What is ERAS?

- Enhanced Recovery After Surgery (ERAS)
  - Collection of best anesthesia and surgical practices bundled into a coordinated care pathway that benefits the patient and hospital by reducing length of stay, complications, readmissions, and cost
  - Pathways have been successful in several surgical specialties
    - Basse et al, 2000 – 60 patients undergoing colorectal surgery
    - LOS – 2 days
  - Benefits are achieved by decreasing stress, maintaining normal physiologic function, and enhancing early mobilization
  - Patients benefit from a multi-disciplinary approach to surgical care
What is ERAS?

- The ERAS Society was created in 2001
  - www.erassociety.org
- The mission of the ERAS Society
  - To develop perioperative care
  - To improve recovery through research, education, audit and implementation of evidence-based practice
- In 2005, the ERAS Study Group developed and published an evidence-based consensus protocol for patients undergoing colorectal surgery
What is ERAS?

  - Retrospective cohort study at the Mayo Clinic
  - Included cytoreductive surgery, staging, and prolapse surgery
  - Historical control (241) vs. ERAS pathway (235)
    - Cytoreductive cohort (81 vs. 78 patients)
      - Less narcotic use in 48 hrs (80% reduction) with similar pain scores
      - More nausea but no increase in ileus
      - Decreased LOS (10 vs. 6 days), similar readmission rates (25.9% vs. 17.9%), and similar complication rates (63% vs. 72%)

  - Systematic literature search on PubMed
  - ERAS Society was contacted to identify any unpublished protocols
  - 7 studies that examined the role of ERAS in gynecologic oncology patients
  - No randomized control trials
What is ERAS?


  - Common interventions included:
    - Oral intake of fluids up to 2 hours before anesthesia
    - Solids up to 6 hours before anesthesia
    - Carbohydrate supplementation
    - Intra- and postoperative euvolemia
    - Aggressive nausea/vomiting prophylaxis
    - Oral nutrition and ambulation the day of surgery

What is ERAS?


  - Bowel preparations, NPO after midnight rule, nasogastric tubes, and intravenous opioids were discontinued
  - Significant improvements in patient satisfaction, length of stay, and cost were observed in ERAS cohorts compared to historical controls
  - Morbidity, mortality, and readmission rates were similar between groups

What is ERAS?


  - ERAS is a safe perioperative management strategy for patients undergoing surgery for gynecologic malignancies
  - ERAS reduces length of stay and cost, and is considered standard of care at a growing number of institutions
  - There is a need for formalized evidence-based guidelines for patients with gynecologic cancer undergoing surgery
What is ERAS?

- 2 part evidence-based guidelines for Gynecologic Oncology published in 2016

Implementing an ERAS program for your patients

- What is UAB care?
  - Hospital wide initiative focused on optimizing care for specific conditions and ensuring that redefined standards are applied
- Goals
  - Improve quality of care
  - Reduce variation
  - Control cost
- Initiated ERAS programs for colorectal and urology

Implementing an ERAS program for your patients

- Implementation team and ERAS champion
  - MDs (surgeons and anesthesia), nursing, administration, informatics
- Project goals
- Protocol development
  - Leading Practice Guidelines (LPGs)
  - Team — STAFF, CLINIC, OR, PACT, PREOP, POSTOP
- Audit database to evaluate compliance and outcomes
Project Goals

- The ERAS pathway will address areas where there is room for improvement such as length of stay, variable cost per case, readmissions, and infections

<table>
<thead>
<tr>
<th>Goal</th>
<th>Current Performance</th>
<th>Goal (FY 17 Q1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average O/E LOS Index</td>
<td>1.07</td>
<td>0.95</td>
</tr>
<tr>
<td>Readmission %</td>
<td>6.71%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Infections identified or reading</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>SSI %</td>
<td>2.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Variable cost per case</td>
<td>$4,493</td>
<td>$4,200</td>
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</tbody>
</table>

Dashboard

Protocol Development

- Discovery Assessment: Process observation, staff interviews, data analysis, stakeholder feedback
- Rapid Redesign Session – 7/2016: Create leading practice guidelines (LPGs), develop key initiatives (KIs)
- First Implementation Meeting – 9/2016: Assign key initiative teams
- Implementation Meetings: Meet every two weeks to provide KI team updates
- Key Initiative (KI) Team Meetings: Meet independently to implement solutions to achieve KI goals
- Executive Staff and Stakeholders
- Celebration and Project Closure – 11/2016
Protocol Development

