Perioperative Pain Management: A Team Approach

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Faculty Disclosure

No Conflict of Interest
Kettering Medical Center

- 562 Beds
- 1,170 Physicians on staff
- 4,607 Employees

Sycamore Medical Center

- 112 Beds
- 927 Physicians on staff
- 1,154 Employees
Kettering Medical Center is ranked as the 2013-2014 U.S. News and World Report Best Regional Hospital & as high performing hospital in Orthopedics.

The Kroger Company along with Anthem Blue Cross Blue Shield has just named Kettering Medical Center a High Performing Center for Hip and Knee Replacements and Spinal Fusions Tier 1 Hospital High Quality Blue Distinction Facility with travel benefits for patient and companion October 2013.

CMS named KMC as one of 97 Best Hospitals for Joint Replacements in Dec 2013 due to low readmission rate – the only hospital in Southwest Ohio, and 1 of 3 hospitals in all of Ohio.

CMS Hospital Quality Incentive Demonstration (HQID) Project – Top Scoring Hospital for Orthopedics in the Nation (Highest Quality score and Pay for performance award) in 2007– featured in the American Hospital Association Magazine.

CMS HQID Project 2008 – one of the top orthopedic performers in the Nation 2008.


Healthgrades ranked KMC as the # 1 hospital in Ohio for Joint surgery for 2002, 2003, and 2004 and among the top 5% in the nation for joint surgery from over 5,000 hospitals.

Health Plan Awards:

Blue Cross Blue Shield Blue Distinction Center for Hip and Knee Replacement 2013 (Total Value for Quality and Cost) – only hospital with this designation in Dayton, Ohio.

Aetna Institute of Quality Orthopedic Care Total Joint Replacement since 2010.

UnitedHealth Premium Total Joint Replacement Specialty Center since 2007.
Controlling patients’ pain during the perioperative period is an often elusive but necessary goal.

Pain control should begin with Preadmission Testing Assessment and continue through the operative period and PACU experience.

Interdisciplinary team approach—manage pain proactively.
Objectives

1. Describe the goals of a perioperative pain management program.
2. Identify the components of a successful perioperative pain management program.
3. Discuss the role of perioperative staff in managing perioperative pain.
Goals of a Perioperative Pain Management Program

- Improve patient experience by implementing pre-emptive, multimodal pain management strategies for surgical patients.
- Build a team approach involving the interdisciplinary members to manage surgical pain effectively.
Why do We Care About Pain?

- 1990s– Pain Became the 5th Vital Sign
- Effects of Uncontrolled Pain
  - Hypoventilation
  - Increased myocardial stress
  - Suppression of immune system
- Focus became pain assessment and treatment with opioids.
- Concept of pre-emptive, multimodal analgesia started to develop.
2000’s

- The Hospital Consumer Assessment of Healthcare Providers and Systems survey (HCAHPS) started as the first national survey of patients' perspectives.
- The Score on questions related to Pain management is shown as a percentage of patients who reported that their pain was "Always" well controlled & hospital staff “did everything they could to help”

(CMS.gov)
Affordable Care Act of 2010 uses HCAHPS scores to calculate payments to hospitals.

There is an estimated 76.5 million Americans (26%) with chronic pain, which makes this even more challenging. (American Pain Foundation, 2009)

Opioid–related adverse drug reactions following surgery – associated with significantly increased LOS and cost (Oderda, G. M. et al. 2007)
System Level

- 2011: Kettering Health Network Pain Policy Team with network representation
  - Pain CNS
  - Pain Management Specialist, Dr. Abraham
- Network Policies
- Education
  - Patients
  - Healthcare providers
- Ordersets
  - Multimodal pain management therapies
- EMR
  - Evidence based pain scales
  - Sedation scale with protocols to treat over-sedation
Hospital Level

- Perioperative Pain Committee
  - Discussion of timely issues facing patients
    - Suboxone
    - Patient education
      - Pain management
      - Prescription abuse
      - Prior to admission medications
    - Pain score documentation

- Joint Councils – KMC/SMC
  - Pain – standing agenda item
Nociceptors
- Nerve endings in the peripheral nervous system, muscle, fascia, blood vessels, joints, viscera, and dura
- Receptors for painful stimuli
- A fibers—evoke sharp & aching pain
  - Fast pain
- C fibers—evoke burning pain
  - Slow pain that may be long-lasting

(American Society of Pain Management Nurses Core Curriculum, 2012)
Activation of Nociceptors

- Pain is activated with injury.
  - Exchange of Na and K ions occurs at the cell membranes causing release of chemical messengers:
    - Norepinephrine
    - Epinephrine
    - Substance P
    - Glutamate
    - Bradykinin
    - Histamine
    - Hydrogen ions
    - Prostaglandins from the break down of arachidonic acid by Cyclooxygenase (COX)
    - Interleukins
    - Tumor Necrosis Factor
    - Serotonin (stimulates pain peripherally)

(Agitation and Pain in the Recovery Room February 6, 2012)
Transduction:

- Activation of nociceptors causes conversion of stimulus to electrical impulse
- Na and Ca channels open causing depolarization of the nerve endings and release of the electrical signal.
- Primary afferent fibers are stimulated and signal is carried to CNS
Pain is transmitted to dorsal horn of spinal cord
From the dorsal horn, spinothalamic tracts carry signal up to the brain
Impulses reach thalmus & midbrain

