Preoperative Optimization and Surgical Site Infection Reduction

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Objectives

• Introduce Enhanced Recovery (ERAS)
• Discuss Preoperative Optimization
• Surgical Site Infection Risk Reduction Strategies

Preoperative Optimization

• Meet Tim
• 55 yo male with new colon cancer
• Poor appetite
• Smoker
• COPD on albuterol prn
• BMI 40
• History of 10 lb unintentional weight loss over past month
Enhanced Recovery Pathways

ERAS

Pre-Op | Intra-Op | Post-Op

Medical optimization | Exercise | Nutrition

Minimize fasting | Carbohydrate Loading

ERAS

Pre-Op | Intra-Op | Post-Op

Pain Management | PONV

Early Feeding | Early Mobilization

Immunonutrition | Minimize drains, catheters

Local, Regional Anesthesia | Normothermia

Fluid Management | Laparoscopy
Identification of two or more of these six criteria is recommended for diagnosis:

- Insufficient energy intake
- Weight loss
- Loss of muscle mass
- Diminished functional status (handgrip strength)
- Localized or generalized fluid accumulation
- Loss of subcutaneous fat

**Insufficient energy intake**

<table>
<thead>
<tr>
<th>Type of malnutrition</th>
<th>Acute illness or injury-related</th>
<th>Chronic disease-related</th>
<th>Social or environmental cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>&lt;75% of est. energy requirement for &gt;7 days</td>
<td>&lt;75% of est. energy requirement for ≥1 month</td>
<td>&lt;75% of est. energy requirement for ≥3 months</td>
</tr>
<tr>
<td>Severe</td>
<td>≤50% of est. energy requirement for ≥25 days</td>
<td>≤75% of est. energy requirement for ≥1 month</td>
<td>≤50% of est. energy requirement for ≥1 month</td>
</tr>
</tbody>
</table>

White et al, JPEN 2012

**Weight loss**

<table>
<thead>
<tr>
<th>Type of malnutrition</th>
<th>Acute illness or injury-related</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>% Time</td>
<td>% Time</td>
<td>% Time</td>
</tr>
<tr>
<td>1–2</td>
<td>1 week</td>
<td>5 month</td>
<td>5 month</td>
</tr>
<tr>
<td>5</td>
<td>1 month</td>
<td>7.5 month</td>
<td>7.5 month</td>
</tr>
<tr>
<td>7.5</td>
<td>3 months</td>
<td>20 month</td>
<td>20 month</td>
</tr>
<tr>
<td>Severe</td>
<td>% Time</td>
<td>% Time</td>
<td>% Time</td>
</tr>
<tr>
<td>&gt;2</td>
<td>1 week</td>
<td>&gt;7.5 month</td>
<td>&gt;7.5 month</td>
</tr>
<tr>
<td>&gt;5</td>
<td>1 month</td>
<td>&gt;10 month</td>
<td>&gt;10 month</td>
</tr>
<tr>
<td>&gt;7.5</td>
<td>3 months</td>
<td>&gt;20 month</td>
<td>&gt;20 month</td>
</tr>
</tbody>
</table>

White et al, JPEN 2012
Effect of Malnutrition on Surgical Complications

N = 100 patients


Increased risk of post-surgical complications

Pre-existing malnutrition increases risk for post-surgical complications by 2- to 5-times.


Surgery is a sport – train!

Goal: Increase / maintain muscle mass to improve surgical outcomes


Evidence for Preoperative Pulmonary Exercise

Source: Dronkers et al. Clin Rehabil 2008 vol. 22 no. 2 134-142
Quit Smoking to Reduce SSI

- The odds ratio for SSI in smokers is 1.51 (95%CI, 1.20-1.90; P < .001)
- The odds ratio for SSI if smoking on the day of surgery is 1.96 (95%CI, 1.23-3.13; P < .001)


Real World Application of Immunonutrition Preoperative Oral Supplements: The Strong for Surgery Project

- Elective Colorectal Procedures w/ anastomosis
- Composite Adverse Event Rate (Reintervention, Infection, Anastomotic Leak and/or Death)
  - No preoperative supplements 9.4%
  - Preoperative immunonutrition 7.1%
  - Did not reach statistical significance
- Length of Stay improved with immunonutrition


The Power of Oral Nutritional Supplements

High protein oral vs. placebo.
Primary Endpoint was readmission

Study Population:
- Congestive heart failure (CHF)
- Acute myocardial infarction (AMI)
- Pneumonia (PNA)
- Chronic obstructive pulmonary disease (COPD)

(CC BY-NC-ND 4.0)
SSI Reduction – Gametime!

