Enhanced Recovery After Cesarean Section (ERAC): The Same But Not The Same

Efrain Riveros Perez MD MBA
Associate Professor
Director Obstetric Anesthesia
Vice-Chair of Clinical Operations
Associate Residency Program Director
Department of Anesthesiology and Perioperative Medicine
Medical College of Georgia

AUGUSTA UNIVERSITY

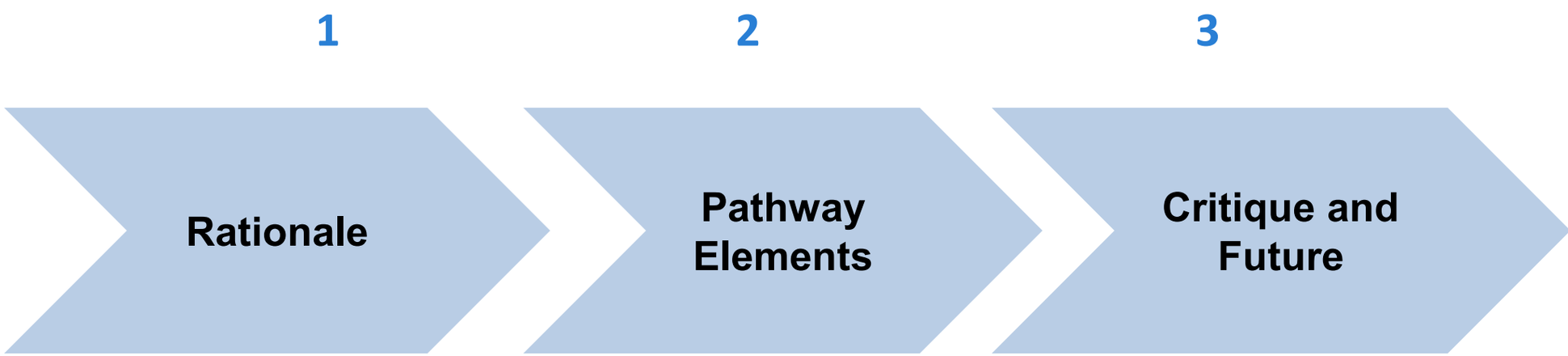
Objectives

1. Understand the unique aspects of cesarean delivery and opportunities for improvement of care
2. Understand the rationale behind ERAC protocols
3. Characterize the role of ERAC in the perioperative care context
4. Establish the critical aspects for ERAC success
5. Determine the role of multimodal analgesia and the role of the anesthesiology in ERAC pathways
6. Determine the mechanisms for multidisciplinary team coordination

Disclosures and COI

None

The Anesthesiologist Beyond the OR (The case of ERAC)



ERAC Value Chain

PREOP PREPARATION

INTRAOP STRESS REDUCTION

EARLY RETURN TO FUNCTION

Registry Audits and Systems

Patient Education and System Control

Care Management Across Process

ERAC – Principles and Rationale

Strategy to improve care and minimize the impact of surgery on function (colorectal)

Clinical outcomes and patient satisfaction

Efficiency and costs (everybody wins)

Ljungqvist O, Scott M, Fearon KC. JAMA Surg 2017;152(3):292–8.

.

ERAC – Principles and Rationale

Three actors: Patient, institution, healthcare professionals

Patient: Education and participation

Institution: Administrative support. PDCA. Quality strategy

Healthcare professionals: Standardization and compliance

Ljungqvist O, Scott M, Fearon KC. JAMA Surg 2017;152(3):292–8.

.

ERAC – Principles and Rationale

Customization to CD and institution

Evidence-based strategies

Adaptation from experience (own and others)

Continuous quality improvement

Bisch SP, Wells T, Gramlich L. Gynecol Oncol 2018;151(1):117–23.

.

ERAC – Principles and Rationale

CS most common worldwide surgery. US most expensive

One in three women in US

72-hour expectation (Unique surgery)

Population impact (ERAC reduces variability and healthcare disparities)

White RS, Matthews KC, Tangel V. J Natl Med Assoc 2019;111(4):464–5.

ERAC – Pathway and Elements

Preoperative

- Fasting
- CHO loading
- Education
- Lactation / breastfeeding
- Hemoglobin optimization

Bollag L, Lim G, Sultan P. Anesth Analg 2020;132(5):1362–77.