(Agitation and Pain in the Recovery Room February 6, 2012)
Nociceptive message is transmitted to the cortex, parietal lobe, frontal lobe and limbic system

Stimulation of the limbic system produces emotional reaction

Hypothalma–pituitary–adrenal axis is stimulated & catecholamines are released– induce anxiety

Repeated stimulation of spinal cord causes the pain to intensify

(American Society of Pain Management Nurses Core Curriculum, 2012)
Modulation

- Body’s attempt to decrease pain
- When primary afferent fibers terminate in dorsal horn, there is a release of neurotransmitters to block pain impulses:
  - Gamma-aminobutyric acid (GABA)
  - Neurotensin
  - Acetylcholine
  - Oxytocin
  - Endogenous opioids

(American Society of Pain Management Nurses Core Curriculum, 2012)
Modulation

- Opioid Receptors – located in the dorsal horn at the end of the afferent pain fibers: M (mu), K (kappa) & Δ (delta)
- Endogenous opioids binds to these to block painful stimulus
- Midbrain activation causes fibers to modulate pain through descending pathway activation:
  - Serotonin & Norepinephrine released & binds to the neurons of descending analgesic tract
    - When reuptake of norepinephrine and serotonin is inhibited, the descending analgesic system is enhanced

(American Society of Pain Management Nurses Core Curriculum, 2012)
Types of Pain

- Somatic – nociceptive activation of skin, SQ tissue, bones, muscles and blood vessels
  - Feels like sharp, aching, throbbing

- Visceral – nociceptive activation of organs
  - Feels like diffuse gnawing or cramping

- Neuropathic – aberrant somatosensory processing in peripheral nervous system, can occur with injury or dysfunction of peripheral nervous system or CNS
  - Feels like burning, shooting, stinging

(American Society of Pain Management Nurses Core Curriculum, 2012)
Chronic Pain – Central Sensitization

- Increase excitability of neurons in the CNS
- Normal sensory input causes abnormal sensing & responses leading to spontaneous impulses
- Can persist after acute injury is healed & peripheral input stops
- Can expand beyond the site of the initial injury

(American Society of Pain Management Nurses Core Curriculum, 2012)
Pain Transmission video

http://www.youtube.com/watch?v=6tLqh1qYvV4&feature=player_detailpage#t=2
## Opioid Comparison Chart

<table>
<thead>
<tr>
<th>DRUG</th>
<th>DOSE EQUIVALENTS</th>
<th>SIDE EFFECTS</th>
<th>COMMENTS</th>
<th>NURSING IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>IV-10 mg PO-30 mg</td>
<td>-Can cause histamine release: itching &amp; hypotension - Metabolites can cause confusion, sedation &amp; myoclonus</td>
<td>Hydrophilic- slower absorption due to inability to cross the lipid-rich cell membranes - Caution in renal impairment and elderly</td>
<td>PEAK-30 minutes Duration 4-5 hrs Reassess pain and sedation level (POSS) in 30 minutes</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>IV-1.5 mg PO-7.5 mg</td>
<td>Less histamine release and side effects 5-7 X more potent than Morphine - Better for renal impairment or BP instability</td>
<td></td>
<td>ONSET- 15 minutes Duration 2-3 hrs Reassess pain and sedation level (POSS) in 15 minutes</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>IV-0.1 mg (100 mcg)</td>
<td>Less sedation and constipation than Morphine - No active metabolites so it is safer for patients with renal failure</td>
<td>100 Times more potent than Morphine- dosed in micrograms Lipophilic- Almost immediate onset when given IV- lasts 30-60 minutes (repeated doses may have longer effects because of distribution to fat stores)</td>
<td>ONSET- 1-2 minutes Peaks in 3-5 minutes Duration 30-60 minutes Stay in room after IV administration to reassess pain and sedation level (POSS).</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>PO-20 mg</td>
<td>Less histamine release than Morphine so fewer side effects- pruritis &amp; nausea</td>
<td>-For moderate to severe pain - More potent than Morphine</td>
<td>ONSET- 30-60 minutes Duration 3-4 hrs Reassess pain and sedation level (POSS) within 60 minutes</td>
</tr>
<tr>
<td>Hydrocodone (Norco)</td>
<td>PO-30 mg</td>
<td>Caution acetaminophen dose limit of 4 gms -For mild to moderate pain</td>
<td></td>
<td>ONSET- 10-30 minutes Peak: 30-60 Duration 4-6 hrs Reassess pain and sedation level (POSS) within 60 minutes</td>
</tr>
<tr>
<td>Tramadol</td>
<td>PO-100 mg</td>
<td>Caution with MAO’s, SSRI’s &amp; TCA- side effect seizures Weak opioid analgesic</td>
<td></td>
<td>Onset- 30-60 minutes Duration 4-6 hrs</td>
</tr>
<tr>
<td>Fentanyl Patch</td>
<td>25 mcg patch= 12-20 mg IV morphine/day or 36-60 mg PO morphine /day</td>
<td>-Heat increases absorption - fever &gt; 104 increases absorption by 1/3 (WATCH for oversedation)</td>
<td></td>
<td>Onset- 12-16 hrs Duration- 72 hrs</td>
</tr>
</tbody>
</table>
Pasero Opioid Induced Sedation Scale with Interventions (POSS)

