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Clinical Pathways

Evidence-Based Practice Collaborative

6-2024

Periacetabular Osteotomy ERAS

Children's Mercy Kansas City

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Periacetabular Osteotomy Enhanced Recovery After Surgery Pathway Synopsis

Periacetabular Osteotomy: Prior to Surgery Algorithm

Inclusion Criteria:

- Patients undergoing
 - Ganz Periacetabular Osteotomy
 - Surgical Hip Dislocation

Exclusion Criteria:

- Closed pelvic procedures

Medication and Diet Instructions
(received at Orthopaedic Surgery Clinic and PAT):

- **Medication:**
 - Mupirocin for 5 days
 - Patient takes all normal daily medications night prior to surgery unless specifically instructed to stop
- **Diet:**
 - Standard NPO guidelines
 - **2 - 3 hrs prior to surgery:** Carbohydrate-rich drink (Gatorade, Powerade, or Pedialyte)
- **Arrival time/location**

Prior to Surgery

Patient scheduled for PAO

Patient seen in **Orthopaedic Surgery Clinic AND PAT** for pre-surgery evaluation to review the following:

- Pain management and regional anesthesia plan, including risks
- **Medication and diet instructions**
- Mitigation of pre-op anxiety
- Refer to PT for gait training
 - *Same day as pre-op appointment*
- [ERAS overview handout \(English\)](#)
- [ERAS overview handout \(Spanish\)](#)
- **Medications to be ordered in PAT**
 - Celecoxib (Patients >25 kg, 100 mg PO)
 - Midazolam as indicated

48 hours prior to surgery date, SDS calls caregiver for surgery time, NPO times, and reminder for carbohydrate-rich last PO intake



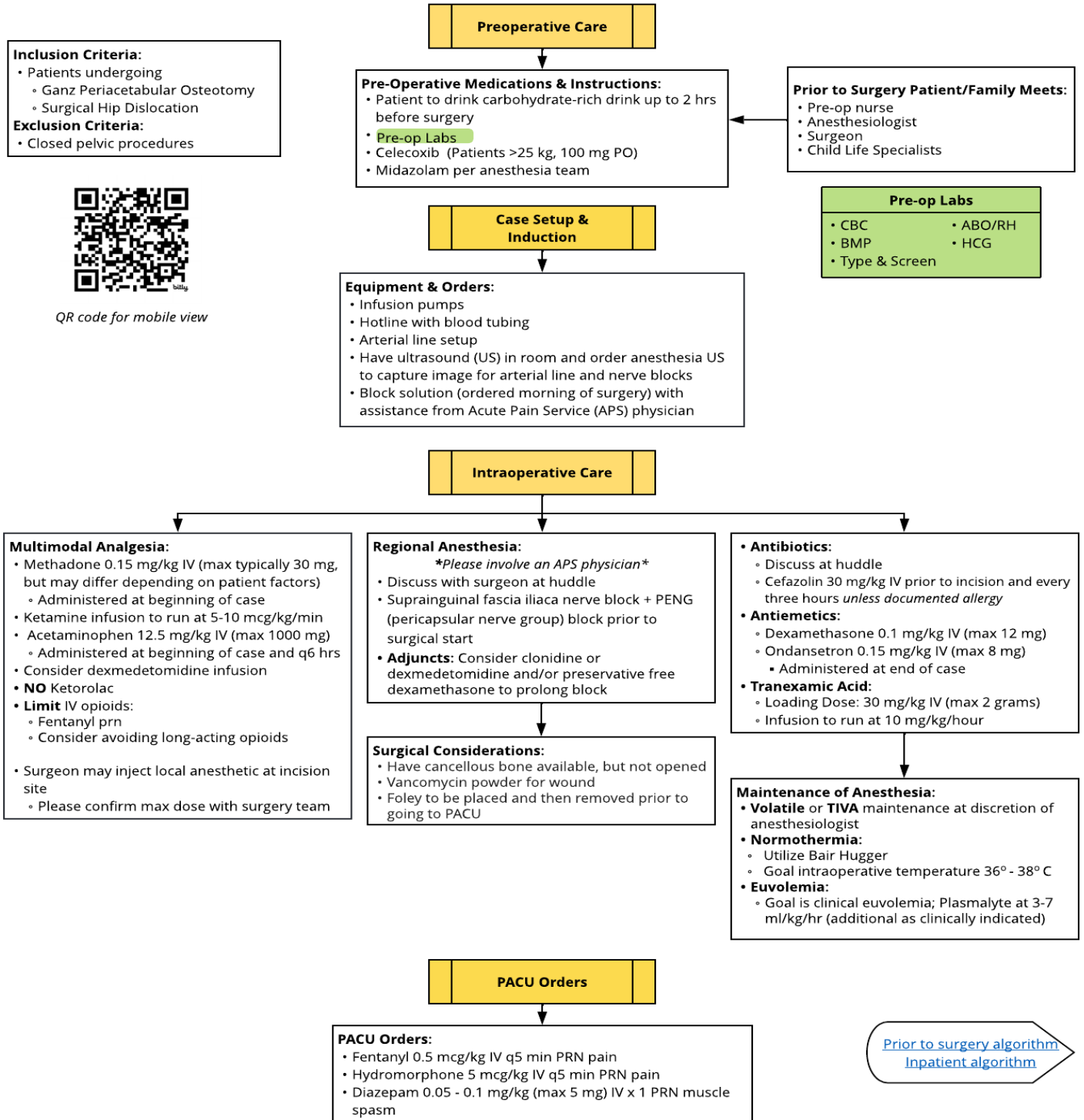
QR code for mobile view

Abbreviations:
PAO = periacetabular osteotomy
PAT = pre-admission testing
SDS = same day surgery