ERAC – Pathway and Elements

Intraoperative

- Hypotension prevention
- Normothermia
- Uterotonic therapy
- Antibiotic prophylaxis
- PONV
- Multimodal analgesia
- IV fluids
- Delayed umbilical cord clamping

Bollag L, Lim G, Sultan P. Anesth Analg 2020;132(5):1362–77.

ERAC – Pathway and Elements

Postoperative

- Early oral intake
- Early mobilization
- Maternal rest
- Urinary catheter removal
- DVT prophylaxis
- Early discharge
- Anemia treatment
- Breastfeeding support
- Multimodal analgesia
- Glycemic control
- Return of bowel function

Bollag L, Lim G, Sultan P. Anesth Analg 2020;132(5):1362–77.

ERAC – Hemoglobin Optimization

20% < 8 g/dL

Definition first/third and second trimester

Maternal consequences

- Fatigue/depression
- CV symptoms
- Breastmilk production
- SSI

Neonatal consequences

- IUGR/SGA/NICU admission
- Intrauterine death
- Preterm labor/ Neurocognitive deveopment

American College of O, Gynecologists. ACOG. Obstet Gynecol 2008;112(1):201–7.

ERAC – Hemoglobin Optimization

ACOG recommends screening

Oral iron 4 weeks

Reduces risk of transfusions

IV iron: lack of response after 4 weeks or < 8 g/dL

Identification and treatment of postpartum anemia at 24 hours

Munoz M, Pena-Rosas JP, Robinson S. Transfus Med 2018;28(1):22–39.

ERAC – Hypotension Prevention

- Starts with fasting guidelines (ASA/SOAP)
- Encourage CHO loaded clear fluids 2 hours
- Coloading versus preloading or no fluids (Cochrane review) after spinal anesthesia
  - 26 studies, 9565 patients. Hypotension(outcome)
  - Crystalloids versus nothing (RR 0.84(0.72-0.98)
  - Colloids versus crystalloids (RR 0.68(0.58-0.8). Low-quality evidence
- Fluids are insufficient (vasopressors)
- ERAC is the most fluid liberal ERAS protocol

Chooi C, Cox JJ, Lumb RS. Cochrane Database Syst Rev 2020;7: CD002251.

ERAC – Nutritional and Digestive

General diet soon after surgery (Bowel function, nutrition)

Surgical stress and catabolism vs. insulin

Start within 2 hours (ERAS society)

Start clears 1 hour and general 4 hours (SOAP)

Meta-analysis: Patient satisfaction and LOS

Bowel movement – 6.75 h. Ileus (RR 0.82(0.53-1.25))

Am J Obstet Gynecol. 2019 Oct;221(4):349.e1-349.e9..

ERAC – Education

Shared decision making and active participation

Patients want to participate in recovery process (Poland et al 2017)

Informational material, checklists, and communication

Set the expectations (goals, patient role, discharge)

Poland F, Spalding N, Gregory S. *BMJ Open.* 2017;7(6):e013498.

ERAC – Breastfeeding

WHO/AAP medical neurodevelopmental advantahes of breastfeeding (public health vs lifestyle)

Encouragement of breastfeeding

Pain management and breastfeeding

5350 patients. Every one-point increase in average pain score was associated with a 21% reduction in the odds of in-hospital exclusive breast-feeding relative to exclusive formula-feeding, OR = 0.79 [0.70-0.90], p < .0002.

Babazade R, Vadhera RB, Krishnamurthy P. J Clin Anesth. 2020 Jun;62:109697.

ERAC – Hypotension Prevention

Spinal anesthesia (Nausea, placental perfusion)

Fluids and pressors

Phenylephrine vs ephedrine

Infusion versus boluses (transient hypertension)

Phenylephrine vs Norepinephrine

Coloading 2 L. Less restriction

Habib AS: *Anesth Analg.*2012;114(2):377–90.

ERAC – Normothermia

Wound infection, coagulopathy, blood loss, transfusion (general cases)

More than 60% hypothermia in CS

Redistribution (vasodilation and sensation). Heat loss mechanisms

1.3 degrees intestinal temp drop. 4.5 h baseline)8 h in 29%)

Delayed PACU discharge and LOS

Active warming (better neonatal pH, shivering). Patient acceptance

Passive warming

Du Toit L, van Dyk D, Hofmeyr R. *Anesth Analg.* 2018;126(1):190–5. .