Preoperative Education

- All patients with a planned laparotomy or hysterectomy are eligible for ERAS
- Transferred patients or those admitted from the ED can be enrolled as inpatients
- The surgeon introduces the ERAS concept followed by the clinic nurse reviewing the education booklet
  - Teach Back method
- Surgery scheduled using the Anesthesia Type
  - ERAS + General
  - Intrathecal morphine

Preoperative Education

- Patients are enrolled into Emmi to view educational videos before surgery
- Patients with suspected malnutrition are started on Ensure TID until surgery
- The PACT appointment is scheduled at least 7 days prior to surgery
- No solid food after midnight
- Continue oral hydration with clear liquids up to 2 hours before surgery (arrival to hospital)
  - Carbohydrate load with 400 mL Powerade or Gatorade 2 hours before surgery
Preoperative Education

- Patient is identified as ERAS at PACT
- Routine patient processing is done
  - Medication reconciliation, medical interview, labs
- Patient education booklet/information is provided
  - CHG bath instructions
  - Regular diet until midnight
  - Clear liquids until 2 hours before surgery
  - Gatorade/Powerade AM of surgery (carbohydrate loading)
Perioperative Management

- Consent is obtained for intrathecal anesthesia and patient education questions are answered by a physician
- Patient role in recovery is reinforced
  - Decreased narcotic use
  - Early feeding
  - Early ambulation

- Multimodal analgesic regimen is given prior to surgery
  - Tylenol, Celebrex, Gabapentin
  - Intrathecal injection recommended
    - TAP (transverse abdominis plane) block
    - PCA pump if not a candidate for intrathecal
  - Intraoperative - Lidocaine infusion, Dexamethasone, Propofol
  - Multimodal postoperative nausea/vomiting prophylaxis

- Intraoperative fluids
  - Goal directed fluid management to maintain cardiac output while avoiding postoperative volume overload
  - 800 cc/hour
  - Limit crystalloid – albumin for bolus if MAP < 60 mmHg
  - Avoidance of normal saline – LR or Plasmalyte
  - Wound closure trays and change of gloves required
  - Alexus wound protector for all planned bowel cases
  - OR debriefing required
Perioperative Management

- ERAS Gyn Oncology PowerPlan
  - Includes PACU and Post-op components
  - Limited usage of narcotics in PACU
  - Ice chips in PACU
  - Initiate LR at 40 cc/hr
    - If hypotensive, can give 250 cc bolus of LR or 5% albumin

Postoperative Optimization

- Day of Surgery
  - Clear and advance as tolerated
  - Out of bed 2 hours
  - LR at 40 cc/hr

- POD 1
  - Regular diet with Ensure
  - DC Foley and IVFs by 0800
  - Out of bed 8 hrs – staff to document activity
  - Hemoglobin in AM with other labs as indicated
  - Chewing gum recommended
Postoperative Optimization

- **Multimodal Pain Control**
  - Acetaminophen
    - 975 mg, Oral, Every 6 hours (scheduled)
  - Oxycodone regular release (*24 hours after intrathecal*)
    - 2.5 mg, Oral, Every 4 hours, PRN Pain, Mild
    - 5 mg, Oral, Every 4 hours, PRN Pain, Moderate
    - 10 mg, Oral, Every 4 hours, PRN Pain, Severe
  - Hydromorphone
    - 0.4 mg, IV, Every 1 hour, PRN breakthrough pain
    - Only if pain score >7 more than 1 hour after receiving oxycodone
    - Notify MD if 2 doses required

- **Based on age and weight of patient**
  - Ketorolac: 15-30 mg, IV, Every 6 hours x 4 doses. Start 12 hours after preoperative Celebrex dose.
  - Ibuprofen: 400-800 mg, Oral, Every 6 hours. Start 6 hours after last dose of ketorolac.

- **If GFR <60 or patient unable to take NSAIDs for other reasons**
  - Tramadol: 100 mg, Oral, Every 6 hours. Begin on morning of POD1. For patients <65.
  - Tramadol: 100 mg, Oral, Every 12 hours. Begin on morning of POD1. For patients >65 or with Cr clearance <30 mL/min

Postoperative Optimization

- Discharge planning starts on POD1
- Documentation of daily weights, shower, and ambulation
- Discharge when tolerating diet, voiding, and adequate pain control
  - Assess the need for narcotic prescription
  - Lovenox for 21 days if cancer diagnosis or high risk
- Automated phone call with 72 hours of discharge
- Postop visit within 28 days
  - Two ERAS protocols were developed
    • Full pathway using regional anesthesia for open procedures
    • Light pathway without regional anesthesia for vaginal and MIS
  - Usual ERAS pathways
  - A before-and-after study design compared clinical outcomes, costs, and patient satisfaction