[Intraoperative algorithm](#)
[Inpatient algorithm](#)

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Periacetabular Osteotomy: Intraoperative Algorithm



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Periacetabular Osteotomy: Inpatient to Discharge Algorithm



QR code for mobile view

Inclusion Criteria:

- Patients undergoing
 - Ganz Periacetabular Osteotomy
 - Surgical Hip Dislocation

Exclusion Criteria:

- Closed pelvic procedures

Inpatient to Discharge

Postoperative Pain Management
Acute Pain Service consult and PCA only if poor pain trajectory anticipated by team

- **Acetaminophen** 12.5 mg/kg IV (max 1000 mg) q6 hrs
 - Transition to PO acetaminophen 12.5 mg/kg (max 1000 mg) q6 hrs on POD 1
- **Diazepam** 0.05-0.1 mg/kg IV or PO (max 5 mg) q4-6 hrs prn
- **Oxycodone** 0.1 mg/kg PO (max 7.5 mg) q4 hours prn
- **Hydromorphone** 5 mcg/kg IV (max 500 mcg) q3 hrs for breakthrough pain or not tolerating PO

OR

- **Morphine** 0.05 mg/kg IV (max 4 mg) q2 hrs prn for breakthrough pain or not tolerating PO
- **Celecoxib** (for pts >25 kg) 100 mg PO BID
 - 1st dose given 12 hours after preoperative dose
 - Complete 21 days for heterotopic ossification prophylaxis
 - THIS IS INSTEAD OF KETOROLAC

Inpatient Care

Diet

- Advance as tolerated
- Miralax 17 gm PO BID

DVT Prophylaxis

- Aspirin 81 mg PO BID (for 30 days) start on POD 1

Dressings

- To remain on until 2 week follow-up appointment

Physical Activity

- PT consulted on POD 0
- TDWB

Labs

- No routine labs scheduled

Perioperative Antibiotics

- Cefazolin IV x 2 doses (30 mg/kg)

Discharge Readiness
The Goal is to Discharge on POD2

Discharge Requirements

- Tolerating oral intake
- Transitioned to oral pain medication with good pain control
- **P.T. criteria passed**

Discharge Teaching

- Post-op care instructions reviewed by team with family (available in Cerner depart education)

Follow-up appointment at 2 weeks

P.T. criteria

Patient is TDWB and must be able to:

- Transfer
- Ambulate
- Complete stairs (if applicable) with crutches/walker independently

Abbreviations:

BID PC = twice a day after meals
 POD = Post-operative day
 P.T. = physical therapy
 TDWB = touch down weight bearing

[Prior to surgery algorithm](#)
[Intraoperative algorithm](#)

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Objective of Surgical Pathway

The objective of the Periacetabular Osteotomy ERAS Pathway is to minimize the variation of care for the patient undergoing surgery, starting with the pre-admission testing visit through hospital discharge. This includes optimizing preoperative nutrition/metabolism, decreasing adverse medication side effects such as opiate-induced ileus and post-operative nausea and vomiting, promoting an earlier return to mobility, improving pain management, and reducing overall hospitalization length of stay.

Background

Periacetabular osteotomy (PAO) surgery in pediatric patients involves repositioning or rotating a portion of the pelvic bone to cover more of the femoral head, allowing increased stability of the hip joint (Boston Children's Hospital, 2024). PAO is the main surgical treatment for pediatric patients, including adolescents, with hip dysplasia who experience hip pain and are limited in their daily function (Hassenfeld Children's Hospital, 2024). In the last several decades, the application of ERAS principles has shown significant improvements in various surgeries regarding decreased length of stay, decreased opioid use, improved pain control, and return to diet (Fearon 2005, Thiele 2014, Liu 2017). With the implementation of the ERAS pathway for PAO, restoration of hip stability, reduction of hip pain, and improved daily function will be observed in a shorter timeframe.

Target Users

- Pediatric Anesthesiologists
- Pediatric Orthopaedic Surgeons
- Nurse practitioners
- Nurses (Operating Room, Inpatient)

Target Population

ERAS Inclusion Criteria

- Patients undergoing:
 - Ganz Periacetabular Osteotomy
 - Surgical Hip Dislocation

ERAS Exclusion Criteria

- Closed pelvic procedures

Core Principles of ERAS

- Preoperative education of patients and families 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 post-operative enteral feeding

ERAS Management Recommendations:

Pre-Operative Care

- This ERAS pathway begins before the surgical date. The concept of ERAS is presented to the patient/family at the initial surgical appointment and reinforced pre-operatively.
- At the initial surgical appointment, the patient and family are provided with educational items, including pre-op diet restrictions, risks of anesthesia, and pain management strategies.
- At the Pre-Admission Testing (PAT) clinic, the core concepts of ERAS are introduced to the patient and their families, including the emphasis on early post-op PO intake and a multimodal pain management approach. Expectation management is crucial in the pre-operative phase. An ERAS handout is also given to the family.