S = Sleep, easy to arouse.
Acceptable; no action necessary; may increase opioid dose if needed

1 = Awake and alert
Acceptable; no action necessary; may increase opioid dose if needed

2 = Slightly drowsy, easily aroused
Acceptable; no action necessary; may increase opioid dose if needed

3 = Frequently drowsy, arousable, drifts off to sleep during conversation
Unacceptable; monitor respiratory status and sedation level closely until sedation level is stable at less than 3 and respiratory status is satisfactory; decrease opioid dose 25% to 50% or notify prescriber or anesthesiologist for orders; consider administering a non-sedating, opioid-sparing nonopioid, such as acetaminophen or an NSAID, if not contraindicated.

4 = Somnolent, minimal or no response to verbal or physical stimulation
Unacceptable; stop opioid; consider administering naloxone; notify prescriber or anesthesiologist; monitor respiratory status and sedation level closely until sedation level is stable at less than 3 and respiratory status is satisfactory
Mechanistic Approach to Multimodal Analgesia

**Perception:** opioids, NMDA antagonists, APAP Anticonvulsants, COX-2 inhibitors, α2-agonists

**Modulation:** Neuraxial opioids, NMDA antagonists

**Transmission:** Local anesthetics, opioids, α2-agonists

**Transduction:** Local anesthetics, anticonvulsants, NSAIDs, COX-2 inhibitors,

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NMDA antagonists: Ketamine, Methadone

Alpha-2 agonist: Clonidine, Precedex

Adapted with permission from Kehlet H, Dahl JB. Anesth Analg. 1993;77:1048-1056.
PERIOPERATIVE PAIN MANAGEMENT

“Actions before, during, and after a procedure that are intended to reduce or eliminate postoperative pain before discharge.”
–Anesthesiology 2012; 116: 248–49

MULTIMODAL APPROACH

The administration of two or more drugs (administered via the same or different routes) acting by different mechanisms to provide analgesia
–Anesthesiology 2012: 116: 253
GOALS

• Improve pain relief by targeting more than one pain pathway

• Reduce doses of each medication thereby reducing adverse effects

• Facilitate recovery, discharge, and rehabilitation

• Decrease costs
TECHNIQUES

- Gabapentiniods
  - Pregabalin
- COX–2 Inhibitors
  - Celebrex
- IV Acetaminophen
- Regional Techniques
- Infiltration Techniques
  - Exparel
PREGABALIN

Gamma–aminobutyric acid analog (GABA)

- Exact mechanism of action not understood
  - Modulation of calcium channel function
  - Activation of noradrenergic pain–inhibition pathways in spinal cord and brain

(Schmidt, Ruchelli, Mackey & Carroll, 2013)
PREGABALIN

- Opioid consumption first 24 hours post –op
- Postoperative N&V
- Chronic Pain
- Visual Disturbances
- Peak plasma level after oral administration: 1 hour
- Peak CSF level: Median time of 8 hours

- Oral dose of 150 mg PO preoperatively
- OFF LABEL USE

(Zang, No & Wang, 2011)
(Buvanendran, Kroin, Kari, Moric & Tuman, 2010) (Clarke, Bonin, Orser, Englesakis, Wijeysundera & Katz, 2012)
Non-Steroidal Anti-Inflammatory (NSAID)

- Proven to reduce Opiate use
- Always use lowest effective dose
- Avoid in CV disease, GI disease or Bleeding risk
  - Low dose being used with close monitoring
- Around the clock dosing if not contra-indicated
- Somatic Pain
- Cox Inhibitor: Inhibits Prostaglandin Production
  - Non-selective
  - Cox 2 selective – fewer GI effects
COX-2 INHIBITORS
CELECOXIB

Blocks enzyme making prostaglandins (cyclooxygenase 2)
• Reduced pain and swelling
• Less GI effects than less selective NSAIDS
• No effect on platelet function
COX – 2 INHIBITORS
CELECOXIB

- Peak plasma levels in 2 – 3 hours
- Decreased pain scores during first month post op vs control
- Decreased opioid use approximately 30%
- Decreased opioid side effects
- Decreased PACU length of stay
- No effect on pain, ROM, and outcome 1 year post op

- Oral dose of 400 mg po preoperatively

(Muenier, Lisander & Good, 2007)
(Maund, McDaid, Rice, Wright, Jenkins & Woolacott, 2011)
(Reuben, Ekman & Charron, 2007)
IV ACTAMINOPHEN OFIRMEV

- FDA approved November 2010
- Site of Action: CNS
  - Inhibition of prostaglandin synthesis
  - Interaction with both serotonergic and cannabinoid pathways
- Serum therapeutic effect needed to produce analgesic effect
  - 16 mcg/ml in adults
- Higher peak levels compared with oral administration
  - Avoids first pass metabolism
- Clinical effect within 15 minutes
  - Tmax with IV is 15 – 25 minutes compared to 45 minutes with oral
- Peak effect within 1 hour
- Duration 4–6 hours

