Evaluation of Regional Anesthesia in Hip Fracture Patients: A Retrospective Review

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Objectives

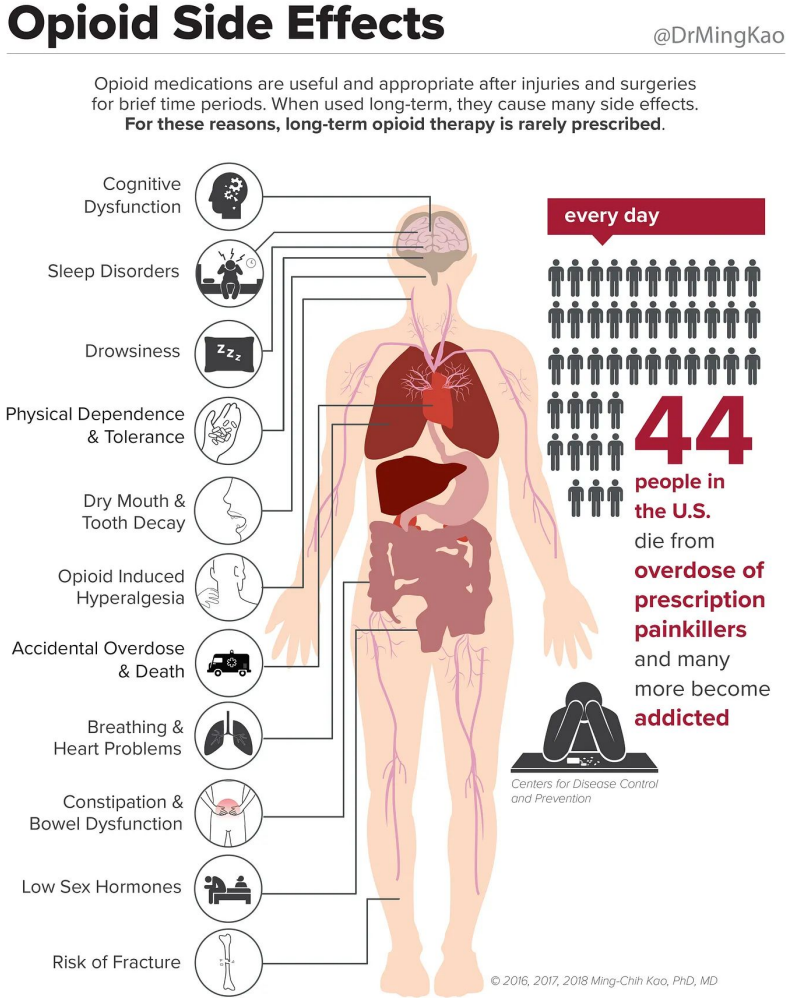
- Review the recent literature on the relevance of peripheral nerve blocks (PNBs) for the management of traumatic hip fractures
- Report on the primary and secondary patient outcomes utilizing a retrospective review of 60 patients at a Level-1 trauma center
- Discuss the benefits and translational findings a structured approach to the administration of PNBs among patients with hip fractures

Background

- Elderly patients who suffer from hip fractures are at risk of morbidity, decreased quality of life, level of mobility, ambulation, and increased rates of death
- 150,000 adults suffer from hip fractures annually costing the United States an estimated 10.3 to 15.2 billion dollars
- One-year mortality from hip fractures among elderly patients (>65 years) is up to 25%
- Opioids are a mainstay treatment and associated with negative sequalae for a vulnerable patient population
- PNBs help reduce opioid use and improve patient outcomes

