GRAND ROUNDS

Closing the ERAS Care Gap

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Enhanced Medical Nutrition  in-kind contribution

Edwards Life Sciences, HLS Therapeutics Inc.  Honoraria

Cardiac Surgery Unit – Advanced Life Support (CSU-ALS), Renibus Therapeutics Inc.  Advisory Board

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#TeamArora

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#geriatriciansarecool

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Jonathan Afifalo– McGill U
Quality and ERAS Linked for Optimal Care

ERAS in Cardiac Surgery We can do better Pre-, Intra- Post-op

ERAS is a Team Sport Small Wins Matter

THE MOST IMPORTANT SLIDE
THE NEXT MOST IMPORTANT SLIDE

Baseline Vulnerability
- Cognitive Function
- Atherosclerosis
- Age
- Frailty/Nutrition
- Psycho-social stressors

Surgical Stressor
- Acute Event
- Anesthesia
- Open Procedure
- Blood Loss/Transfusion

Post-Event Stressor
- Hemodynamic perturbations
- Mobility
- Medications
- Environment
- Sleep deprivation

The "3-Strike Model"

Another MOST IMPORTANT SLIDE

The patient’s journey

Ok... The Last MOST IMPORTANT SLIDE

- Patients are getting older and sicker
- The “eyeball” test is not enough
- We need a more comprehensive management plan
“...clinical scenario in which mortality results from a potentially modifiable major complication”
Top 2 subcategories:
1. Catastrophes (unexpected fatal events)
2. Deficiencies in the identification and treatment of acute decompensation.

More common in the LOWEST risk group

Let’s Start with a Case

• Case Example

• 73-year-old male
  • critical aortic stenosis
  • 3v Coronary artery disease
"I don't know, a check for my heart?"

EuroSCORE II

Operative Mortality = 2.78%
Ok... The Last MOST IMPORTANT SLIDE

• Receives:
  • 2mg of lorazepam
  • 2mg hydromorphone
  • 10mg of haloperidol
  • Now very sleepy...
  • Then hypoxic...

https://medpix.nlm.nih.gov/case?id=b739a916-6bc1-490c-9f7a-a36645055eb4

Course in Hospital

• Mechanically ventilated for 5 days
  • Re-intubated x 2
  • Required a tracheostomy
• Acute Kidney Injury
• 40 days in hospital
SUCCESS
LOADING...

If your patient leaves the Hospital ALIVE...

...was your care Successful?
Poor Functional Survival

• ~50% of patients are likely frail
• 5X ↑ MACCE
• 3-8X ↑ delirium risk, independent of EuroSCORE II.

Assesses institutional effectiveness of postoperative care

- allowing hospitals to target quality improvement efforts.
Guidelines for Perioperative Care in Elective Colonic Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations

Guidelines for Perioperative care after radical cystectomy for bladder cancer: Enhanced Recovery After Surgery (ERAS®) society recommendations


Guidelines for Perioperative Care for Liver Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations


Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations: 2018


Guidelines for Perioperative Care in Esophagectomy: Enhanced Recovery After Surgery (ERAS®) Society Recommendations

2nd Enhanced Recovery After Cardiac Surgery (ERACS)
Best-Practices, Cost-Effective Symposium
Mandarin Hotel Ballroom, Boston, MA | April 29, 2017
Mission

To optimize perioperative care of cardiac surgical patients through collaborative discovery, analysis, expert consensus, and dissemination of best practices.

www.erascardiac.org
The Power of Tiny Gains

1% better every day: \(1.01^{365} = 37.18\)

1% worse every day: \(0.99^{365} = 0.03\)

JamesClear.com
On Friday, October 16, 1846

- Removal of a growth from a man's neck.
- “instead of using pulleys, hooks, and belts to subdue a patient **writhing in pain**

“first...general anesthetic”

“No one knew whether the secret concoction would work.”

“Some even feared it might kill the patient.”
Early extubation goals

Fast track:
- Extubation 6-12 hours

Ultrafast track:
- Extubation in the OR

Rates of Extubation in OR (2000 to 2014)

•~50% of patients are likely frail
Fallacy of the Eyeball Test

Frailty is associated with an increased risk of major adverse cardiac and cerebrovascular events (MACCE) following cardiac surgery.