(Lachiewicz, 2013)
(Oscier & Milner, 2009)
IV ACETAMINOPHEN OFIRMEV

- Dose:
  - 1000 mg every six hours (15 mg/kg)
  - Total dose/24 hours any route – 4000 mg
- Peak effect within 1 hour
- Duration 4–6 hours
- Comparable efficacy to NSAIDS after THA
- Reduced postoperative morphine consumption in first 24 hrs
  - No reduction in opioid side effects

(Oscier & Milner, 2009)
BLOCK AND INFILTRATION TECHNIQUES
KNEES AND HIPS

• FEMORAL NERVE BLOCK
• INFILTRATION TECHNIQUE
  • Steadman–Hawkins Clinic TKA Care Pathway
• ADDUCTOR CANAL BLOCK
• FASCIA ILIACA BLOCK
FEMORAL NERVE BLOCK

Nerves Blocked: Femoral, Lateral Femoral Cutaneous, and Obturator

- Indications: TKA and Anterior cruciate ligament reconstruction
- Single shot: 0.5% bupivacaine or ropivacaine 30–40 ml
- Duration: 15–24 hours
- Continuous: Initial dose as above
  - Catheter insertion with infusion of 0.2 ropivacaine at 10–14 ml/hr for 2–3 days
IDEAL BLOCK

EFFECTIVE ANALGESIA
MINIMIZE OPIOID USE
PRESERVE MOTOR STRENGTH

(Kim, Lin, Goytizolo, Kahn, Maalouf, Manohar & YaDeau, 2014)
JOINT INFILTRATION TECHNIQUE

• Intraoperative injection of local anesthetic by surgeon
• Provides effective post operative pain relief
• Usefulness limited by duration of local anesthetic

(Andersen, Husted, Kirstensen, Otte & Gaarn–Larsen, 2010)
BUPIVACAINE LIPOSOME INJECTABLE SUSPENSION

EXPAREL

DEPOFOAM (DRUG DELIVERY SYSTEM) + BUPIVACAINE = EXPAREL
• Microscopic particles with internal aqueous chambers
• Bupivacaine is encapsulated in and around chambers
• Drug is released over a period of time

Trials using Exparel for wound infiltration showed statistical reduction of pain up to 72 hours along with reduced opioid requirements

("Addressing current challenges," March)
EXPAREL FOR TKA

PACIRA PHARMACUTICALS 200 PATIENT STUDY
SEPTEMBER 2012

COMPARISON OF EXPAREL INFILTRATION WITH FEMORAL NERVE BLOCK

- Lower pain scores during first 24 hrs and on day 2
- Better knee flexion at both weeks 3 and 9
- Shorter length of stay (2.2 vs 2.5 days)
  - 12% Exparel patients went home the day after surgery
  - Zero femoral nerve block patients went home day after surgery
- Reduction in medication and delivery system costs
- No quadriceps weakness
- Better early ambulation

(“Exparel proves beneficial,” September) (”News release: Study,” September)
COMPARISON OF JOINT INFILTRATION AND FEMORAL NERVE BLOCK

TKA

• Lower pain scores with movement first post op day
• No difference in pain scores at rest
• Lower opioid consumption first post op day
• Shorter PACU Stay
• Better quadriceps function days 1 & 2
• Earlier ambulation > 3 meters
STEADMAN–HAWKINS EXPAREL TECHNIQUE

• *Exparel* 20 ml (266 mg Bupivacaine) diluted with 40 ml NS : TV 60 ml
  • Prior to component implantation
    • 10 ml: posterior capsule
  • After component implantation
    • 10 ml: periosteum
    • 15 ml: medial deep tissues
    • 15 ml: lateral deep tissues
    • 10 ml: subcutaneous tissue

• Bupivacaine 30 ml 0.25% with epi 1:200,000 (75 mg)
  • 20 ml: subcutaneous tissue
  • 10 ml: Joint (after capsule closure)
ADDUCTOR CANAL BLOCK

ADDUCTOR CANAL

• FASCIAL TUNNEL IN THE MID THIRD OF THE MEDIAL THIGH
• CONTAINS FEMORAL VESSELS AND SAPHENOUS NERVE
• MAY ALSO CONTAIN OTHER NERVES
  • MEDIAL FEMORAL CUTANEOUS
  • POSTERIOR BRANCH OF THE OBTURATOR NERVE
• AT THIS LEVEL SAPHENOUS NERVE IS SENSORY NOT MOTOR
• INJECTION OF LARGE AMOUNTS OF LOCAL ANESTHETIC INTO AC RESULTS IN SENSORY BLOCK OF ENTIRE FRONT OF KNEE WITH PRESERVATION OF QUADRICEPS FUNCTION

(Quemby & McEwen, 2013)
ADDUCTOR CANAL BLOCK

COMPARISON OF ACB AND FNB

• ADC superior in the preservation quadriceps strength and balance
• ADC not inferior in pain relief or amount of opioid used
• No significant differences in N&V, pruritus, patient satisfaction or LOS
  o ACB LOS: 3.7 ± 0.8 days
  o FNB LOS: 3.6 ± 0.8 days

(Kwofie, Shastri, Gadsden, Sinha, Abrams, Xu & Sulviz, 2013)
(Kim, Lin, Goytizolo, Kahn, Maalouf, Manohar & YaDeau, 2014)
ADDUCTOR CANAL BLOCK PROGRAM
AT SYCAMORE