Negative Sequela Associated with Opioid Administration

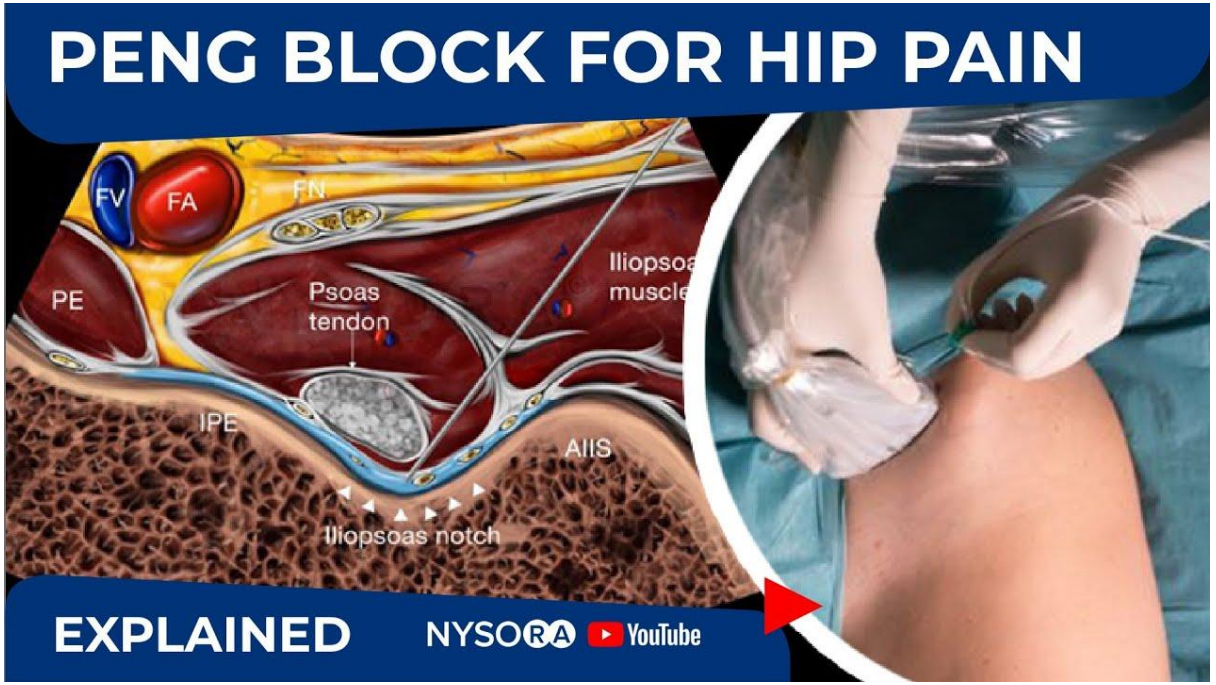
- Cognitive dysfunction
- Pulmonary complications
- Slower gastric motility
- Decreased mobility
- Poorly controlled chronic pain



(Güllüpinar et al., 2022)

Peripheral Nerve Blocks

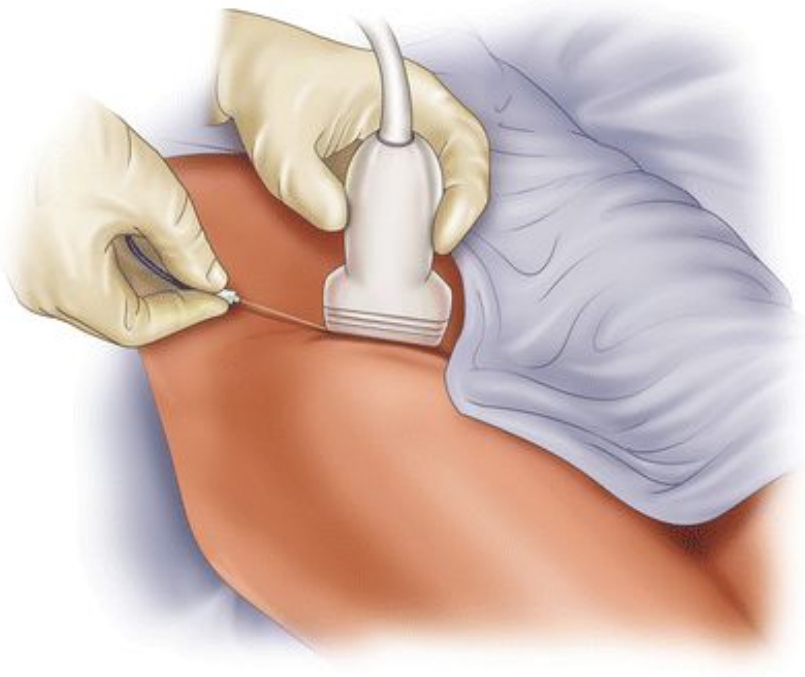
- PNBs are anesthetic techniques that involve the deposit of local anesthesia around a nerve or bundle of nerves to block pain and/or motor function temporarily