Appropriate Compensation

Decompensation, adverse events, complications, mortality

Sepehri et al. (2014)
- 6 studies
- 4756 patients
- 9 measures of frailty
- OR: 4.89 95% CI 1.64-14.60

Essential Frailty Toolset (EFT)

Chair rise time
Gait speed
Standing balance
Handgrip strength
Body mass index
Weight loss
Exhaustion
Inactivity
Falls
Visual impairment
Hearing impairment
Cognitive impairment
Depressed mood
Anxious mood
Hemoglobin
Leukocyte count
Platelet count
Serum albumin
Malnutrition
Nagi items
OARS items

Afilalo J. JACC 2017; 70: 689
Essential Frailty Toolset (EFT)

Results

3 out of 5

Patient information

- 60° Isolated CABG

- Chair rise 10 seconds

- Cognition
  - Cognitively impaired

- Hemoglobin
  - 105 g/L

- Albumin
  - 28 g/L

Interventions

- If cognitive impairment not better explained by delirium, consult geriatrics and consider administering the MoCA

Afialo J. JACC 2017; 70: 689

"NEW" Prehabilitation

- Alleviating preoperative anxiety and stress
- Individually-tailored exercise intervention to improve baseline functional capacity
- Dietary modification to counter protein-energy malnutrition

↓ sarcopenia → ↓ frailty → ↓ poor outcomes
Prehabilitation is beneficial for patients undergoing elective cardiac surgery with multiple comorbidities or significant deconditioning.

Class of Rec. **Class IIa**: Level of Evidence **B-NR**

- Low risk vs ? Delay
- Two RCT
  - safe and efficacious
  - reduction in LOS
  - Improved exercise capacity.
- Some mixed meta-analysis supportive
COOL STORY...

BUT WHAT'S YOUR POINT EXACTLY?

DIYLOL.COM

Timeline for Quick Wins 2023

Timeline Milestones Listed Below

- Kick Off Meeting (with quick wins DRI & OE Team)
- Jan: Develop simple & quick provider education
- Feb: Complete order set
- Feb: All elective cardiac surgery patients to be ERAS patients
- Feb: Start chart audits for compliance
- Mar: Report off work and initial results of the quick audit

Project Completion/Implementation
Due Date: Thursday, March 16th, 2023
Big Picture

Preoperative
- ERAS
- Phase 1
- Phase 2

Intraoperative
- ERAS Multimodal Opioid

Postoperative
- ERAS
- MITT
- Respiratory

Discharge
- Clinical Pathways
- H @ H

ERAS Patient
- Yes
- No

Is the patient vaccinated for Covid?
- Select item...

Division Request
- Select item..

For OB Only: EDC
How common is it?

- Pathirana AK, et al 2014

39% of the hospitalized patients (age >65 years) were malnourished

Evident in 20% cardiac surgery patients
Pre-operatively

100-g the night before and 50-g complex CHO **2-4 hours** preoperatively

Reduces
- insulin resistance and tissue glycosylation

Improves
- postoperative glucose control

Enhances
- return of gut function.
Less NPO

• CHO load **2-4 hours** before general anesthesia

• Class of Rec. **Class IIb**: Level of Evidence **C-LD**

Preoperative Correction of Nutritional Deficiency

• 7 to 10 days preoperatively
  – a reduction in the prevalence of infectious complications
    • Colorectal patients

• Class of Rec. **Class IIA**: Level of Evidence **C-LD**
“No patient undergoing an elective surgery should go to the OR malnourished”

Duke POET pathway

- Preop
  1. High-protein ONS
  2. Vitamin D assessment and repletion:
     - If Vit. D level < 20 ng/ml:
       - 50,000 I.U. vitamin D3-1 x week for 3 weeks then
       - 2000 I.U. vitamin D3 per day

- Periop/Hospital
  Immunonutrition: 5-7 days pre-op
  AND
  carb loading 2h pre-op

- Postop
  Immunonutrition: 5-7 days post-op
  THEN
  High-protein ONS x 3-6 weeks

TEAM TRAINING are KEY
Iteration is necessary
METHODOLOGY:
Comparisons Across Existing Guidelines/Consensus Manuscripts

