</table>
Pre-op

- Immunonutrition
41% reduction in infections
2.4 day decrease in length of stay
Perioperative Use of Arginine-supplemented Diets:
A Systematic Review of the Evidence

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Infections are the most frequent cause of morbidity after surgery and up to 54% of all hospital-acquired infections occur in high-risk surgical populations.1 Infections result in prolongation of hospital stay and increased healthcare costs by up to $10 billion per year in the United States alone.2 Multifaceted efforts to prevent infection are an essential component of any surgical practice.3

Surgical stress predisposes patients to immune dysfunction, placing them at higher risk of infection, risks that are increased even more if the patient is malnourished before surgical insult.4 Various nutrient and nutritional strategies have been studied to evaluate their effect on immune function and clinical outcomes. One pharmacologic that has been the center of much debate in the literature is arginine and arginine-supplemented nutritional formulas.5 Arginine is an amino acid involved in multiple metabolic processes. It is a precursor of the formation of polyamines and nitric oxide, which is important for connective tissue repair, and is the precursor for the formation of nitric oxide, an important signaling molecule.6 In addition to these vital roles, arginine is an essential metabolic substrate for immune cells and required for normal lymphocyte function.7

Arginine deficiency after surgical stress was reported more than 30 years ago, although the mechanisms behind this have until recently remained unknown.8,9 More than 20 years ago, supraphysiologic concentrations of arginine were added to the diets of critically ill and surgical patients. These diets were aimed at “enhancing immune function” and also contained increased amounts of omega-3 fatty acids, nucleotides, and other nutrients. These nutrients were eventually incorporated into commercial diets without a rigorous evaluation of their individual effects or side effects in different patient populations. In 2001, Heyland and colleagues reported a meta-analysis suggesting that these arginine-supplemented diets were not beneficial in critically ill patients and could even potentially adversely affect outcomes in this population.10 In contrast, patients undergoing elective surgery appeared to benefit, with a possible decreased rate of infection. The treatment effect of these diets was systematically different in critically ill patients compared with elective surgery patients, and it became apparent that a dedicated meta-analysis should be done separately for patients undergoing elective surgery. Although subsequent meta-analyses have recently been done,11,12,13,14 they were limited in scope, not including all pertinent articles, included unpublished and duplicate publications, and combined studies with different study designs in evaluating the role of perioperative nutrition. The purpose of this review is to provide an up-to-date systematic review on all studies of arginine-supplemented diets in elective surgical patients. With a larger database, we might be able to shed some light on the perioperative role of such diets.

METHODS

Study identification

We conducted a systematic review of the published literature to identify all relevant trials. Using text word or MeSH headings containing “randomized,” “blind,” “clinical trial,” “nutrition,” “arginine,” “glutamine,” “omega-3 fatty acids,” “fish oil,” “nucleotides,” “immune,” “immunonutrition,” we performed computerized searches for relevant articles on MEDLINE, EMBASE, BIOSIS, CINAHL, electronic databases Cochrane Controlled Trials Register from 1990 to March 2010. We also searched our personal files and reference lists of review articles and original studies. There were no language restrictions.

Study selection criteria

Citations were classified as primary studies, review articles, or other. All primary studies were retrieved and reviewed independently. We included primary studies if they were randomized clinical trials (RCTs); studies of elective surgical
Brief Correspondence

Effects of Immunonutrition for Cystectomy on Immune Response and Infection Rates: A Pilot Randomized Controlled Clinical Trial

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Abstract

After radical cystectomy (RC) patients are at risk for complications including infections. The expansion of myeloid-derived suppressor cells (MDSCs) after surgery may contribute to the lower resistance to infection. Immune response and postoperative complications were compared in men consuming either specialized immunonutrition (SIM; n = 14) or an oral nutrition supplement (ONS; n = 15) before and after RC. MDSC count (Lin–CD11b+ CD33+) was significantly different between the groups over time (p = 0.005) and significantly lower in SIM 2 d after RC (p < 0.001). MDSC count expansion from surgery to 2 d after RC showed a weak association with an increase in infection rate 90 d after surgery (p = 0.061). Neutrophil:lymphocyte ratio was significantly lower in SIM compared with ONS 3 h after the first incision (p = 0.039). Participants receiving SIM had a 33% reduction in postoperative complication rate (95% confidence interval [CI], 1–66; p = 0.060) and a 39% reduction in infection rate (95% CI, 8–70; p = 0.027) during late-phase recovery. The small sample size limits the study findings.