• STARTED BY DR. JAMES BRUCE APRIL 2014
• BLOCKS ARE PLACED IN PRE OP AREA USING ULTRASOUND GUIDANCE
• BUPIVACAINE 0.5% WITH EPI 1:200,000 (30 ML)
  • VOLUME AND/OR CONCENTRATION OF BUPIVACAINE MAY CHANGE AS PROGRAM PROGRESSES
  • POTENTIAL FOR CATHETERS AND CONTINUOUS INFUSIONS IN FUTURE
• BUPIVACAINE 0.5% WITH EPI 1:200,000 (30 ML) IS INJECTED BY THE SURGEON IN THE POSTERIOR CAPSULE BEFORE THE COMPONENT IS PLACED.
ADDUCTOR CANAL BLOCK PROGRAM AT SYCAMORE

• BLOCKS ARE LASTING 16 – 18 HOURS

• PAIN SCORES, OPIOIDS GIVEN, QUADRICEPS STRENGTH AND DISTANCES AMBULATED ON PAR WITH STUDIES

• LOS 2 – 3 DAYS
CON
• Shariat et al concluded no difference in pain intensity after FIB vs sham block for THA
  – (Shariat, Hadzic, Xu, Shastri, Kwofie, Gandhi, ... & Unis, 2013)

• Newman et al found that pts with a fem neck fx had superior pain relief with femoral nerve block than with FIB
  – (Newman, McCarthy, Thomas, May, Layzell & Horn, 2013)

PRO
• Excellent analgesia without complications for hip fractures
  – (Haines, Dickman, Ayyazyan, Pearl, Wu, Rosenblum & Likourezos, 2012)

• Very good, efficient and safe alternative in tx. of pain – easy to learn
  – (Elkhodair, Mortazavi, Chester & Pereira, 2011)

• As effective as FNB as part of multimodal anesthetic regimen for TKA
  – (The Brisbane Orthopaedic, 2010)
FASCIA ILIACA BLOCK

• Compartment block of the femoral and lateral femoral cutaneous nerves
• Indications: Hip fracture (pre and post op)
• Goal is placement within 2 hrs after confirmed diagnosis in ER
• Total Hip Arthroplasty (Anterior Approach)
• Total Knee Arthroplasty

• Single shot: 50 ml 0.4% ropivacaine
• Continuous: 50 ml 0.4% ropivacaine 10–12 ml/hr 0.2% ropivacaine infusion 1–2 days post op
• Advantages: Easy to learn, safe
FIB FOR FEMORAL NECK FRACTURE Guidelines

• BLOCK PLACED WITHIN 2 HOURS OF CONFIRMED DIAGNOSIS
  • Ultrasound guidance
  • Catheters threaded
    o Infusion started continuing 1 – 2 days post op
• PATIENTS ARE TO BE TAKEN TO SURGERY WITHIN 24 HRS
GOALS

• Early effective pain relief
• Reduced narcotic use
• Shorter hospital stays
• Decreased cost
CURRENT TECHNIQUE

TOTAL HIP ARTHROPLASTY

PREOPERATIVE
• Pregabalin
• Celecoxib

INTRAOPERATIVE
• IV Acetaminophen
• Opioids
• NSAID
• FIB – Anterior Approach THA

PACU
• Opioid
• NSAID
TOTAL KNEE ARTHROPLASTY

PREOPERATIVE
• PREGABALIN
• CELECOXIB
• FNB
  o w/wo catheter
  o w/wo sciatic blk
• ACB
TOTAL KNEE ARTHROPLASTY

INTRAOPERATIVE
• IV Acetaminophen
• Opioid
• NSAID
• Infiltration Technique

PACU
• Opioid
• NSAID
Local Anesthetic Toxicity

• Initial signs
  - Drowsiness
  - Light headedness
  - Dizziness
  - Anxiety
  - Peri-oral numbness
  - Metallic taste
  - Blurred vision
  - Tinnitus
  - Disorientation

• Higher Dose Signs
  - Initial CNS excitation followed by CNS depression
  - Muscle twitching
  - Convulsions
  - Unconsciousness
  - Coma
  - Respiratory depression
  - Cardiac arrhythmias
  - Cardiac arrest
LipidRescue™ TREATMENT FOR LOCAL ANESTHETIC–INDUCED CARDIAC ARREST

PLEASE KEEP THIS PROTOCOL ATTACHED TO THE INTRALIPID BAG

In the event of local anesthetic–induced cardiac arrest that is unresponsive to standard therapy, in addition to standard cardio–pulmonary resuscitation, Intralipid 20% should be given i.v. in the following dose regime:

- Intralipid20%1.5mL/kgover1minute
- Followimmediatelywithaninfusionatarateof0.25mL/kg/min,
- Continuechestcompressions(lipidmustcirculate)
- Repeatbolusevery3–5minutesupto3mL/kgtotaldosedurationcirculationisrestored
- Continueinfusionuntilhemodynamicstabilityisrestored.Increasetherate
to0.5mL/kg/minifBPdeclines
- Amaximumtotaldoseof8mL/kgisrecommended

In practice, in resuscitating an adult weighing 70kg:

- Takea500mlbagofIntralipid20%anda50mlsyringe.
- Drawup50mlandgivestati.v.,X2
- ThenattachtheIntralipidbagtoanivadministrationset(macrodrif)and
  runit.i.voverthenext15minutes
- Repeattheinitialbolusuptotwicemore–ifspontaneousscirculationhas
  notreturned.