- Skin care is crucial to SSI reduction
Postoperative Skin Care

- Epithelialization occurs in 48 hours
- Dressings changed before 48 hours require sterile technique
- Most wounds ok for gentle soap/water shower (not bath/soak) after 48 hours

Wound Healing and Abdominal Core Health

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Topics Today

- General concepts of wound healing
- Practical guide to wound infection
- Abdominal Core Health

GENERAL CONCEPTS OF WOUND HEALING
Phases of Wound Healing

Characteristics of the Phases

- Inflammation -> Exudate
- Proliferation -> Granulation
- Maturation -> Contraction

Clinical Implications

- 1 week postop -> protect incision from excessive stretching/moisture
- 2-3 weeks postop -> increase activity
  - ***use pain as your guide

PRACTICAL GUIDE TO WOUND INFECTION
**Surgical Site Infection**

*Image: Surgical Site Infection Diagram*

**Surgical Site Occurrences**

- Include all SSIs
- Expand to include other wound events
  - Wound cellulitis
  - Non-healing incision
  - Fascial disruption
  - Skin/soft tissue ischemia
  - Skin/soft tissue necrosis
  - Serous/purulent drainage
  - Stitch abscess
  - Seroma/hematoma
  - EC fistula

**When Do SSOs Occur? Not Just 30 Days!**

*Image: Graph showing the rate of SSOs by MRSA Status*

**How Do You Recognize a Wound Infection?**

- Erythema, heat, swelling, pain...and drainage
- Sometimes can be difficult to differentiate normal postop inflammatory phase of wound healing vs an infection
- Best approach is to follow incision over time
How Do You Treat a Wound Infection?

- Oral antibiotics for wound cellulitis (consider patient risk factors)
- If anything more severe-> needs wound opening and local wound care
  - Local wound care – BID packing with iodoform gauze, BID damp to dry with Kerlix, negative pressure dressing
- If signs/symptoms of sepsis-> need aggressive treatment
  - Aggressive treatment: admission, IV antibiotics, operative debridement, prosthetic removal
- If any doubt or concern-> talk you your proceduralist
  - Communication is key for effective postoperative care; ***PARTNERSHIP
Abdominal Core Health
Spectrum of Disease

Hernia  Chronic Pain  Back

Diastasis  Intrinsic Pathology  Pelvic Floor

Abdominal Core Health
Patient Experience

Symptom Based Decisions  Quality of Life Optimization  Tailored Management  Rehabilitation  CQI

Symptom Based Decisions  Preoperative Optimization  Tailored Operation  Rehabilitation  CQI

Center for Abdominal Core Health

The Ohio State University
Wexner Medical Center

Abdominal Core Health
Spectrum of Disease

Hernia  Chronic Pain  Back

Diastasis  Intrinsic Pathology  Pelvic Floor
**Common Themes To All Hernias**

- Management based on symptoms
  - Exceptions: femoral hernias in women, Spigelian hernias
- Diagnosis made by physical exam
  - Adjuncts can help (CT/US->ventral and femoral; US->inguinal)
- Continuum from normal->hernia can make diagnosis challenging

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**Incarceration and Strangulation**

- Incarceration (opposite: ‘Reduceable’)
  - Chronic
  - Acute
- Strangulation
  - Incarceration with ischemic or functional compromise
  - Acute

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**Ventral Hernia**

Henry Gray (1918) Anatomy of the Human Body
Bartleby.com: Gray's Anatomy, Plate 392
Author: Henry Vandyke Carter
### Ventral Hernia

<table>
<thead>
<tr>
<th>Spontaneous</th>
<th>Acquired</th>
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<tbody>
<tr>
<td>• Midline</td>
<td>• Incisional</td>
</tr>
<tr>
<td>• Umbilical</td>
<td>• Subxyphoid</td>
</tr>
<tr>
<td>• Epigastric</td>
<td>• Suprapubic</td>
</tr>
<tr>
<td>• Hypogastric</td>
<td>• Traumatic</td>
</tr>
<tr>
<td>(rare)</td>
<td></td>
</tr>
<tr>
<td>• Lateral</td>
<td></td>
</tr>
<tr>
<td>• Spigelian</td>
<td></td>
</tr>
</tbody>
</table>

### Choices for Repair

- Open vs Minimally Invasive (robotic or laparoscopic)
- Location of mesh
- Type of mesh

### Goals of Repair

- Improve quality of life and overall well being
- Minimize risk of recurrence (chronic disease?)

### Inguinal Hernia and Myopectineal Orifice
Types of Hernia in This Region

- Inguinal hernia
- Femoral hernia
- Obturator hernia

Choices for Repair

- Open vs Minimally Invasive (robotic or laparoscopic)
- Open – mesh based or tissue based
- Special situations
  - Open infra-inguinal approach to femoral hernia
  - Laparoscopic approach to obturator hernia

Goals of Repair

- Improve quality of life
- Minimize chronic groin pain
- Minimize recurrence