ERAC – Uterotonics

Early infusion of oxytocin (15-18 units/h)

Rule of threes

Avoid hypotension and myocardial ischemia

Early use of second line uterotonics (contraindications)

George RB, McKeen D, Chaplin AC. *Can J Anaesth.* 2010;57(6):578–82.

ERAC – Antibiotics

5-20 times higher risk of infection vs VD

Infections: LOS and readmissions

Prophylactic antibiotics for 100%

Within 60 min of incision vs cord-clamping

Broad spectrum (cefazolin)

Azithromicin if ruptured membranes

Committee on Practice Bulletins-Obstetrics. ACOG. *Obstet Gynecol*. 2018;132:e103–e119.

ERAC – PONV

Delays oral intake. Dehydration

Common after use of opioids

Multifactorial

IONV: Phenylephrine, metochlopramide, uterine exteriorization, avoid saline irrigation

PONV: Dexamethasone and ondansetron

Wu JI, Lo Y, Chia YY. *Int J Obstet Anesth.* 2007;16(2):122–7.

ERAC – Multimodal Analgesia

Postop pain: less bonding, less mobility (DVT), chronic pain and depression

Goal of multimodal: less doses, less side effect, less opioid

Neuraxial + oral + block

Neuraxial: mainstay, less ileus, skin to skin, support person, witness delivery

Opioids: fentanyl and Duramorph (monitoring)

Uchiyama A, Nakano S. *Int J Obstet Anesth.*1994;3(2):87–91.

ERAC – Multimodal Analgesia

Acetaminophen and NSAIDs

- Minimal effect on secretion of breast milk
- RTC with PRN opioid (Valentine et al)
- NSAIDS opioid sparing up to 50% RTC

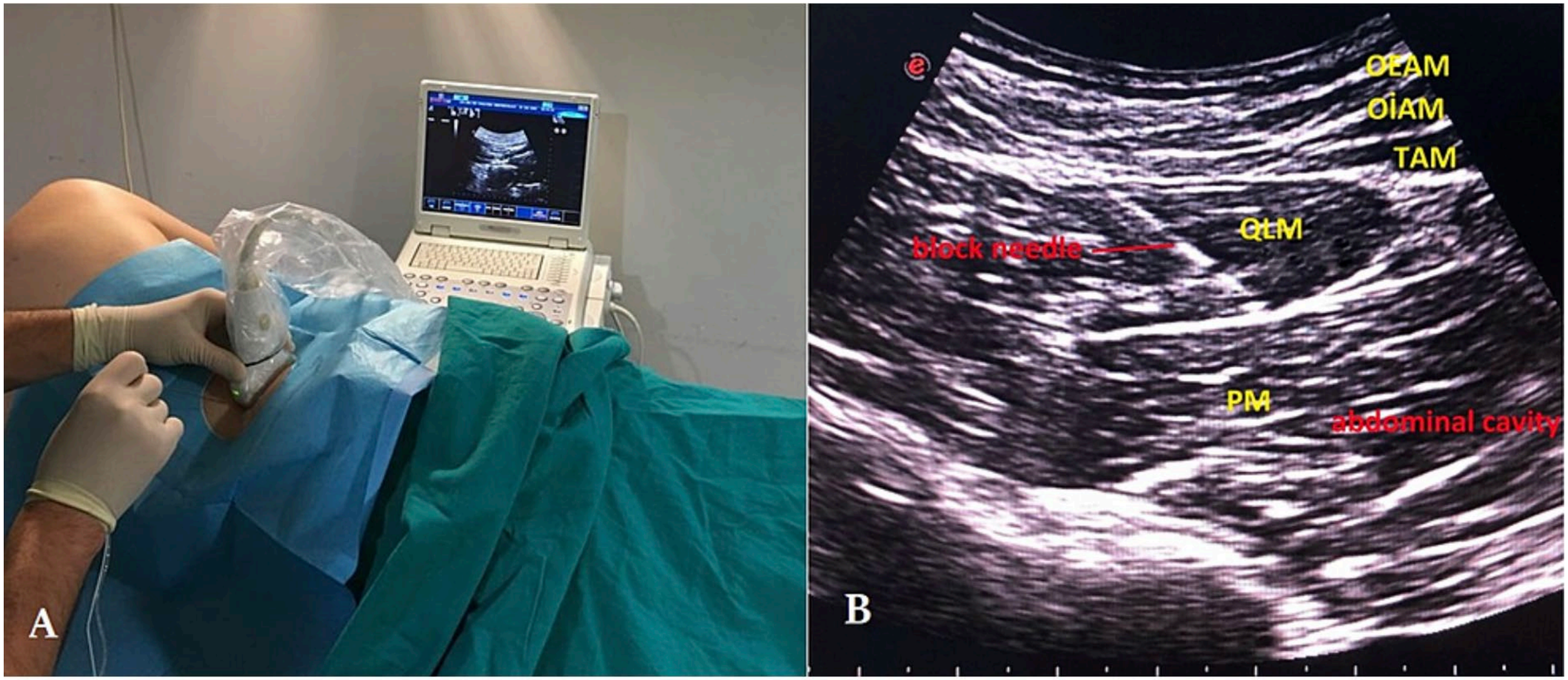
Wound infiltration vs IT morphine vs nothing (useful but more rescue opioids (Lalmand et al). Liposomal bupivacaine (mixed results)