If you use Intralipid to treat a case of local anaesthetic toxicity, please report it at www.lipidrescue.org. Remember to restock the lipid. Ver 7/06
EXPAREL SAFETY INFORMATION

• Hasn’t been studied in patients under the age of 18
• Entire dose may be released immediate if used together with other local anesthetics
  • After 20 minutes may use lidocaine
  • No other forms of bupivacaine should be used for 96 hours

("News release: Study, September)
Review of Literature

- Patient educational program
  - reduces preoperative anxiety
  - patients better prepared to cope with postoperative pain
  - experimental group
    - significantly less anxiety preoperatively and at discharge
    - reduction in postoperative pain

Develop a Perioperative Team

- Surgeon
- Anesthesia Providers
- Pain Specialist
- Preadmission Testing RN
- Pre-operative RN
- Operating Room RN
- PACU RN
- Discharge RN
- Inpatient RN
Collaboration with surgeon office staff
  ◦ Giving the same message
    • Take pain medication day of surgery
    • Education for patients
      • Manage pain to tolerable level, not eliminate pain
    • Pain management referral preoperatively for patients on chronic opioids
Preop Pain Education in Preadmission Testing

- Review of history & medications
  - Is patient currently taking Pain medication?
  - History of chronic pain
  - History of abuse
  - History of anxiety or depression
  - History of obstructive sleep apnea
  - Suboxone
    - Requires referral to pain specialist

- Pain brochure
- Pain video
**GENERAL INFORMATION:**
Kettering Health Network is committed to helping you with your pain. Although ALL pain from surgery cannot be eliminated, we will do our best to help reduce your pain.

Pain control is important to allow coughing, deep breathing, turning, and walking after surgery, and to prevent chronic pain from developing. Blood clots, pneumonia, and lung collapse can occur if you are not able to move after surgery.

You will be asked to rate your pain based on a number scale of 0 (no pain), up to 10 (the worst pain you can imagine).

If you are already on pain medicine, be sure and tell your doctor so a specific pain plan can be developed for your needs.

Side effects from narcotics (opioids) may include constipation, inability to urinate (pee), sleepiness, or nausea and vomiting. Drink plenty of fluids, 8-10 glasses of water a day. Tell your nurse if you have any side effects.

If you have questions about your pain plan, call the Pain Nurse Specialist at (937) 914-7249.

Your call will be returned within the next 24-48 hours.

**WHEN YOU GO HOME:**

- Store your pain prescriptions in a safe place to prevent theft - NOT in plain view, medicine cabinets, bedside tables, or bathroom closets. *Pain meds that are lost or stolen will NOT be replaced.*

- Continue to take Tylenol (acetaminophen)
  1000 mg on a schedule every 8 hours.
  3000 mg per day is a safe maximum.

  Make sure you are NOT taking other medicines with Tylenol (acetaminophen) in it. This will help reduce the amount of narcotic you need.

- Your doctor will prescribe pain medicine to take if you are having pain. Increase the time between each dose as you feel better.

- If you need a muscle relaxer, take it every 8 hours for 3 days then every 12 hours for 3 days, then as needed up to every 6 hours.

- Continue to use ice to your surgical area at home. Place a pillowcase between the ice and your skin to prevent ice burn.

- Music, movies, or using the computer, will all help distract you from pain and can help.

- **PLAN AHEAD** - If your pain medicine isn’t working, call the surgeon’s office by 2 pm Monday-Friday. New pain medicines will NOT be called in on the weekend. Call your family doctor for medicines that have been ordered by him/her.
BEFORE SURGERY:
Tell your surgeon IF YOU:
1. Are taking or have taken pain or anxiety medicines for any reason in the past 5 years. Current medications should usually be taken with a sip of water on the morning of surgery.
2. Have had addiction any time in the past, you may require extra pain medicine or a special pain plan.
3. Have sleep apnea – bring your C-Pap machine with you to the hospital. Pain medicine can be dangerous without your machine when you have sleep apnea.

"It's important to remember that managing pain promotes the healing process"

What is Pre-emptive Pain Medicine?
Medicine given just before surgery to slow or block the pain process. More than one medicine may be used to prevent or reduce pain. The medicines chosen help decrease inflammation, slow nerve firing, and/or block or numb the nerves. Medicated ahead of time can help reduce pain after surgery.

DURING SURGERY:
You will receive more pain medicine during surgery even when you are asleep. You may also have a numbing agent used at or around your incision to reduce pain when you wake up.

AFTER SURGERY:
Pain Goal:
You will be asked to identify a “pain goal” which is a tolerable level of pain for you. We will keep you as comfortable as possible but want to prevent sleepiness or breathing problems. Several types of pain medicines together help reduce the amount of narcotic (opioid) you need.

Pain Medicines:
How you describe your pain helps the nurse and doctor decide the best medicine for the pain. A variety of medicines will be used together. You will be given some pain medicines that decrease inflammation and decrease muscle spasm. You may have a ball that runs fluid in or near your surgical site, to numb the area. If you still have pain, tell your nurse, and you can have medicines that are ordered “as needed”, but you will need to ask for them. Pain medicines can cause constipation, so tell the nurse if you cannot go to the bathroom. It is sometimes helpful to take a fiber laxative when you get home, drink lots of fluids, and eat foods high in fiber.

