Endometriosis
Enhanced Recovery After Surgery Pathway Synopsis

Prior to Surgery Algorithm

Inclusion criteria:
- Reproductive-aged natal females referred to gynecology clinic and decision is made to pursue diagnostic laparoscopy for evaluation of endometriosis

Exclusion criteria:
- Already seen by Complex Pain Clinic

High Risk

If the patient has **any** of the following:
- 3 months or more of severe-disabling acyclic pelvic pain
- Previous emergency department/urgent care visits for pelvic pain
- Other chronic pain disorders (e.g., sickle cell) or medical diagnosis that may complicate pain management (e.g., Crohn's, transplant)
- Taking chronic pain medications including gabapentinoids (e.g., gabapentin, pregabalin), TCAs (e.g., amitriptyline) or SNRIs (e.g., duloxetine)
- Patient has been seen and cleared by more than one specialty at the time of Gyn referral (e.g., GI, urology, nephrology etc.)

Low Risk
- Does not meet High Risk criteria
- Patient with pelvic pain who is anticipated to do well with surgery and menstrual suppression

Gynecology clinic will review the endometriosis referrals to determine if the patient is at a high or low risk of a pain crisis during the perioperative period

Is the patient High or Low Risk?

Low Risk →
- No Complex Pain Clinic referral
- Schedule surgery
- Schedule PAT visit

High Risk ↓

Gynecology Clinic Provider

Facilitate Complex Pain Clinic Evaluation
- Submit referral to Pain Management. In comment put "Complex Pain Clinic, high risk endometriosis"
- Update patient's email address in Cerner to help get REDCap form sent
  - Intake form must be completed prior to scheduling
    - Once completed, patient is prioritized on wait list

Refer to pelvic floor P.T. or OT as soon as possible
Begin Prior Authorization Process for Lupron/Orilissa (precert-clinic@cmh.edu)
Schedule surgery: include need for PAT
Start medicine regimen
- Celecoxib: 50 mg po BID for < 50 kg; 100 mg po BID for > 50 kg
  - Patients should not be taking any other concurrent NSAIDs
- Gabapentin: Start at 100 mg po TID for one week, then increase to 200 mg po TID for one week, then increase if appropriate with the final goal of 5 mg/kg TID

Stop the above medications if side effects are encountered. Gabapentinoids may cause fatigue and brain fog. In very rare cases, teenagers may experience exacerbation of depression symptoms including suicidality

For immediate questions, contact Complex Pain Clinic team
- Can email, Message Center, call 816-983-6750, or message via Connect

Patient seen in **PAT** for pre-surgery evaluation to review the following:
- Introduction to ERAS
- Pain management
- Discuss anesthesia risks and plan

Medications to order for SDS
- Pregabalin 75 mg PO x 1
- Diazepam 0.05 mg/kg IV or PO (max dose: 5 mg)

Medication/Diet Instructions

Medication:
- Patient takes all normal daily medications (except celecoxib) the night prior to surgery or the morning of surgery unless specifically instructed to stop

Diet:
- Standard NPO guidelines
- 2-3 hrs prior to surgery - drink a carbohydrate-rich drink such as Gatorade, Powerade, or Pedialyte

Arrival time/location

Medication/Diet instructions
Given at Surgery Clinic, PAT
AND/OR
48 hours before surgery via SDS phone call

Intraoperative to discharge

Abbreviations:
OT = Occupational Therapy
PAT = Pre-admission testing
P.T. = Physical Therapy
SDS = Same Day Surgery
TCAs = Tricyclic Antidepressants
SNRIs = Serotonin –norepinephrine reuptake Inhibitors

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Intraoperative to Discharge Algorithm

Abbreviations:
OT = Occupational Therapy
PAT = Pre-admission testing
P.T. = Physical Therapy
SDS = Same Day Surgery
TIVA = Total Intravenous Anesthesia

Preoperative Care in SDS

Medications (To be ordered at PAT)
- Pregabalin 75 mg PO x 1
- Diazepam 0.05 mg/kg IV or PO x 1 (max dose: 5 mg)

Intraoperative Care

Multimodal Analgesia
- Acetaminophen 12.5 mg/kg (max dose: 1000 mg)
- Ketamine 0.5 mg/kg x 1 (max dose: 50 mg)
  - Consider infusion
- Ketorolac 0.5 mg/kg (max dose: 15 mg)
- Consider dexmedetomidine
- Fentanyl prn
- Hydromorphone 10 mcg/kg prior to extubation
- Surgeon to inject local anesthetic at port sites