(American Academy of Orthopaedic Surgeons, 2022)

Multimodal Anesthesia

- Excessive opioid use is a threat to geriatric patients due to natural aging processes and decreased physiological reserves
- PNBs were commonly performed by MD anesthesiologists
- PNBs used for hip fractures:
  - PENG (pericapsular nerve group block)
  - Fascia Iliaca Block
  - Femoral Nerve Block
  - Lateral Femoral Cutaneous Block
  - Erector Spinae Block



(Güllüpinar et al., 2022)

Multimodal Anesthesia

- Additional non-opioid multimodal techniques include:
  - Celebrex
  - acetaminophen
  - Toradol
  - magnesium
  - dexmedetomidine
  - ketamine
  - methadone

An Evidence Based Practice Project

- Primary Site: St. Anthony Hospital (SAH) Common Spirit in Lakewood, CO
- Hospital receives large influx of adult hip fracture patients seasonally due to winter sports as well as a vast geriatric population year-round
- St. Anthony created a standing order in January 2021 to consult anesthesia services to administer a PNB to ED patients with hip fractures

Clinical Question

"In adult and geriatric orthopedic trauma patients within the greater Denver area suffering from hip fractures, does the use of a PNB verbal order change patient outcomes compared to patients prior to the establishment of the protocol (>2 years ago) who did not receive PNBs?"

Outcomes of Interest

- Pain scores (NRS)
- Morphine Milligram Equivalents (MME)
- Complications
- Vasopressors
- Blood transfusions
- Fluid administration
- Estimated blood loss
- Time from ED arrival to receiving block
- Time to first ambulation
- Block type

Methods

Gathering the Evidence:

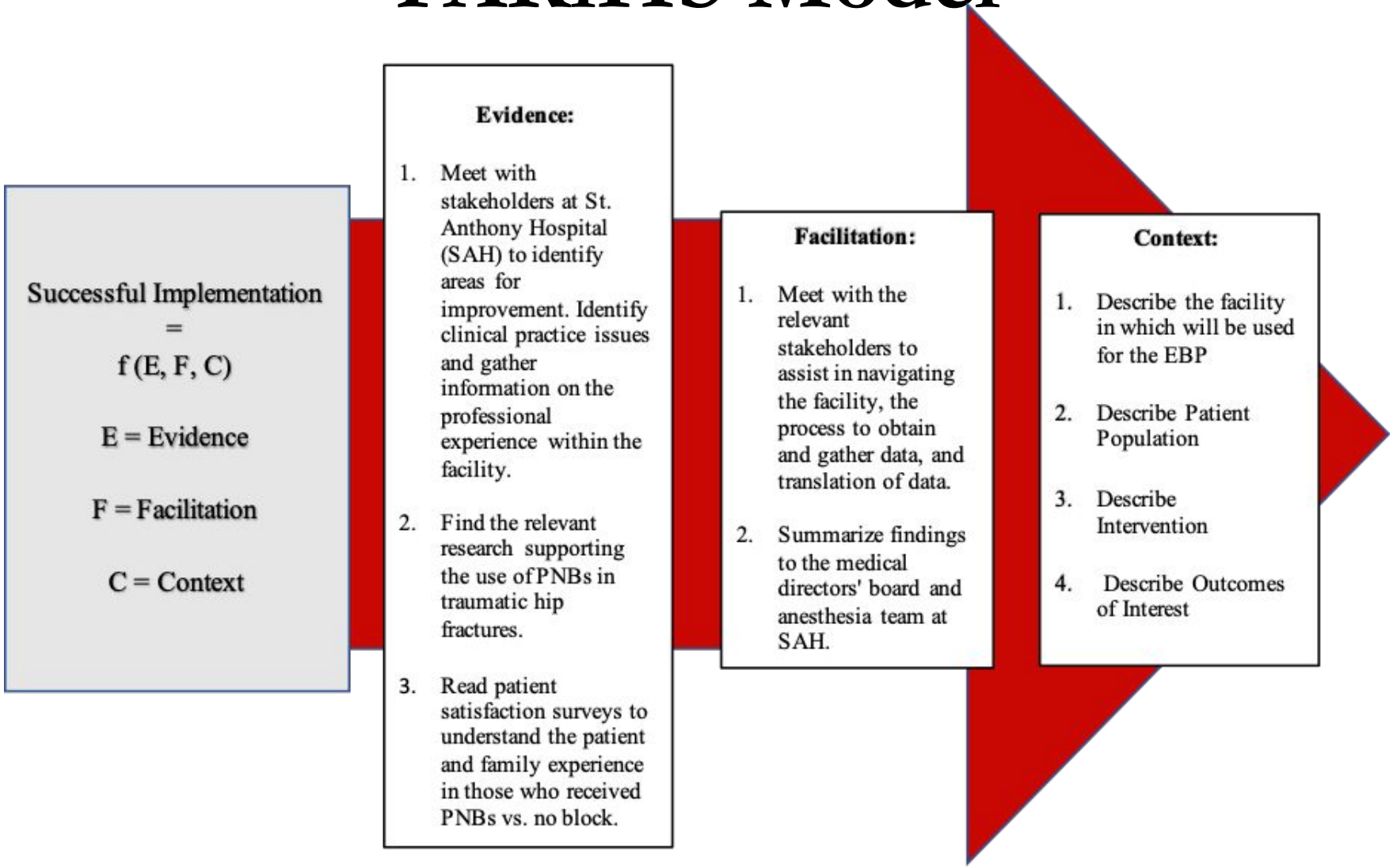
- A **systematic search** for applicable articles was conducted via PubMed, CINAHL Complete, and OvidMedline
- Advanced search was done utilizing terms: *older adults* OR *geriatric* AND *peripheral nerve block* OR *femoral nerve block* AND *hip fracture* OR *intertrochanteric fracture* OR *femoral head fracture* AND *postoperative outcomes* OR *pain* OR *ambulation* OR *length of stay* OR *deep vein thrombosis* OR *opioid consumption*.
- Proposal development based on the evidence