Nerve blocks

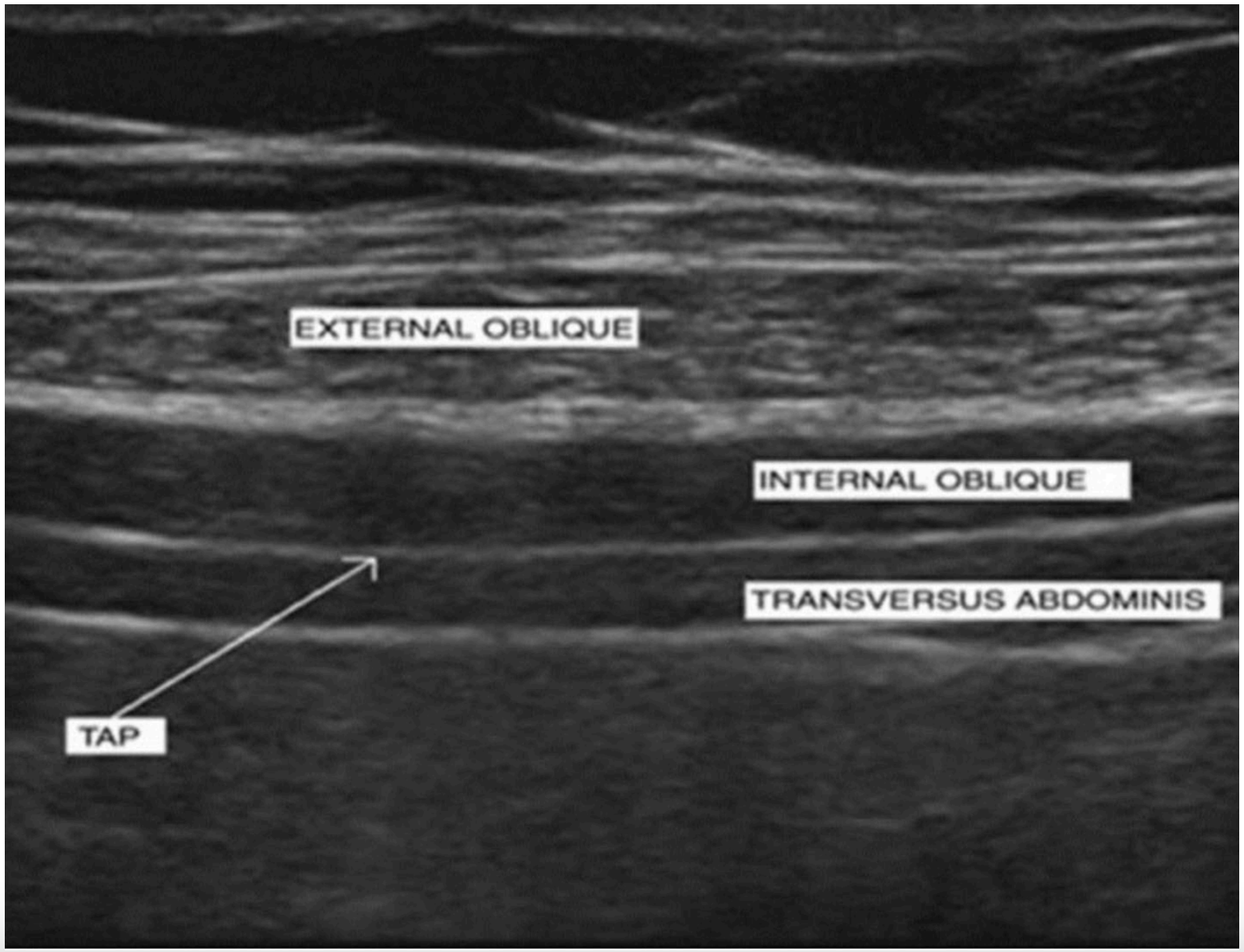
- TAP in no IT opioid group (Abdallah et al)
- Quadratus lumborum (With IT morphine not studied)
- Anterior QL similar to TAP
- Posterior QL difusses to paravertebral: visceral pain

