



1

Background

Large surgical procedures continue to have risk factors

- Cardiopulmonary complications
- Infection
- Thromboembolic events
- Hospital stay
- Periods of fatigue

2

Background

- Inability to work
- Postoperative changes in endocrine & metabolic function (surgical stress)
- Intestinal paralysis
- Semi-starvation
- Semi-immobilization
- Immunosuppression

3

Old Practice

Tradition in the late 1990's

- Patients hospitalized postoperatively
- Observation and treatment of anesthetic or surgical complications
- "Nursed" back to self care
- Bed rest
- Lots of opioids
- Foley catheters
- Drains
- NG tubes

4



Hypothesis

Late 1990's – Dr. Henrik Kehlet

With continued changes in anesthesia techniques and non-invasive surgical technology – would decreasing surgical stress response have a positive effect on surgical outcomes?

5

Review of the Data

Evaluated multiple studies – endoscopic vs. open cholecystectomy

- No significant differences in endocrine response
 - Cortisol, catecholamines, glucagon vs insulin, growth hormone
- No significant differences in inflammatory and immune response
 - C-reactive protein and interleukin 6
- Pulmonary function/decreased hypoxemia improved with endoscopic approach
 - Decreased atelectasis & respiratory infections
- Shortened postoperative GI paralysis
 - Clinically significant – allow early nutrition
 - Reduces catabolism and risk of sepsis

6

<h2>Shortcomings</h2>	<p>Failed to evaluate</p> <ul style="list-style-type: none"> ◦ Effects of multimodal medications ◦ Sleep disturbances ◦ Surgical techniques “gasless” (American vs French) ◦ Patient positioning
-----------------------	--

7

<h2>Limitations</h2>	<ul style="list-style-type: none"> Unnecessary drains NG tubes Inadequate pain relief Inadequate oral nutrition Immobilization <ul style="list-style-type: none"> ◦ Increased catabolism ◦ Increased complication from thromboembolic event ◦ Impaired pulmonary function & oxygenation
----------------------	--

8

<h2>Conclusions</h2>
<p>Potential advantages of endoscopic vs open procedures must include:</p> <ul style="list-style-type: none"> ◦ Integration of minimally invasive surgical technique ◦ Effective pain control ◦ Early enforced oral nutrition ◦ Early mobilization

9

<h2>ERAS – Enhanced Recovery After Surgery</h2>	<ul style="list-style-type: none"> ◦ Henrik Kehlet MD PhD pioneered in Denmark in the late 1990's ◦ Determined change needed in patient management before, during, after surgery ◦ Optimize patient health and disease processes (DM, CAD,HTN) ◦ Minimize surgical stress response ◦ Accelerated recovery through multimodal/multidisciplinary approach
---	--

10

<h2>Health Optimization</h2>	<p>Disease and organ dysfunction</p> <ul style="list-style-type: none"> ◦ Strong determining factors of postoperative complications ◦ Extended hospital LOS ◦ Assessment of cardiovascular, pulmonary and thromboembolic risk ◦ Optimize conditions to re-stratify high-risk patient into lower risk group <ul style="list-style-type: none"> • Maximize nutrition • Smoking cessation • Alcohol abuse <ul style="list-style-type: none"> ◦ Alcohol induced immunosuppression ◦ Subclinical cardiac dysfunction ◦ Amplified hormonal surgical response
------------------------------	---

11

Anesthesia 101- Understanding the “Why”?

Autonomic nervous system medicine

Central autonomic nervous system (ANS)

- Hypothalamus
 - Surgical stress response
 - Proinflammatory cytokines
 - Tumor necrosis factor alpha (TNF- α)
 - Interleukins
 - Activation of pituitary hormones
 - Catecholamines
 - Cortisol
 - Glucagon
 - Growth hormone
 - Temperature regulation

12

Impact of Anesthesia



- Peripheral autonomic nervous system
- Sympathetic nervous system neurotransmitters
 - Norepinephrine
 - Stimulate alpha- and beta-adrenergic receptors
 - Dopamine
 - Supplies dopamine receptors
 - Parasympathetic nervous system
 - Acetylcholine neurotransmitter
 - Stimulates nicotinic and muscarinic receptors

13

Accelerated Recovery

- Multimodal/multidisciplinary approach
- Preadmission counseling
 - No bowel prep
 - Fluid and carbohydrate loading/no fasting
 - No tubes
 - Regional anesthesia
 - Minimally invasive incisions
 - Patient warming
 - Prevention of PONV
 - Non-opiate oral analgesics/NSAIDs
 - Early catheter removal

14

Nursing Education

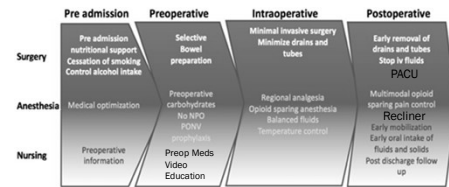
Must "**believe**" the program is evidence-based and best for the patient

- Zoog et al. (2018). "Enhanced recovery" protocol compliance influences length of stay: resolving barriers to implementation. *American Surgeon*, 84, 801-807.
- Investigated the efficacy of enhanced recovery protocols at their academic institution
 - Should be the standard of care and can be implemented
 - Protocol compliance requires collaboration between the entire team
 - Change in culture involves intensive patient education and defining expectations preoperatively

25

15

Dr. Ljungqvist ERAS Flowchart (Modified)



With permission from Dr. Ljungqvist

16

ASA Fasting Guidelines

Table 1.
Fasting and Pharmacologic Recommendations

A. Fasting Recommendations*	Minimum Fasting Period†
Ingested Material	
• Clear liquids‡	2h
• Breast milk	4h
• Infant formula	6h
• Nonhuman milk§	6h
• Light meal**	6h
• Fried foods, fatty foods, or meat	Additional fasting time (e.g., 8 or more hours) may be needed

Anesthesiology March 2017, Vol. 126, 376-393.