Why?
- Implementation
- Subject matter experts

What?
- Accumulated evidence
- Peer-reviewed literature
- Current enhanced recovery practices

What?
- Turn key order sets (TKOs)
TKO ACTIONS BY PHASE OF CARE

<table>
<thead>
<tr>
<th>PRE-OP</th>
<th>INTRA-OP</th>
<th>POST-OP</th>
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</thead>
<tbody>
<tr>
<td><strong>ASSESSMENT</strong></td>
<td>Multidisciplinary Team Approach</td>
<td>Closely monitor eGFR and UO</td>
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<tr>
<td>Kidney Health Assessment</td>
<td></td>
<td>Avoid hyperthermia</td>
</tr>
<tr>
<td>Lithography for proteinuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COMMUNICATION</strong></td>
<td></td>
<td>Avoid hypotension</td>
</tr>
<tr>
<td></td>
<td>Limit angiotensin II antagonists</td>
<td></td>
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<tr>
<td></td>
<td>Hold ACEI and ARBs</td>
<td>Goal-directed perfusion (DO_2 &gt;700)</td>
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<tr>
<td></td>
<td></td>
<td>Glycemic control (goal: HbA1c &lt;8%)</td>
</tr>
<tr>
<td><strong>THERAPY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Squids 2-4 hours preop</td>
<td>Preserved intravascular volume</td>
<td>CDT (BP, CVP, CI, UD, PAD, So2)</td>
</tr>
</tbody>
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### Phase 1 - Core Elements of ERAS Compliance

<table>
<thead>
<tr>
<th>Preoperative Phase</th>
<th>Clinical Role Responsible for Compliance to the Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-admission counseling</td>
<td>Clin/Nurse/ERAS Nurse Leader</td>
</tr>
<tr>
<td>Carbohydrate loading</td>
<td>Clin/Nurse/ERAS Nurse Leader</td>
</tr>
<tr>
<td>No prolonged fasting</td>
<td>Clin/Nurse</td>
</tr>
<tr>
<td>No/limited bowel prep</td>
<td>Surgeon/Advanced Practice Provider</td>
</tr>
<tr>
<td>Antibiotic prophylaxis</td>
<td>Surgeon</td>
</tr>
<tr>
<td>Thromboprophylaxis</td>
<td>Surgeon</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Intraoperative Phase</th>
<th>Clinical Role Responsible for Compliance to the Recommendation</th>
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</thead>
<tbody>
<tr>
<td>Short-acting anesthetics</td>
<td>Anesthesia</td>
</tr>
<tr>
<td>No drains</td>
<td>Surgeon</td>
</tr>
<tr>
<td>Goal directed fluids</td>
<td>Anesthesia/Surgeon</td>
</tr>
<tr>
<td>Normothermia</td>
<td>Anesthesia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postoperative Phase</th>
<th>Clinical Role Responsible for Compliance to the Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional anesthesia/analgesia</td>
<td>Anesthesia/Surgeon</td>
</tr>
<tr>
<td>No nasogastric tubes</td>
<td>Surgeon</td>
</tr>
<tr>
<td>Prevention of nausea and vomiting</td>
<td>Anesthesia</td>
</tr>
<tr>
<td>Goal directed fluids</td>
<td>Anesthesia/Advanced Practice Provider</td>
</tr>
<tr>
<td>Early removal of catheter / avoidance of catheter</td>
<td>Advanced Practice Provider / ERAS Nurse Leader</td>
</tr>
<tr>
<td>Early oral nutrition</td>
<td>Advanced Practice Provider / ERAS Nurse Leader</td>
</tr>
<tr>
<td>Non opioid oral pain meds (analgesia)</td>
<td>Advanced Practice Provider</td>
</tr>
<tr>
<td>Early mobilization</td>
<td>Nurse / ERAS Nurse Leader</td>
</tr>
<tr>
<td>Stimulation of gut motility</td>
<td>Advanced Practice Provider</td>
</tr>
<tr>
<td>Audit</td>
<td>ERAS Nurse Leader / Advanced Practice Provider / Nurse</td>
</tr>
</tbody>
</table>
One-Year Results from the First US-based Enhanced Recovery after Cardiac Surgery (ERAS Cardiac) Program

