

Sports Medicine Enhanced Recovery After Surgery Synopsis

Sports Medicine ERAS Algorithms

Inclusion criteria:

- Patients > 10 years of age
- Shoulder, elbow, knee, and ankle sports medicine cases (open and arthroscopic)

Exclusion criteria:

- · Diagnostic scope alone
- Manipulation under anesthesia only
- Trauma cases

Nerve Block Considerations

- Please involve an APS Physician for ordering block solution
- Adjuncts: Consider clonidine or dexmedetomidine and preservative free dexamethasone to prolong block

Preoperative Care

- · Carbohydrate-rich clears up to 2 hours before surgery start time
- SDS Medications (administered after pt seen by surgeon/resident in pre-op):
 - · Midazolam if needed for anxiolysis
 - Acetaminophen PO 15 mg/kg (max 1000 mg)
 - · Oxycodone PO
 - 0.1 mg/kg up to 50 kg, 5mg for 50-75 kg, 7.5 mg for 75-100 kg, 10 mg for >100 kg
 - To be ordered by surgeon or anesthesiologist
- · Consider scopolamine patch if high risk for PONV

Abbreviations (laboratory and radiology studies excluded):

SDS - Same Day Surgery

APS - Acute Pain Service

iPACK- Infiltration between the Popliteal Artery and Capsule of

the **K**nee

PONV - Post-operative nausea and vomiting

TIVA - Total intravenous

anesthesia

anestnesia

PACU - Post-Anesthesia Care Unit ACL - Anterior cruciate ligament

Intraoperative Care

Intraoperative Medication Bundle

· Antibiotics:

- Discuss at huddle & administer prior to incision
- Cefazolin 30 mg/kg
- Max of 2 g or 3 g if >120 kg
- Clindamycin 10 mg/kg
 - Max 900 mg
- Only if patient has failed pre-op testing for allergy or has documented severe reaction to cefazolin

Antiemetics:

- Dexamethasone 0.1 mg/kg (max 8 mg)
- o Ondansetron 0.15 mg/kg (max 4 mg)

Multimodal Analgesia:

- Acetaminophen IV 12.5 mg/kg (max 1000 mg) if not given in SDS
- Ketorolac IV 0.5 mg/kg (max 15 mg) at closure
- · IV opioids as needed

Regional Anesthesia

- *Please Involve an APS Physician*
- · Discuss nerve blocks with surgeon at huddle
 - If Shoulder/Elbow surgery:
 Brachial plexus block
 - If Knee surgery:
 - Adductor canal/femoral block
 - For ACL & multi-ligamentous knee reconstruction cases
 - Adductor canal/femoral block+ iPACK block
 - No block for diagnostic arthroscopy, plica excision, lateral meniscus repair only

• If Ankle surgery:

• Popliteal nerve block + saphenous nerve block

Postoperative Care: PACU to discharge

Maintenance of Anesthesia

- Volatile or TIVA maintenance at discretion of anesthesiologist
- · Normothermia:
 - · Utilize Bair Hugger
 - Goal intraoperative temperature is 36°
 38° C

Additional Considerations

- Vancomycin solution needed for ACL autograft cases
 - Exclusion: allergy, IT Band ACL reconstructions
- Tranexemic Acid
- Discuss at huddle with surgeon
- 10 mg/kg bolus with 5mg/kg/hr infusion
- Osteotomy cases (femoral derotation osteotomy, distal femoral osteotomy, tibial tubercle osteotomy, high tibial osteotomy, distal tibial osteotomy)
- Exclusions: allergy, history of DVT or PE

Postoperative Management

PACU Orders:

- Pain Management:
- Fentanyl 0.5 mcg/kg prn pain
- Hydromorphone 5 10 mcg/kg or morphine 0.05 0.1 mg/kg prn breakthrough pain
- Clonidine IV 1mcg/kg prn agitation and/or breakthrough pain
- PONV:
- Ondansetron and diphenhydramine prn
- Can consider scopolamine patch and/or amisulpride IV 10 mg