Methods

Conducting the Research:

- 60 patients who met inclusion criteria were enrolled for data collection using consecutive sampling technique
- **Inclusion Criteria:** adult and geriatric patients (ASA I, II, III) who presented to the ED with a traumatic hip fracture before Jan 2021 (Group 1) and after Jan 2021 (Group 2), consented for regional anesthesia
- **Exclusion Criteria**: ASA IV or V, multiple fractures, polytrauma, traumatic brain injury, aortic stenosis, coagulopathy, allergy to local anesthetics, distal femur fracture
- **Primary Outcomes:** Pain Scores (NRS), Morphine Milligram Equivalents (MMEs), Length of Stay (LOS)
- **Secondary Outcomes:** Estimated Blood Loss, Fluid Administration, Foley Catheter Rates, Complications (Surgical Site Infection, Pulmonary Infection, Encephalopathy)
- IBM SPSS version 29.0.2.0 was utilized for data analysis

PARiHS Model



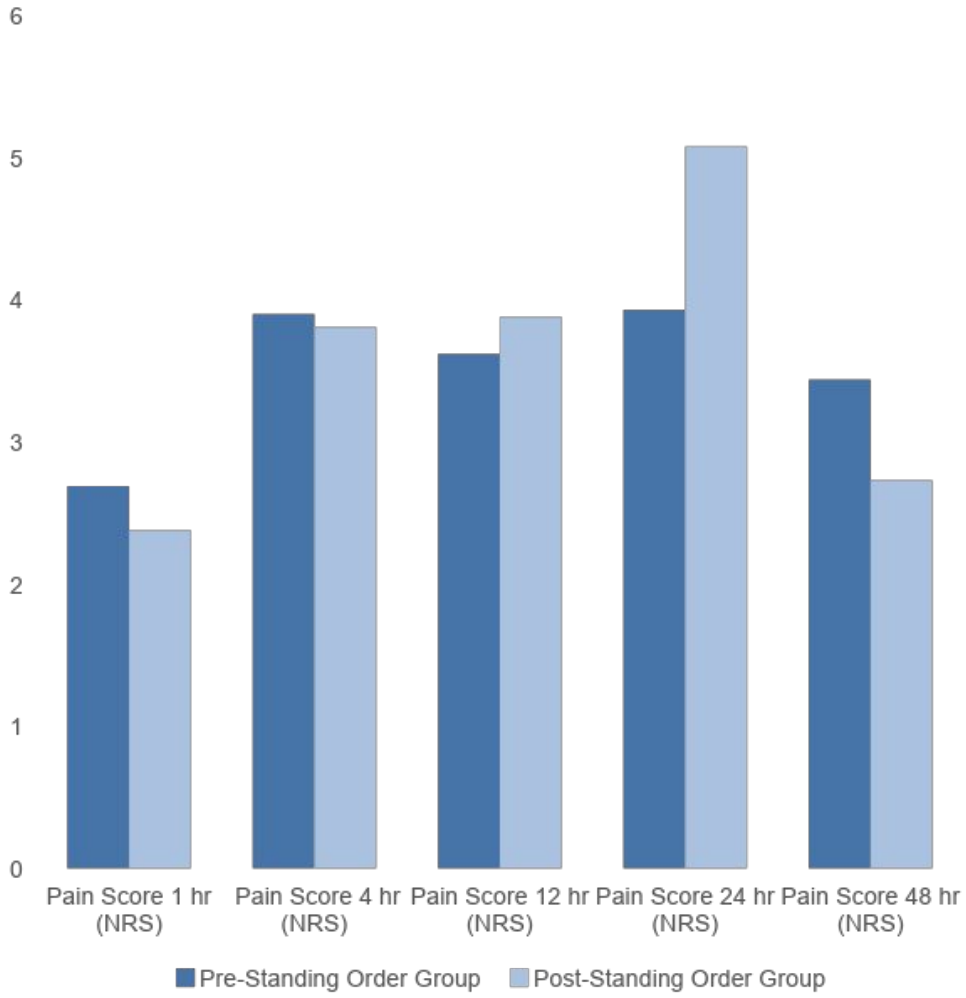
Demographic Data

Demographics	Pre-Standing Order Group	Post-Standing Order	P-value
Mean Age (years)	67.3	74.6	0.036
Gender	M: n = 12 F: n = 18	M: n = 8 F: n = 22	0.206
Mean BMI kg/m^2 ($\bar{x}$=24.57)	25.1	24.0	0.196
Physical Status (ASA)	1: n = 4 2: n = 15 3: n = 11	1: n = 0 2: n = 12 3: n = 18	
Hx of DM yes	n = 5	n = 6	0.5
Hx of HTN yes	n = 14	n = 11	0.3
Hx of Smoking yes	n = 7	n = 4	0.253

Mean Pain Scores

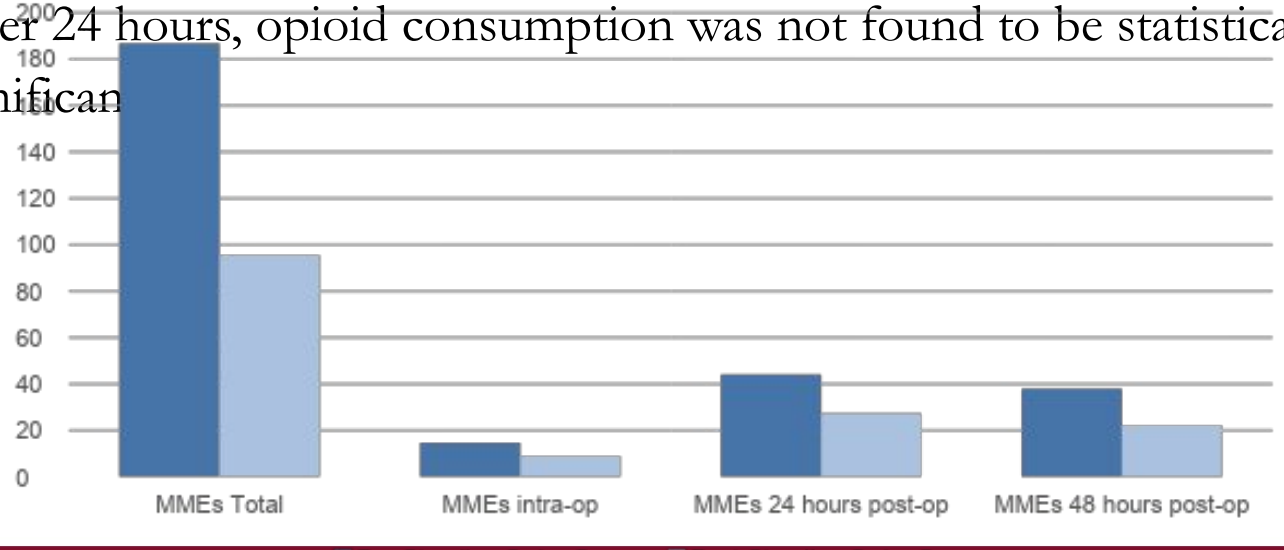
- Pain scores decreased between groups at hours 1, 4, and 48 hours post-operatively