Valentine AR, Carvalho B. *Int J Obstet Anesth.* 2015;24(3):210–6.

ERAC – Multimodal Analgesia



ERAC – Multimodal Analgesia



ERAC – Multimodal Analgesia

NMDA antagonists. Potential to avoid chronic pain and opioid hyperalgesia (NMDA receptors). Ketamine infusion for 24 h (31% reduction in opioid consumption)

Magnesium: NMDA. Paech et al. no effect. 2017 systematic review lowered VAS scores and rescue analgesics after CS

Clonidine/bupivacaine reduced 70% opioid need in patients on Suboxone. Dexmedetomidine isolated studies (IT and IV)

Hoyt MR, Shah U, Cooley J, Temple M. *Int J Obstet Anesth.* 2018;34:67–72.

ERAC – Delayed Cord Clamp

30-60 s delay. Preterm: less risk of IVH, volume resuscitation. Higher hematocrit

Term: Higher hematocrit. More jaundice (phototherapy)

Safe practice

Fogarty M, Osborn DA, Askie L. *Am J Obstet Gynecol.* 2018;218(1):1–18. 10.

ERAC – Thromboprophylaxis

Hypercoagulable state

Pneumatic leg compression for all until ambulation

Pharmacologic for one or more additional risk factors

D'Alton ME, Friedman AM, Smiley RM. *Anesth Analg.* 2016;123(4):942–9.

ERAC – Skin to Skin

Increased rate and duration of breastfeeding, less anxiety and depression

Support early initiation (effect on LOS)

“Natural” CS: transparent drape, skin to skin. Patient satisfaction and successful breastfeeding

Armbrust R, Hinkson L, von Weizsäcker K. *J Matern Fetal Neonatal Med.* 2016;29(1):163–8.

ERAC – Early Mobilization

Pulmonary function, insulin resistance, DVT, LOS

Should involve patient. Depends on analgesia

Urinary catheters removed before 24 hours. 7 hours reported as safe (Deniau et al)

Deniau B, Bouhadjari N, Faitot V. *Anaesth Crit Care Pain Med.* 2016;35(6):395–9.

ERAC – Special Considerations

Postop opioid use

40% lower morphine equivalent usage, fewer requiring opioids within 24 h of discharge (41.1% vs 74.6%),

ERAC reduced oxycodone consumption 36 mg/patient

LOS/cost savings

Over a 2-year period increased POD 1 discharge from 1.6 to 25% and reduced costs

Shinnick JK, Ruhotina M, Has P. Am J Perinatol. 2020. 10.1055/s-0040-1709456.

ERAC – Special Considerations

Racial disparities

Severe pain ≥7 more common in black and Hispanic women, significantly fewer oxycodone postpartum (Johnson et al)

Elliminated racial disparities in LOS with no differences in readmissions or mortality in colorectal surgery

COVID-19

More emphasis on DVT prophylaxis. Earlier desire to go home (2-night 12% to 45% Greene et al)

Johnson JD, Asiodu IV, McKenzie CP. *Obstet Gynecol.* 2019;134(6):1155–1162.

ERAC – Conclusions

Anesthesiologist called to lead the value chain

Interdisciplinary coordination

Patient active participation

Preoperative, intraoperative, and postoperative small changes

CS had most of these measures already

Now, more organized and in the context of QI

Future: personalized plans

Questions?

Contact information: eriverosperez@augusta.edu