Patient summary: Results show that the immune response to surgery and late infection rates differ between radical cystectomy patients receiving specialized immunonutrition versus oral nutrition supplement in the perioperative period.

Trial registration: ClinicalTrials.gov NCT01868087.

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<table>
<thead>
<tr>
<th>Complications, n (%)</th>
<th>Specialized immunonutrition, n = 14 men</th>
<th>Oral nutrition supplement, n = 15 men</th>
<th>Differences between groups, % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 d</td>
<td>10 (71)</td>
<td>11 (73)</td>
<td>−2 (−36 to 33)</td>
</tr>
<tr>
<td>90 d</td>
<td>2 (14)</td>
<td>7 (47)</td>
<td>−33 (−70 to −5.7)</td>
</tr>
<tr>
<td>High-grade complications, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 d</td>
<td>2 (14)</td>
<td>2 (13)</td>
<td>1 (−25 to 27)</td>
</tr>
<tr>
<td>90 d</td>
<td>0 (0)</td>
<td>2 (13)</td>
<td>−13 (−37 to 11)</td>
</tr>
<tr>
<td>Antibiotic use, n (%)²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 d</td>
<td>5 (36)</td>
<td>9 (60)</td>
<td>−24 (−66 to 18)</td>
</tr>
<tr>
<td>90 d</td>
<td>2 (14)</td>
<td>8 (53)</td>
<td>−39 (−77 to −0.94)</td>
</tr>
<tr>
<td>Intra-abdominal infection, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 d</td>
<td>1 (7)</td>
<td>4 (27)</td>
<td>−20 (−53 to 14)</td>
</tr>
<tr>
<td>90 d</td>
<td>0 (0)</td>
<td>1 (7)</td>
<td>−7 (−26 to 13)</td>
</tr>
<tr>
<td>Ileus &gt;5 d, n (%)</td>
<td>4 (27)</td>
<td>2 (13)</td>
<td>14 (−21 to 51)</td>
</tr>
<tr>
<td>Length of stay</td>
<td>6.3 (3.1)</td>
<td>6.1 (1.9)</td>
<td>0.2 (−1.79 to 2.23)</td>
</tr>
<tr>
<td>SIRS, n (%)³</td>
<td>1 (7)</td>
<td>2 (13)</td>
<td>−6 (−34 to 22)</td>
</tr>
<tr>
<td>Readmission, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4 (29)</td>
<td>6 (40)</td>
<td>−11 (−53 to 30)</td>
</tr>
<tr>
<td>No</td>
<td>10 (71)</td>
<td>9 (60)</td>
<td>11 (−29 to 53)</td>
</tr>
<tr>
<td>Clavien-Dindo grade 30 d, n (%)⁴</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 0</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>7 (−22 to 37)</td>
</tr>
<tr>
<td>Grade 1</td>
<td>2 (14)</td>
<td>1 (7)</td>
<td>4 (−36 to 44)</td>
</tr>
<tr>
<td>Grade 2</td>
<td>8 (57)</td>
<td>8 (53)</td>
<td>−7 (−26 to 13)</td>
</tr>
<tr>
<td>Grade 3a</td>
<td>0 (0)</td>
<td>1 (7)</td>
<td>−7 (−26 to 13)</td>
</tr>
<tr>
<td>Grade 3b</td>
<td>0 (0)</td>
<td>1 (7)</td>
<td>−7 (−26 to 13)</td>
</tr>
<tr>
<td>Grade 4-5</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Clavien-Dindo grade 90 d, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 0</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Grade 2</td>
<td>2 (14)</td>
<td>5 (33)</td>
<td>−19 (−56 to 18)</td>
</tr>
<tr>
<td>Grade 3a</td>
<td>0 (0)</td>
<td>2 (13)</td>
<td>−13 (−37 to 11)</td>
</tr>
<tr>
<td>Grade 3b</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Grade 4-5</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
</tbody>
</table>

CI = confidence interval; SIRS = systemic inflammatory response syndrome.

¹ Recruitment and follow-up occurred from September 2013 to April 2015. Clinical outcomes data abstracted at 30 and 90 d were analyzed from all participants who signed the informed consent and who received any allocated supplements. Rates were compared using a chi-square test using intention to treat for categorical variables. A p < 0.05 was considered statistically significant.

² Infectious complications were defined by the need for intervention or prescription of nonphylactic antibiotics. All patients followed the same antibiotic protocol according to the standard pathways of the University of Kansas Medical Center. All patients receive 24 h of Mefoxin followed by 1 mo of Macrodantin 100 mg every day.