Intraoperative Medications
- ***Antibiotics:***
  - Discuss at huddle
  - Administer before incision
- ***Antiemetics:***
  - Dexamethasone 0.1 mg/kg
  - Ondansetron 0.15 mg/kg (max dose: 8 mg)

Maintenance of Anesthesia
- ***Volatile or TIVA***
  - Maintenance at discretion of anesthesiologist
- ***Normothermia:***
  - Room temperature set to 70° F
  - Utilize Bair Hugger
  - Goal intraoperative temperature 36° - 38° C
- ***Euvolemia:***
  - Goal is clinical euvolemia
  - Plasmalyte at 3-7 ml/kg/hr (additional as clinically indicated)

Postoperative - PACU to Discharge

Pain Control
Please consult Acute Pain Service with questions

PACU Orders:
- ***Pain Management:***
  - Fentanyl prn
  - Hydromorphone 5 - 10 mcg/kg for breakthrough pain if not tolerating PO (max dose: 500 mcg)
  - Clonidine or dexmedetomidine for agitation and/or breakthrough pain
  - Oxycodone PO 0.1 mg/kg (max dose: 5 mg) once tolerating clears
    - To be ordered by OB/GYN
- ***If Post-operative Nausea/Vomiting:***
  - Ondansetron and diphenhydramine
  - Can consider scopolamine patch and/or amisulpride IV 10 mg

If unable to discharge home due to inadequate surgical pain control, please consult Acute Pain Service to evaluate and treat patient

Discharge

Medications ordered by Gynecology
- Oxycodone 5 mg q6 hrs prn pain for 3 days
  - Do not take oxycodone within one hour of taking diazepam
- Diazepam 2 mg q4 hrs prn muscle cramps for 7 days
  - Do not take diazepam within one hour of taking oxycodone.
- Acetaminophen 12.5 mg/kg (max dose: 1000 mg) q8 hrs scheduled for 7 days, then for 7 days prn
- Celecoxib twice a day for 14 days
  - 50 mg for patients < 50 kg or 100 mg for patients > 100 kg
- Magnesium glycinate 400-600 mg per day

Gynecology will continue medications previously started by the Complex Pain Clinic

Postoperative Appointments
Gynecology Clinic: 2 weeks post-op and continued hormonal support
- 2 weeks post-op: check wound healing, discuss results, evaluate need for Lupron/Orilissa
- Continued hormonal support: q3-6 months pending patient needs

Complex Pain Clinic:
- Follow up intervals determined by Complex Pain Clinic

Pelvic Floor P.T./OT:
- Resume or begin at 3-6 weeks postoperatively
- Short or long term

Psychology Support:
- Through Complex Pain Clinic or external clinic
- Short or long term

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Objective of the Endometriosis ERAS Pathway

The objectives for the Endometriosis ERAS pathway are to minimize the variation of care for the patients with a diagnosis of endometriosis undergoing surgery starting with and continuing through the referral to surgery, plan for pain management, pre-admission testing visit, and hospital discharge. This pathway includes preoperative assessment and evaluation of the severity of pain, the establishment of a pain management plan prior to surgery to be implemented post-op, nutrition/metabolism optimization, and reducing overall hospitalization length of stay. In the last several decades, the application of ERAS principles has shown significant improvements in various surgeries regarding length of stay, opioid use, pain control, and return to diet (Liu et al., 2017; Melnyk et al., 2011).

Background

Endometriosis is a disease affecting up to 15% of reproductive-age natal females, including adolescents (ACOG, 2018). This disease is characterized by ectopic endometrial tissue (endometrial glands and stroma), typically found in, but not limited to, the pelvis (ACOG, 2018). There are many theories regarding pathogenesis (stem cell progenitors, coelomic metaplasia, and retrograde menstruation); however, the etiology is still debated (ACOG, 2018; Shim et al., 2020). Subacute pelvic pain or dysmenorrhea are usually the first symptoms prompting medical evaluation, but endometriosis is also associated with chronic pelvic pain, subfertility, and concomitant gastrointestinal and genitourinary symptoms (Greene et al., 2009). Higher rates of endometriosis are seen in patients who have asthma, inflammatory bowel disease, and a first-degree relative with endometriosis (Dowlut-McElroy & Strickland, (2017). The only way to diagnose endometriosis is during surgery (typically laparoscopy) with direct visualization of classic endometriosis lesions or pathology confirming endometrial glands and stroma. This ectopic endometrium is hormonally active and displays signs of angiogenesis and hypersensitive neural pathways; therefore, the patient with endometriosis needs a multimodal approach to treatment. The treatment approach should consist of pain management while addressing fertility concerns, as there is currently no cure. Specifically, in our institution, we utilize the following team members for multidisciplinary support of adolescents with endometriosis:

- Adolescent Gynecologist: surgically diagnose endometriosis and treat endometriosis with hormones or anti-hormones
- Pain Management Specialist: direct multimodal analgesic care, which may include medications, acupuncture therapy, massage therapy, and reframing chronic pain
- Pelvic floor physical therapy: provide education and therapy to the muscles of the lower abdomen and pelvic floor, which are often more tense and hypersensitive to pain
- Psychologist: diagnose and treat co-existing depression and anxiety
- Social Worker: communicate the patient's needs with the school and work with insurance if needed for funding of certain medications

While endometriosis is known to be the leading cause of secondary dysmenorrhea, there remains a delay in diagnosis of years which is even longer in the adolescent population (5 years compared to 2 years in adults) (Greene et al., 2009). During this time of suffering, young girls and women are often missing work, school, and extracurricular activities, impacting their social engagement. At baseline, those with endometriosis score lower on mental and physical quality of life surveys (Gallagher et al., 2018). The longer a diagnosis is delayed, the worse symptoms become, and the worse quality of life scores become (Gallagher et al., 2018).

Our goal at Children's Mercy Kansas City through our Endometriosis Program is to decrease the time from symptom onset to diagnosis and approach treatment with a multidisciplinary team to optimize symptoms and quality of life in our teens.

Target Users

- Gynecologists, Anesthesiologists, Pain Management Physicians, Nurses

Target Population

- Reproductive-aged natal females

ERAS Inclusion Criteria

- Reproductive-aged girls with chronic pelvic pain who have failed medical (non-surgical) management of pain

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- Patients referred to Pediatric and Adolescent Gynecology to pursue diagnostic laparoscopy for evaluation

ERAS Exclusion Criteria

- Patients who have already been seen in the Complex Pain Clinic

Core Principles of ERAS

- Preoperative education of patients and family with an introduction to ERAS
- Reduced pre-operative fasting, with clear liquid oral carbohydrate loading until 2 hours prior to surgery
- Goal-directed strict intraoperative intravenous fluid therapy guidelines to avoid hypo-or hypervolemia
- Avoidance of pre-operative mechanical bowel preparation
- Avoidance of routine nasogastric tube use
- Minimizing long-acting opioid analgesia in favor of regional anesthesia with epidural and/or local anesthesia for intra-operative and postoperative pain control when appropriate and using alternative non-opioid medications when appropriate (e.g., non-steroidal anti-inflammatories or acetaminophen)
- Early post-operative mobilization
- Early postoperative enteral feeding

ERAS Management Recommendations

Pre-Operative Care

- Pediatric and Adolescent Gynecology (PAG) Clinic reviews referrals for endometriosis and determines the patient's level of risk for a perioperative pain crisis.
- All high-risk perioperative pain patients will be referred to CM Pain Management Clinic and Pre-Admission Testing (PAT) Clinic prior to surgery
- Low-risk perioperative pain patients will be seen in the pre-admission testing clinic prior to surgery to establish a pain management plan.
- At PAT clinic:
    - Patients are encouraged to drink carbohydrate-rich clear fluids up to 2 hours prior to procedure start time.

Intra-Operative Care

- Patient is provided with a multimodal analgesia approach

Post-Operative Care

- Acute Pain Service is consulted with any questions
- Pain management and postoperative nausea/vomiting (PONV) medications are initiated
- For discharge
    - Medications are ordered by Gynecology and Complex Pain Clinic
    - Post-operative appointments include:
        - PAG clinic two weeks postoperatively
        - Complex Pain Clinic
        - PT/OT is resumed at 3-6 weeks postoperatively
        - Psychology support is resumed or ordered as needed

Additional Questions Posed by the ERAS Committee

No clinical questions were posed for this review, and standard work is based on consensus as the evidence is sparse to guide patient care.