Judson B. Williams MD, MHS, Gina McConnell RN, J. Erin Allender, PharmD, Patricia Wolitz PhD, RN, Kathy Kane MS, Peter K. Smith MD, Daniel T. Engelman MD, William T. Bradford MD

WakeMed Health and Hospitals, Raleigh, NC; Duke University School of Medicine, Durham, NC; Baystate Medical Center, Springfield, MA
judson.williams@duke.edu

May 2019 Journal of Thoracic & Cardiovascular Surgery

A prospective study in patients undergoing CABG

- offered participation in mobile health app ERAS platform

Control Group received our Standard Post-op Care

Gregory Rushing
Basanta Mohapatra
Primary Outcomes:
- 30-day ED visits – **17 less visits**
- 30-day Readmissions – **down 40%**

Secondary Outcomes:
- Nursing Facility Dispositions – **down 41%**
- Office Phone Calls – **down 37%**

**Preoperative**
- Patient selection
- Optimization

**Patient Blood Management**
- Avoidance of anemia

**Mobilization**

**ERAS Components in MICS**

**Multimodal Pain Management**

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Giulio Mag, MD\(^1\), Tommaso Rega\(^1\), Antonio Compagno\(^2\), Corrado Cervello\(^3\), Giuseppe Pinto\(^4\), Andrea Corti\(^5\)

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wrap up

up next

what

why

about

75

76
Demonstrated sig. reductions in:

- LOS
- blood loss
- time to ambulation
- increases in pt. satisfaction around pain.
Phase 2 - Patient Engagement Panels to Refine Protocols

Five databases:
- 5292 citations
- 43 articles included

108 patient preferences
32 caregiver preferences
19 prioritized outcomes

Information and education Most common preference

Collective voices of 3789 stakeholders

Improved quality of life Most common patient outcome priority

Conclusion: Patient and caregiver values do not always align with those of clinicians. Valuable insights can be gained by involving these stakeholders in research aimed at improving their care and recovery.

Phase 2 - Patient Engagement Panels to Refine Protocols

- Developed by clinicians
- Primarily relate to improving clinical outcomes
- E.g. antiinflammatory, glycemic control, biomarkers for kidney injury, etc.

Overlapping strategies:
- E.g. Prohabilitation, information about risk reduction, more effective pain control, etc.

Scoping review and workshop:
- Patient and caregiver preferences and prioritized outcomes
- Primarily relate to experience of surgery and impact on life
- E.g. Information about psychological components of surgery, involvement in decision making, social support, etc.
We need a more **comprehensive** management plan

A pessimist sees the **difficulty** in every opportunity; an optimist sees the **opportunity** in every difficulty.

- Winston Churchill
Chest Wall Blocks

Post-op Mobility Depends on *Minimal* Opioid Usage

1 of 10 patients will continue to use opioids over 90 days after surgery
Post-op Mobility Depends on Minimal Opioid Usage

Postoperative:
- IV acetaminophen every 6 hours x 8 doses then PO
- Precedex IV infusion (SICU & SPCU)
- Lidocaine IV bolus (in OR) and 1-5 mg/min infusion for first 24 hours
- Fentanyl 25 mcg IV every 15 min PRN
  - Only the first 8 hours after surgery
- Gabapentin 300 mg TID starting POD1
  - Home with weaning prescription
- Valves only: Ketorolac (Toradol) q 6 hours PRN x48 hours
- Lidocaine patches
- Pressure points
- Icepacks

1 of 10 patients will continue to use opioids over 90 days after surgery.
The tubule structures (epineurium, perineurium and endoneurium) remain intact. Function to resume over the course of roughly 1-3 months.
What can “ERAS-CS” look like?

What can “ERAS-CS” look like??
Why ERAS Matters

- Delirium 20-50%
- AFIB 20-50%
- Kidney Injury 20-30%
- Stroke 1-10%
- Lung Infection 2-5%
- Surgical Site Infection 2-7%
- GI complications 1-5%
- Persistent postoperative opioid use 5-9%
- Postoperative cognitive dysfunction 5-15%
- Admission to rehab 10-50%