Postoperative medication instructions algorithm

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Postoperative Medication Algorithm

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Postoperative Medication Instructions

Instruct patient/family to use alternating doses of ibuprofen and acetaminophen first and then add oxycodone/diazepam only as needed for breakthrough pain or muscle spasms

Minor Case

- Ex: plica excision, diagnostic arthroscopy, partial meniscectomy, microfracture
- Acetaminophen 15 mg/kg q 6 hours x 3 days, then as needed
- Ibuprofen 10 mg/kg q 6 hours x 3 days, then as needed
- Oxycodone 0.1 mg/kg q 4 hours PRN for 5 doses
- ∘ Tablets: 5 mg/10 mg
- Oxycodone elixir concentration 1 mg/ml

Moderate Case

- Ex: ACL, MPFL, OCD fixation, meniscus repair
- Acetaminophen 15 mg/kg q 6 hours x 5 days, then as needed
- Ibuprofen 10 mg/kg q 6 hours x 5 days, then as needed
- Oxycodone 0.1 mg/kg q 4 hours PRN for up to 10 doses (3 days)
 - ∘ Tablets: 5 mg/10 mg
 - Oxycodone elixir concentration 1 mg/ml
- Aspirin 81mg BID for 21 days for patients (female >13 years, male >15 years) with weight bearing restrictions

Major Case

- Ex: shoulder cases, multiligament knee reconstruction, osteotomy cases
- Acetaminophen 15 mg/kg q 6 hours x 7 days, then as needed
- Ibuprofen 10 mg/kg q 6 hours x 7 days, then as needed
- Oxycodone 0.1 mg/kg q 4 hours PRN for 15 doses
 - Tablets: 5 mg/10 mg
- Oxycodone elixir concentration 1 mg/ml
- Diazepam 0.1mg/kg q 8h PRN for muscle spasms for 9 doses
- Aspirin 81mg BID for 21 days for patients (female >13 years, male >15 years) with weight bearing restrictions

Intraoperative to discharge algorithm

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Date Created: April 2023

3

Contents

| Sports Medicine ERAS Algorithms |
|---|
| Objective of ERAS Model |
| Background |
| Target Users |
| Target Population |
| ERAS Inclusion Criteria4 |
| ERAS Exclusion Criteria |
| Core Principles of ERAS |
| ERAS Management Recommendations: |
| Preoperative Care |
| Intraoperative Care |
| Postoperative Care |
| Additional Questions Posed by the CPM Committee |
| Key Metrics to Be Monitored: |
| Value Implications |
| Potential Organizational Barriers and Facilitators |
| Potential Barriers |
| Potential Facilitators |
| ERAS Model Preparation |
| Sports Medicine Surgery ERAS Committee Members and Representation |
| Additional Review & Feedback6 |
| ERAS Development Funding |
| Approval Process |
| Approval Obtained: |
| Version History |
| Date for Next Review: |
| Implementation & Follow-Up |
| Disclaimer 8 |

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Objective of ERAS Model

The objective for the Sports Medicine Surgery Enhanced Recovery after Surgery (ERAS) pathway is to minimize the variation of care for the patient undergoing shoulder, elbow, knee, or ankle surgery. In the last several decades the application of ERAS principles has led to significant improvements in various surgeries regarding length of stay, opioid use, pain control, and return to diet (Liu 2017).

Background

Crutchfield et al. (2022) found that use of opioids was disproportionately related to orthopedic surgeries when compared to other types of surgeries, resulting in 8% of all narcotic prescriptions despite orthopedic surgeons making up 2.5% of currently practicing physicians in the United States. The authors also found that peripheral nerve blocks (PNBs) provide an alternative pain control associated with less need for long-term postoperative opioids, quicker hospital discharge and faster recovery. Use of PNBs in combination with the other core ERAS pathway principles helps to ensure optimal recovery.