³ SIRS, based on temperature (<36 °C or >38 °C), heart rate (>90 beats/min), respirations (>20 breaths/min or Paco2 <4.3 kPa), white blood cell count (<4000 cells/mm³ or >12 000 cells/mm³ or >10% bands present).

⁴ Clavien-Dindo classification of surgical complications; a higher grade indicates a greater severity of complication.

* p = 0.060.
* * p = 0.027.
Perioperative Oral Nutrition Supplementation Reduces Prevalence of Sarcopenia following Radical Cystectomy: Results of a Prospective Randomized Controlled Trial.

Ritch CR, Cookson MS, Clark PE, Chang SS, Fakhoury K, Ralls V, Thu MH, Pensam DE, Smith JA Jr, Silver HL.

Abstract

PURPOSE: We designed a prospective randomized, controlled pilot trial to investigate the effects of an enriched oral nutrition supplement on body composition and clinical outcomes following radical cystectomy.

MATERIALS AND METHODS: A total of 61 patients were randomized to an oral nutrition supplement or a multivitamin multimineral supplement twice daily during an 8-week perioperative period. Body composition was determined by analyzing abdominal computerized tomography images at the L3 vertebra. Sarcopenia was defined as a skeletal muscle index of less than 55 cm/m in males and less than 39 cm/m in females. The primary outcome was the difference in 30-day hospital free days. Secondary outcomes included hospital length of stay, complications, readmissions and mortality.

RESULTS: The oral nutrition supplement group lost less weight (-5 vs -6.5 kg, p = 0.04) compared to the multivitamin multimineral supplement group. The proportion of patients with sarcopenia did not change in the oral nutrition supplement group but increased 20% in the multivitamin multimineral supplement group (p = 0.01). Mean length of stay and 30-day hospital free days were similar in the groups. The oral nutrition supplement group had a lower rate of overall and major (Clavien grade 3 or greater) complications (48% vs 67% and 19% vs 25%, respectively) and a lower readmission rate (7% vs 17%) but the differences did not reach statistical significance.

CONCLUSIONS: Patients who undergo radical cystectomy after consuming an oral nutrition supplement perioperatively have a reduced prevalence of sarcopenia and may also experience fewer and less severe complications and readmissions. A larger blinded, randomized, controlled trial is necessary to determine whether oral nutrition supplement interventions can improve outcomes following radical cystectomy.

Subjects were stratified by age (less than 75, or 75 years or greater) and block randomized to receive twice daily servings of an ONS (Ensure® Clinical Strength) or twice daily MVI (Member’s Mark® Multivitamin) for 3 to 4 weeks before and 4 weeks after RC (fig. 1). Supplements were supplied directly to subjects every other week at clinic visits with a trained research RDN (Registered Dietitian Nutritionist) who reviewed weekly checklists for subject logging of supplement use.
In response to general surgery literature along with the subsequent urologic literature on immunonutrition, the University of Iowa Department of Urology began supplementing all patients undergoing RC with arginine-containing immunonutrition (commercially available products include Impact Advanced Recovery from Nestle or Ensure Surgery Immunonutrition from Abbott). This is to be taken three times daily, in the 5 days immediately prior to RC. All patients are provided with verbal and written dietary instructions at the preoperative clinic visit from a registered dietitian, and these instructions include the recommendation of a high-calorie, high-protein diet before and after surgery once tolerating a general diet. Patients are provided with nutritional information and suggestions for potential ways to achieve this high-protein diet.
Pre-op

- Carbohydrate loading

- No bowel prep*
Carbohydrate Loading

- Multi-disciplinary discussion with anesthesia
- 50 g per serving drink of clear carbohydrate drink
- The night before and 2 hours prior to surgery

Carbohydrate Loading

Compared to supplementation with arginine-containing nutritional formula, the literature on optimization of preoperative carbohydrate nutrition prior to RC is less robust. It has been hypothesized that “nothing by mouth” prior to surgery leads to a period of preoperative fasting, which can promote insulin resistance and lead to an intensified catabolic state in postoperative RC patients [26, 27]. Therefore, in the general surgery literature, the role of preoperative carbohydrate loading has been examined [28]. While oral carbohydrate supplementation has been demonstrated to be safe and effective in lowering insulin resistance, an improvement in postoperative outcomes has not been clearly demonstrated [28]. Given the low risks of implementation, at the University of Iowa, we do encourage patients to perform carbohydrate loading prior to surgery.
Admission