Outcomes

• ERAS full protocol → 136 patients compared with 211 historical controls
  - Median LOS was reduced (2.0 vs. 3.0 days; P=.007)
  - Reductions were seen in median intraoperative morphine equivalents (0.3 vs. 12.7 mg; P<.001)
  - Immediate postoperative pain scores (3.7 vs. 5.0; P<.001)
  - Total complications (21.3% vs. 40.2%; P=.004)

• ERAS light protocol → 249 patients compared with 324 historical controls
  - Decreased intraoperative morphine equivalents (0.0 vs. 13.0 mg; P<.001) and postoperative (15.0 vs. 23.6 mg; P<.001)
  - 30-day hospital costs were significantly decreased in both ERAS groups
    • $11,172 vs. $9,899; P<.001
    • $8,277 vs. $7,606; P<.001
Outcomes

  - Implementation of ERAS protocols in gynecologic surgery was associated with a substantial decrease in morphine administration, reduction in length of stay for open procedures, improved patient satisfaction and decreased hospital costs.

Outcomes

  - Prospective, randomized, controlled trial comparing ERAS protocol with routine postoperative care among women undergoing laparotomy on the gynecologic oncology service.
  - A sample size of 50 per group was planned to achieve 80% power to detect a two-day difference in LOS.
  - 103 eligible patients were enrolled between 2013 and 2015.
    - 52 in the control group and 51 in the ERAS group.

Outcomes

  - There was no difference in LOS between the two groups.
    - Median 3.0 days in both groups; P=.36
  - ERAS patients used less narcotics on day 0 (10.0 vs. 5.5 morphine equivalents; P=.09) and day 2 (10.0 vs. 7.5 morphine equivalents; P=.05).
  - No difference in ambulation, GI issues, complications, or readmissions.
Outcomes

- When compared with usual care, introducing a formal ERAS protocol did not significantly reduce LOS.
- Of note, the historical LOS was 5 days.
- Issues – Few ERAS elements implemented, compliance not measured, use of ERAS tenets in the control arm.
- Was this a poorly developed RCT?

UAB Outcomes

- Audit database to evaluate compliance and outcomes.
  - McKesson and Tableau.
  - Allison Todd, RN.
  - Quarterly ERAS meetings.
- UAB Gynecologic Oncology Service.
  - Enrollment started November 2016.
  - 217 patients enrolled thru December 2017.
- UAB Gynecology Service.
  - Enrollment started December 2017.
UAB Study

- Retrospective cohort study at UAB
- Gynecologic oncology patients undergoing elective laparotomy from 10/2016 – 6/2017
- Managed on an ERAS protocol and a control group from the year prior to ERAS implementation
- Patients taking daily opioids prior to surgery were classified as chronic narcotic users and compared to non-narcotic users
- 376 patients were identified
  - 197 in the control cohort and 179 in the ERAS cohort

Rates of chronic narcotic use were similar between cohorts
- 20.3% vs. 19.0%; p=0.75
- In the ERAS cohort, chronic narcotic users required significantly more opioids at discharge (1,940 vs. 533 mg OME; p=0.002)
- They were also more likely to require additional narcotic prescriptions within 30 days of discharge
  - 29.4% vs. 7.6%; p<0.001

LOS and readmission rates were similar in chronic narcotic users versus non-narcotic users
- There was no difference in postoperative pain score in chronic narcotic users in the ERAS cohort compared to control cohort (2.8 vs. 3.1; p=0.52), and no reduction in the amount of opioids prescribed at discharge (3,909 vs. 3,276 mg OME; p=0.61)
- In non-narcotic users, both postoperative pain scores (1.8 vs. 2.5; p=0.001) and the amount of opioids prescribed at discharge (1,940 vs. 2,610 mg OME; p=0.001) were significantly reduced with ERAS
UAB Study

- Implementation of ERAS improves pain control and decreases the amount of opioids prescribed at discharge in narcotic naïve gynecologic oncology patients.
- ERAS does not significantly improve postoperative pain control or decrease opioid use in chronic narcotic users.
- ERAS does decrease LOS.

Conclusions

  - Develop a multidisciplinary team and have a champion for the project
  - Develop your ERAS protocol using the published guidelines
  - Audit the program using a database to measure compliance and outcomes
    - LOS, readmissions, complications

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References