Target Users

- Anesthesiologists
- Pediatric orthopedic surgeons
- Nurse practitioners
- OR nurses

Target Population

ERAS Inclusion Criteria

Patients presenting for shoulder, elbow, knee, and ankle sports medicine surgeries (open and arthroscopic)

ERAS Exclusion Criteria

- Diagnostic scope alone
- Manipulation under anesthesia only
- Trauma cases

Core Principles of ERAS (Melnyk et al., 2011)

- Pre-operative 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 intra-operative 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 post-operative 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

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4



Date Created: April 2023

5

ERAS Management Recommendations:

Preoperative Care

- Carbohydrate-rich clear fluids up to 2 hours before surgery time
- Preoperative medications in Same Day Surgery (SDS)

Intraoperative Care

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

- Multimodal approach to pain management
 - Regional nerve blocks specific to surgery type (shoulder, elbow, knee, or ankle)
 - o IV acetaminophen at beginning of case if not given in SDS
 - IV ketorolac at end of case
- · Post-operative nausea and vomiting (PONV) 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

Postoperative Care

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

- Transition from IV to oral medications as soon as possible
- Achieve good pain control utilizing a combination of medications to treat pain
- Prevention of nausea
- Getting out of bed as soon as possible after surgery
- Tolerate oral intake
- Review postoperative instructions including recommended pain and bowel medication regimen

Additional Questions Posed by the CPM Committee

No clinical questions were posed for this review.

Key Metrics to Be Monitored:

| Pre-Op | Intra-Op | Post-Op |
|-------------------------|-------------------------------|---------------------|
| Carbohydrate-rich drink | PONV prophylaxis | PACU PONV score |
| Oxycodone | Antibiotics prior to incision | Average pain score |
| Acetaminophen | Ketorolac | Long-acting opioids |
| | Regional Anesthesia | Length of PACU stay |
| | Normothermia | |

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.

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

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Date Created: April 2023

6

Potential Organizational Barriers and Facilitators Potential Barriers

• Challenges with follow-up faced by some families

Potential Facilitators

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

ERAS Model Preparation

This ERAS pathway was prepared by the Department of Evidence Based Practice (EBP) in collaboration with the Department of Orthopedic Surgery and Department of Anesthesiology. Development of this care process 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.

Sports Medicine Surgery ERAS Committee Members and Representation

- Emily Weisberg, MD, FASA | Anesthesiology | Committee Co-Chair
- Ryan Koehler, MD | Orthopedic Surgery | Committee Co-Chair
- Nichole Doyle, MD, FASA | Anesthesiology | Committee Member
- Kevin Latz, MD | Orthopedic Surgery | Committee Member
- Azita Roberson, MSN, RN, CPN, APRN, FNP-C | Department of Anesthesiology | Committee Member
- Heather Sambol, RN, APRN | Department of Anesthesiology | Committee Member

EBP Committee Members

- Todd Glenski, MD, MSHA, FASA | Anesthesiology, Evidence Based Practice
- Megan Gripka, MT (ASCP) SM | Evidence Based Practice

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 guideline was underwritten by the departments of EBP, Anesthesiology, and Orthopedic Surgery.

Conflict of Interest

The contributors to the Sports Medicine 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 Sports Medicine ERAS Committee and the EBP Department.
- Products are reviewed and updated as necessary each year within the EBP Department at CMKC. Content expert teams are involved with every review and update.

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Approval Obtained:

| Department/Unit | Date Approved |
|-------------------------|---------------|
| Anesthesiology | April 2023 |
| Orthopedic Surgery | April 2023 |
| Evidence Based Practice | March 2023 |

Version History

| Date | Comments |
|------------|-----------------|
| April 2023 | Initial version |

Date for Next Review:

• April 2024

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Date Created: April 2023

3

Implementation & Follow-Up

- Once approved, this ERAS pathway was presented to appropriate care teams and implemented.
- Care measurements will be assessed and shared with appropriate care teams to determine if changes need to occur.
- This ERAS pathway is scheduled to be revisited by all teams within 1 year of the release date.

Disclaimer

When evidence is lacking or inconclusive, options in care are provided in the ERAS algorithm(s) and the power plans that accompany the guideline.

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9

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