OTHER TIPS TO MANAGE PAIN:
• Ice will be used to help decrease swelling and inflammation. Tell your nurse if your ice pack is melted so it can be replaced.
• Pillows can be used to help support or splint painful areas. Ask your nurse if you can use extra pillows.
• Elevation - arms or legs that are painful may benefit from being raised up on a pillow to reduce swelling.
• Fun activities - bringing a CD, I-Pod, or other device with headphones to listen to music, a book, a computer, or other activities, can help take your mind off of pain.
• Sleep - sleep is important to heal and replenish natural pain killers in your body. If you need help to sleep ask the nurse for your pill to sleep.

If you have questions about your pain plan, call the Pain Nurse Specialist at (937) 914-7249.
Your call will be returned within the next 24-48 hours
Preop Pain video

Link to watch video:
https://www.youtube.com/watch?v=j02P5Ic2J2o
Pain Goal

- Evaluate Patients Stated Pain Goal
  - On a scale of 0 to 10
  - What does this mean
  - Is it realistic
  - Take pain medication morning of surgery

- Manage pain to tolerable level, not eliminate pain
Day of Surgery

Preparing Patient for Surgery

- Review medications
  - Did you take your pain medication this morning?
- Interview with Anesthesiologist
- Preop regional block by anesthesia
Regional Pain Block

Preparing Patient: Nurses Role
- Explanation of procedure
- Signed consent
- Assist anesthesiologist
  - Ultra Sound machine
  - Assist in injection of medication
  - Have lipids available in the event of toxicity
PACU

- Hand off communication: SBAR
  - Situation: Procedure performed
  - Background: Patient history i.e. anxiety or depression, comorbidities, chronic pain
- Action
  - Know what analgesics were given in OR
    - Short acting analgesics
    - Long acting analgesics
      - Dilaudid
      - Morphine
      - Ketamine
      - Ketorolac
      - Ofirmev
    - How well is regional block working
- Recommendations
Assessing Patients Pain
- Scale of 0 to 10
- Location
- Intensity
- Duration
- Characteristic
  - Burning – Neuropathic pain managed differently
  - Dull or sharp
- Pain Behaviors – confused patients

Muscular Pain
- Methocarbamol

Reassessment after pain medication
- Reassures patient
- Response
- Monitor for oversedation

Documentation
Different Medications for different pain

- Neuropathic pain: Burning
  - Gabapentin
  - Pregabalin
- Surgical Site Pain: Intense, sharp, localized
  - Dilaudid
  - Fentanyl
  - NSAID’s
- Moderate Pain: Rated 4 to 5 on pain scale
  - Oral pain medication if not nauseated
Non-Pharmacological Pain Management
- Acknowledging their pain leads to decreased anxiety leading to reduced pain
- Ice
- Repositioning
- Elevation
- Use of pillows
- Music
- Ipad
- Movies
SBAR Communication between all Phases of Care

- **Situation:** Procedure
- **Background:** H & P
- **Action:**
  - Pain Score
  - Pain Medication
  - VS including respiratory rate & ventilation
- **Recommendations**
  - Next dose of pain medication
Discharge Education for Outpatients

- Provide prescription for pain from Surgeon
  - Name of pain medication
  - Dose and frequency
  - Take as directed
  - Stay ahead of pain
  - Weaning off pain medication
  - How to store pain medication
  - How to dispose of unused pain medication
    - Place in coffee grounds or cat litter and throw in trash
    - Do not throw down toilet
Discharge Education

- Additional information related to Pain Medication
  - Constipation
  - Do not drive
  - Fear of addiction
  - Tylenol products in pain medicine
Ortho postop Education sheet

Dear Patient,

We have some important information for you!

- We are sending you home with a pain medicine log. Please write down your pain score and the pain medicine that you take. Bring it with you when you have a follow-up visit with your doctor.
- Pain Medicines have side effects: constipation, dizziness, feeling faint, sleepy, feeling sick to your stomach, or vomiting.
- Please **DO NOT** drive or drink alcohol when taking pain medicine.
- Your doctor may send you home with prescriptions for the following pain medicines:
  - Tylenol 1000 mg to take every 8 hours- **DO NOT** take over 3000 mg a day.
  - Oxycodone to take when the pain is not tolerable
- Other medicines that may be ordered:
  - Robaxin to take when you feel painful muscle spasms or muscle tightening
  - Tramadol that is helpful to take in between doses of Oxycodone
    - Tramadol is not ordered if there is a history of seizures or if an antidepressant is taken
- **Weaning**- Pain goes down as you heal and you will need less pain medicine.
  - For example: if you are taking 2 tablets of Oxycodone every 4 hours, start taking 1 tablet every 4 hours.
  - Then start taking 1 tablet of Oxycodone every 6 hours
  - Then take 1 tablet of Oxycodone every 8 or 10 hours until you stop.
  - Wean other pain medicines like Tramadol, Norco, & Percocet also.
- If you are given a pain medicine with Tylenol in it, like Norco or Percocet- **STOP TAKING** Tylenol!
- You may ask your doctor about taking Ibuprofen in between doses of pain medicines.
- Knee patients- if you have upper leg or thigh pain, you can take turns using ice packs or heating pads on your thigh. **DO NOT** put heat on your knee.
- You may put ice bags over the knee or hip, and rest with your legs propped up. Remember the saying, *Toes Above Nose.* This will help keep the swelling down & relieve pain. Make sure there is a cloth between the ice pack and your skin. **DO NOT** use Freezer lunch packs.
- Watch a movie, read a book, or listen to music. This will help take your mind off of the pain and help you relax.
Perioperative Pain Team