17

Current Practice

- Preoperative
- Evening before surgery, food until midnight, clear fluids until 2 hours before surgery - includes apple juice or clear carbohydrate commercial product
 - Eliminate mechanical bowel prep
 - Two saline enemas 1 hour apart (used sparingly)
 - Preemptive analgesia (age dependent)
 - Celecoxib 400mg
 - Acetaminophen 1,000 mg
 - Gabapentin 600mg
 - Dexamethasone 4mg IV (PONV prophylaxis)
 - Ondansetron 4mg before closure (PONV)
 - Ketorolac 15mg IV end of procedure

18

Perianesthesia Influence

Reinforce education received from provider

- Begin with what they know

Clarify misconceptions

- Did they "hear" they are staying in the hospital
- Do not hesitate to have practitioner revisit the patient

Completion of assessment

- Any abnormal – report to the healthcare team

Review of medications

- Are they compliant

Communicate concerns

History of chronic pain

19

Current Practice – Intraoperative

- Minimally invasive surgeries
 - Reduction in trauma and stress
 - Reduction in postoperative fatigue
 - Preserves functional capacity
 - Intraoperative fluid restriction
- Local infiltration
 - Bupivacaine vs. Exparel®
- Regional anesthesia
 - TAP (transversus abdominis plane) – sensory block lower abdominal wall
 - Epidurals as appropriate
- Decreased use of drains
 - Foley's out in PACU/shortly after arrival to inpatient unit

20

Current practice – Post Procedure

- Early mobilization
- Early feeding
 - Fasting prior to surgery produces catabolic state
 - Begin clear liquids in PACU (sips – advance aggressively)
- Multimodal pain management – crucial!
 - Focus on reduction of opioids
 - Remember side effects, nausea, hypotension, pruritis, somnolence
 - Utilization of scheduled NSAIDs, acetaminophen, gabapentin
 - PCA's removed POD 1 for inpatients

21

Nonpharmacologic Comfort Measures

- Repositioning
- Heat/Cold
- Acupuncture**
- Pillows
- Music**
- Therapeutic Touch
- Massage**
- TENS**
- Meditation**
- Pet Therapy

22

Current practice – Post Procedure

- Reduction in nausea and vomiting
 - Aggressive anti-nausea medications
 - OK to be nauseated
- Patient education
 - Accelerated stay
 - Multimodal pain management
 - Around the clock acetaminophen and ibuprofen
 - Reduction in fasting
 - Early removal of catheters
 - Fill and pull as ordered
 - Decreased pelvic cramping and discomfort
 - Early mobilization
 - Ambulate, ambulate, ambulate

23

Perianesthesia Influence

- Reinforce and evaluate patient education
 - Skills and knowledge for successful home recovery
- Shortened length of stay
 - Minimal disruption in lives
 - Recognition home environment better for recovery
- Appropriate home support
 - Clearly defined caregiver role in patient's recovery
 - Assessment of caregiver ability to participate in patient's recovery
- Active participation in self-care
 - Motivated to resume activities of daily living
- Patient empowerment to return to physical, psychological and social wellbeing

24

Nursing Considerations – Cheerleader!

Postoperatively

- Encourage patients to achieve postoperative goals
 - Early mobilization
 - Feeding/prevention of nausea
 - Optimal pain control
- Education and recovery promotion
- Individualize care for each patient
- Coordination of care for promotion of patient satisfaction
 - Extend postanesthesia time as appropriate
 - Time requirements may be amended as necessary (4 hours stay s/p hysterectomy) minimum
 - Fill and pull early into recovery
 - Ongoing encouragement as patient meets each discharge criteria

25

Measure Outcomes

From an overall program perspective:

- Cost
- LOS
- Patient satisfaction
- 30-day readmission rate
- Protocol compliance
- Unanticipated admissions

26

Thank you!



27

Questions?



28

References

Kehlet H. Surgical Stress Response: Does endoscopic surgery confer an advantage? *World Journal of Surgery*. 1999; 23(8): 801-807.

Nelson G, Kalogera E, Dowdy S. (2014). Enhanced recovery pathways in gynecologic oncology. *Gynecologic Oncology*. 2014;135:586-594.

Messinger D, Curtis N, Jones A, Jones E, Smart N, Francis N. Factors predicting outcome form enhanced recovery programmes in laparoscopic colorectal surgery: a systematic review. *Surg Endosc*. 2017;31:2050-2071.

Ljungqvist O, Hubner M. Enhanced recovery after surgery – ERAS – principles, practice and feasibility in the elderly. *Aging Clinical and Experimental Research*. 2018;30:249-252.

Tezber K, Iannitti D, Aviles C, et al. Implementing enhanced recovery after surgery (ERAS) program on a specialty nursing unit. *JONA*. 2018;48(6):303-309.

29

References

Persico M, Miller D, Way C, et al. Implementation of enhanced recovery after surgery in a community hospital: an evidence-based approach. *J Perianesth Nurs*. 2019;34(1):188-197.

Carter-Brooks C, Du A, Ruppert K, Romanova A, Zyczynski H. Implementation of a urogynecology-specific enhanced recovery after surgery (ERAS) pathway. *Am J Obstet Gynecol*. 2018;219:495.e1-10.

Zoog et al. "Enhanced recovery" protocol compliance influences length of stay: resolving barriers to implementation. *American Surgeon*. 2018;84:801-807.

Tisk H, Nielsen A, Pelletier KR, et al. Evidence-based nonpharmacologic strategies for comprehensive pain care: the consortium pain task force white paper. *Explore*. 2018;14(3):177-211.

30