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- On the morning of surgery, the patient drinks carbohydrate-rich clear fluids up to two hours before the procedure start time.
- Anxiolysis is determined by the anesthesia team, and midazolam is used as needed.

Intra-Operative Care

The principal goals during the intraoperative care of these patients are:

- Multimodal approach to pain management
- Peripheral nerve blocks
- Post-operative nausea and vomiting prophylaxis with dexamethasone and ondansetron
- Fluid management goal of euvolemia
- Ensure that antibiotics are administered prior to surgical incision
- Maintain normothermia throughout the entire procedure

Post-Operative Care

The principal goals during the postoperative care of these patients are:

- Transition from IV to oral medications as soon as possible
- Encouraging oral intake
- Multimodal pain control
- Prevention of nausea
- Postoperative bowel regimen
- Physical therapy on post-operative day zero to improve mobility
- Prevention of deep vein thrombosis with prophylaxis
- Focus on early discharge from the hospital with individualized home instructions

Additional Questions Posed by the ERAS Committee

No clinical questions were posed by this committee.

Key Metrics To Be Monitored:

Pre-Op	Intra-Op	Post-Op
Carbohydrate-rich drink	IV Acetaminophen	PACU PONV score
Celecoxib	PONV prophylaxis	Average pain score
	ABX prior to incision	Long-acting opioids
	Suprainguinal fascia iliaca nerve block + PENG block prior to surgical start	IV Diazepam
	Methadone	IV acetaminophen
	Ketamine	Celecoxib
	Normothermia	Length of stay

Value Implications

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

- Decreased inpatient length of stay
- Decreased unwarranted variation in care
- Improved communication between patients and the care team throughout the perioperative period
- Improved post-operative pain control

Potential Organizational Barriers and Facilitators

Potential Barriers

- Challenges with follow-up faced by some families

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Potential Facilitators

- Collaborative engagement across care continuum settings during ERAS development
- High rate of use of ERAS pathway within the hospital setting

Power Plans

- There are no associated power plans with this pathway.

Associated Policies

- There are no associated policies with this ERAS pathway.

ERAS Pathway Preparation

This ERAS pathway was prepared by the Department of Evidence Based Practice (EBP) in collaboration with the Periacetabular Osteotomy ERAS Committee, which is composed of content experts at Children’s Mercy Kansas City. If a conflict of interest is identified the conflict will be disclosed next to the committee member’s name.

Periacetabular Osteotomy ERAS Committee Members and Representation

- Caleb Grote, MD, PhD | Orthopaedic Surgery | Committee Co-Chair
- Emily Weisberg, MD, FASA | Anesthesiology | Committee Co-Chair
- Nichole Doyle, MD, FASA | Anesthesiology | Committee Member
- Christian Taylor, MD, FASA | Anesthesiology | Committee Member
- Colleen Moreland, DO | Orthopaedic Surgery | Committee Member
- Jennifer Foster, BSN, RN | Operating Room | Committee Member
- Anne Stuedemann, MSN, RN, CPNP | Orthopaedic Surgery | Committee Member
- Janet O’Rear, BSN, RN, CPN | Orthopaedic Surgery | Committee Member
- Sylvonna Singleton, MSN, RN, FNP-BC, RNFA | Orthopaedic Surgery | 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

ERAS Development Funding

The development of this ERAS pathway was underwritten by the Departments of Evidence Based Practice, Anesthesiology, and Orthopaedic Surgery.

Conflict of Interest

The contributors to the Periacetabular Osteotomy ERAS have no conflicts of interest to disclose related to the subject matter or materials discussed in this care process.

Approval Process

- This product was reviewed and approved by the Periacetabular Osteotomy ERAS Committee, Content Expert Departments/Divisions, and the EBP Department.
- ERAS pathways are reviewed and updated as necessary every 3 years within the EBP Department at CMKC. Content expert teams are involved with every review and update.

Review Requested

Department/Unit	Date Approved
Orthopaedic Surgery	June 18, 2024
Anesthesiology	June 14, 2024
Evidence Based Practice	June 14, 2024

Version History

Date	Comments
June 2024	Algorithms and a synopsis developed

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Date for Next Review:

- June 2027

Implementation & Follow-Up

- Once approved, this ERAS pathway was presented to appropriate care teams and implemented.
- Key metrics will be assessed and shared with the appropriate care teams to determine whether changes are needed.
- Education tools for patients and families were created for pre-surgery visits. The tools were reviewed by health literacy.

Disclaimer

When evidence is lacking or inconclusive, care options are provided in the supporting documents and the power plan(s) that accompany the ERAS pathway.

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