Patient & Family Discharge Education Examples

1. **Knee patient** - What is the best thing you can do to treat a painful knee?
   - Ice bags over the knee
   - **Toes Above Nose** - Rest with your legs propped up to keep the swelling down & relieve pain.
   - Watch a movie, read a book, or listen to music to take your mind off of the pain and help you relax.
   - Take Ibuprofen in between doses of pain medicines if OK with doctor.

2. **Shoulder patient** - what is the most important thing you can do before you go to bed tonight?
   - Take a pain pill.
   - You received a pain block today that will wear off.
   - Set your alarm and take another dose in the middle of the night so you don’t wake up in severe pain.

3. Review Pain Medicine record with family and patient
   a. Review with them what time their next medicine can be taken.
   b. Also review with them what else can be done for the pain besides taking medicine.
PAIN MEDICINE RECORD FOR AFTER SURGERY

Pain Medicines have common side effects: Constipation, Dizziness, Feeling faint, Sleepy or Feeling sick to your stomach.

Please **DO NOT** drive or drink alcohol when taking pain medicine.

Pain Pills given in hospital - Drug: ___________ Time: ___________ Next Dose: ___________

Drug: ___________ Time: ___________ Next Dose: ___________

As the days go by, you will need the pain meds less often. Write down date, time, and how many pills you take. Please bring form to your doctor appointment after surgery.

<table>
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<tr>
<th>Date</th>
<th>Time</th>
<th>Medication:</th>
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Results

- Highest Pain score after block – 3/10
- Pain Medication Regimen
  - 1 dose Ofirmev
  - Acetaminophen 3 times daily
  - Celecoxib
  - Pregabalin
  - No opioids after Fascia Iliaca block placement
- Length of Stay – less than 4 days
Kettering Hip dashboard

![Graph showing various metrics over time]

<table>
<thead>
<tr>
<th>Date</th>
<th>Anesthesia Response Time within 2 hrs</th>
<th>Hip Fracture Receives Block</th>
<th>Door to OR time within 24 hrs</th>
<th>Block Efficacy</th>
<th>Side Effects/Complications of regional block</th>
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<td>75%</td>
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</tbody>
</table>
Kettering Hip dashboard

19% decrease pain score
26% decrease length of stay
14% decrease readmission
Sycamore hip dashboard

- Anesthesia Response Time within 2 hours
- Hip Fracture Receives Block
- Door to OR time within 24 hrs
- Block Efficacy
- Complications of regional block

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<thead>
<tr>
<th></th>
<th>Aug-13</th>
<th>Sep-13</th>
<th>Oct-13</th>
<th>Nov-13</th>
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<td>100%</td>
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<tr>
<td>Door to OR time within 24 hrs</td>
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<td>63%</td>
<td>57%</td>
<td>100%</td>
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<tr>
<td>Block Efficacy</td>
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<tr>
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</tbody>
</table>
Sycamore hip dashboard

Average Pain Score
Length of Stay In days
% Readmission Rate

32% decrease pain score
13% decrease length of stay
53% decrease readmission
Case Study # 2
Total Knee Replacement

- Patient is a 62 y.o. female with multiple opioid allergies:
  - Codeine
  - Demerol
  - Dilaudid
  - Morphine
  - Percocet
  - Tramadol

- Home medications:
  - Neurontin 600 mg in am, 300 mg at bedtime
  - Norco 7.5–325 mg intermittently
Pain Management

- Exparel Infiltration
- Increase Norco to 10–325 mg 1–2 every 4 hours prn
- Toradol 15 mg IV every 6 hours
- Increase evening dose of gabapentin to 600 mg
Orthopedic unit length of stay

Pre-emptive/multimodal analgesia added to ordersets – Feb. 2012

KHN

Length Of Stay

Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
2012 | 3.32 | 3.18 | 3.36 | 3.08 | 3.15 | 3.08 | 3.20 | 3.27 | 3.10 | 3.15 | 3.07 | 3.11
2013 - actual | 3.20 | 3.14 | 3.20 | 3.60 | 2.92 | 2.87 | 3.02 | 2.92 | 3.08 | 2.74 | 2.73 | 2.62
2014 - actual | 2.68 | 2.87 | 3.16 | 3.14 | 2.91 | 2.69 | 2.84 | 2.87 | 2.95
2014 - target | 3.06 | 3.12 | 3.14 | 3.30 | 3.08 | 3.18 | 3.18 | 3.19 | 3.21

13% decrease LOS
Since Feb 2012
Evidence-based References

- American Pain Foundation website (2009)
- American Society of Pain Management Nurses Core Curriculum, 2012
- CMS.gov (2013)


Institute of Medicine (2010).


Evidence–based References


Evidence-based References