Key Metrics to Be Monitored

Pre-Op	Intra-Op	Post-Op
Pre-operative medications	PONV prophylaxis	Pain score
Carb-rich last clears	Temperature management	PONV score
	Multimodal anesthesia	Post-operative opioids
		Length of stay
		Home prescriptions

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Value Implications

The following improvements may increase value by reducing healthcare costs and non-monetary costs (e.g., missed school/work, loss of wages, stress) for patients and families and reducing costs and resource utilization for healthcare facilities.

- Decreased risk of overdiagnosis
- Decreased risk of overtreatment
- Decreased inpatient length of stay
- Decreased unwarranted variation in care

Organizational Barriers and Facilitators

Potential Barriers

- Variability of an acceptable level of risk among providers
- Challenges with follow-up and pain management faced by some families

Potential Facilitators

- Collaborative engagement across care continuum settings during ERAS development
- High rate of use of ERAS
- Standardized processes throughout the surgical path

Diversity/Equity/Inclusion

Our aim is to provide equitable care. These issues were discussed with the Endometriosis ERAS Committee, reviewed in the literature, and discussed prior to making any practice recommendations.

Power Plans

- Endometriosis ERAS

Associated Policies

- No associated policies with this ERAS pathway

Education Materials

- No associated education materials with this ERAS pathway

ERAS Model Preparation

This surgical pathway was prepared by the Department of Evidence Based Practice (EBP) in collaboration with the Endometriosis ERAS committee composed of content experts at Children's Mercy Kansas City. The development of this surgical pathway supports the Division of Quality Excellence and Safety's initiative to promote care standardization that is evidenced by measured outcomes. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Endometriosis ERAS Committee Members and Representation

- Ashli Lawson, MD, MS | Gynecology | Committee Chair
- Adam Booser, MD | Anesthesiology, Pain Clinic | Committee Member
- Soroush Merchant, MD | Anesthesiology, Pain Clinic | Committee Member
- Emily Weisberg, MD, FASA | Anesthesiology | Committee Member
- Armand Morel, MD | Anesthesiology | Committee Member
- Rae Kingsley, DNP, APRN, CPNP-AC/PC | Rheumatology, Pain Clinic, Rehabilitation for Amplified Pain Syndromes | Committee Member
- Azita Roberson, FNP-C | Anesthesiology | Committee Member
- Heather Sambol, RN, APRN | Anesthesiology | Committee Member

EBP Committee Members

- Todd Glenski, MD, MSHA, FASA | Anesthesiology, Evidence Based Practice
- Andrea Melanson, OTD, OTR/L | Evidence Based Practice

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Additional Review & Feedback

- The ERAS pathway was presented to each division or department represented on the ERAS committee as well as other appropriate stakeholders. Feedback was incorporated into the final product.

ERAS Development Funding

The development of this ERAS pathway was underwritten by the Departments of Evidence Based Practice, Anesthesiology, Gynecology, and Pain Management.

Conflict of Interest

The contributors to the Endometriosis ERAS have no conflicts of interest to disclose related to the subject matter or materials discussed in this pathway.

Approval Process

- This product was reviewed and approved by the Endometriosis ERAS Committee, Content Expert Departments/Divisions, and the EBP Department.
- ERAS pathways are reviewed and updated as necessary every year within the EBP Department at CMKC. Content expert teams are involved with every review and update.

Review Requested

Department/Unit	Date Approved
Gynecology	June 2023
Anesthesiology	May 2023
Pain Clinic	June 2023
Evidence Based Practice	May 2023

Version History

Date	Comments
June 2023	First version – established algorithm, synopsis, power plan

Date for Next Review:

- June 2024

Implementation & Follow-Up

- Once approved, this ERAS pathway was presented to appropriate care teams and implemented.
- Power plans consistent with recommendations were created or updated for each care setting
- Key metrics will be assessed and shared with the appropriate care teams to determine if changes need to occur.
- This ERAS pathway is scheduled to be revisited by all teams within one year of the release date.

Disclaimer

When evidence is lacking or inconclusive, options in care are provided in the ERAS algorithm(s) and the synopsis that accompanies the algorithm(s). This ERAS pathway does not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. Accordingly, this ERAS pathway should guide care with the understanding that departures from the pathway may be required at times.

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