- Early feeding

- Nursing Screening and Dietitian Consult
# Admission Nursing Nutrition Screen

## Old Screen

<table>
<thead>
<tr>
<th>Question</th>
<th>Point Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVN/PVN/tube feed</td>
<td>7</td>
</tr>
<tr>
<td>Food intake less than 50% of usual greater than 7 days</td>
<td>4</td>
</tr>
<tr>
<td>NPO/clear liquids greater than 5 days</td>
<td>4</td>
</tr>
<tr>
<td>Unintentional wt loss/gain greater than 9 lbs</td>
<td>4</td>
</tr>
<tr>
<td>Chew/swallow difficulty</td>
<td>4</td>
</tr>
<tr>
<td>Emaciated/Chronic non-healing wound</td>
<td>4</td>
</tr>
<tr>
<td>Post surgery greater than 77 y/o</td>
<td>4</td>
</tr>
<tr>
<td>Vomit/diarrhea greater than 3 days</td>
<td>2</td>
</tr>
<tr>
<td>Food allergies</td>
<td>2</td>
</tr>
<tr>
<td>Pregnant/lactating</td>
<td>4</td>
</tr>
<tr>
<td>OB patient only</td>
<td>7</td>
</tr>
</tbody>
</table>

**Expedite dietitian consult in high-risk patients**

### FNS Documentation Guidelines:

- Nutrition screen must be completed by nursing within 24 hours of admission
- Once the nutrition screen is complete an initial assessment must be done by FNS staff as follows:
  - Patients with a total score of 7 or above (high risk) need to be assessed within 48 hours of the screen
  - Patients with a total score of 4-6 (moderate risk) need to be assessed within 72 hours of the screen
  - Patients with a score of 3 or lower (low risk) need to be rescreened by FNS staff on a weekly basis (every calendar week)
- Follow-up notes are due on a weekly basis (every calendar week)

Our documentation guidelines have not changed since we have implemented the new screen. Let me know if you have any questions.
Per your request, the Inpatient Food and Nutrition consult order has been added to the Cystectomy Post-op Order Set.

- **GU:Cystectomy Post-op Orders**
  - Admit Orders
  - Code Status
  - Isolation
  - Patient Care Orders
  - Medication Orders
  - Lab Orders
  - Radiology Orders
  - **Consults**
    - INPATIENT CONSULT FOOD & NUTRITION SERVICES
      - Routine, ONCE, Today at 0945, OR - Postop, Sign & Hold
  - **Ad-hoc Orders**

Click the Add Order button to add an order in this section.
Admission

- Advanced Nutritional Support Team
For complex patients or patients where primary service is unsure of management, Advanced Nutritional Support Team is an inpatient consult service staffed by GI physician, 2 dietitians, and a pharmacist.
Today will be a busy day as we ensure everything is prepared for your upcoming surgery. We attempt to have all testing and visits done today to avoid another trip back for you prior to surgery.

However if it is not ideal for you to spend a few hours with us today, please let us know and we can arrange some of these visits on another day.

The plan for today:

☐ ARNP or Resident–Physical assessment and consent signing.
☐ Gabriel Conley, medical Student- testing regarding strength and mobility
☐ Celeste Charchalac-Research assistant- discuss research study
☐ Dietician-Amy Lukas- discussion about nutrition before and after surgery.
☐ Social worker- discussion about cares at home after surgery
☐ Ostomy nurse- mark skin and teach about ostomy and managing after surgery
☐ Clinic nurse- teaching about the day before surgery and what to expect after surgery.
☐ Lab work - blood and urine (if not done recently)
☐ EKG (if not done recently)- 4th floor elevator I
☐ CXR (if not done recently)- 3rd floor elevator F
☐ Anesthesia clinic visit (not required for all) Appointment time_______
☐ Anemia Clinic at Iowa River Landing Appointment time_______
Perioperative ERAS Care in Radical Cystectomy

- **At Baseline**
  - Patients required to pay for nutrition evaluation. Never done.
  - No standard preoperative nutrition evaluation

- **First Steps**
  - American Cancer Society seed grant
  - Preoperative evaluation by registered dietitian
  - Preoperative immunonutrition
  - Postoperative nutrition consult

- **Version 2.0**
  - Added dedicated cancer center dietitian
  - MQii and MN funding for immunonutrition. Trying to bridge to institutional support.
  - Inpatient: Advanced Nutrition Support Team across inpatient services
References


Questions?

15 mins