- Pain scores at 12 and 24 hours were greater in the standing order group compared to non-standing order group



Opioid Consumption

- Patients with opioid consumption greater than 3 standard deviations from the mean were excluded to prevent skewness of data
- Total MME consumption was significantly decreased in the post-standing order group (95.6 vs. 126.8, p=0.002)
- Patients who received PNBs had a **51% decrease in total opioid consumption**
- After 24 hours, opioid consumption was not found to be statistically significan



Primary Outcomes

Outcome Measurements	Pre-Standing Order Group	Post-Standing Order	P-value
Pain Scores 1 hr (NRS)	n = 30 (2.69)	n = 30 (2.38)	0.342
Pain Scores 4 hr (NRS)	n = 30 (3.9)	n = 30 (3.81)	0.458
Pain Scores 12 hr (NRS)	n = 30 (3.62)	n = 30 (3.88)	0.333
Pain Scores 24 hr (NRS)	n = 30 (3.93)	n = 30 (5.08)	0.053
Pain Scores 48 hr (NRS)	n = 30 (3.44)	n = 30 (2.73)	0.164
MMEs total	n = 29 (186.8)	n = 28 (95.6)	0.002
MMEs intra-op (mg)	n = 29 (14.7)	n = 30 (8.9)	0.019
MMEs 24 hr post-op (mg)	n = 25 (44.1)	n = 30 (27.5)	0.018
MMEs 24 hr post-op (mg)	n = 30 (38.0)	n = 30 (22.1)	0.127
LOS (days)	n = 30 (4.3)	n = 30 (5.13	0.076

Secondary Outcomes

Outcome Measurements	Pre-Standing Order Group (n=30)	Post-Standing Order (n=30)	P-value
Foley yes	n = 29 (96.7%)	n = 20 (66.7%)	0.003
Vasopressors yes	n = 21	n = 22	0.774
Antiemetic Use yes	n = 24	n = 24	1.00
Blood Transfusion yes	n = 0	n = 1	0.321
Intraoperative Fluids (mLs)	n = 27 (996.3)	n = (821.4)	0.672
Estimated Blood Loss (mLs)	n = 30 (126.5)	n = 29 (157.4)	0.149
Time to Ambulation (hrs)	n = 29 (35.9)	n = 29 (43.1)	0.191

**Reduced n for some variables due to erroneous or missing data in the EMR

Multimodal Adjuncts

- Multimodal anesthesia was not found to be used more frequently in the standing order group
- Not all patients received multimodal adjuncts
- Evidence based practice supports the use of multimodal adjuncts to optimize patient recovery and improve pain control
- Adjuncts included in data analysis: Celebrex (n=1), acetaminophen (n=27), Toradol (n=4), tramadol (n=16), magnesium (n=2), dexmedetomidine (n=5), ketamine (n=29), methadone (n=0)
- Future protocol creation should consider the routine use of these med

Project Limitations

- Inconsistency in nursing and provider charting in the EMR
- Difficult to find the first documentation of ambulation
- Time of procedure predicted time to first ambulation
- Differing baselines in opioid tolerance among patients (chronic pain vs. acute injury was not accounted for)
- NRS pain scores are a limitation as specifically identified sources of pain were not differentiated in this project
- Lack of consistent charting of pain scores within a set time interval
- Lack of consistency in type of block administered (chosen by anesthesia provider)
- Small sample size of this study limits the generalizability of the results

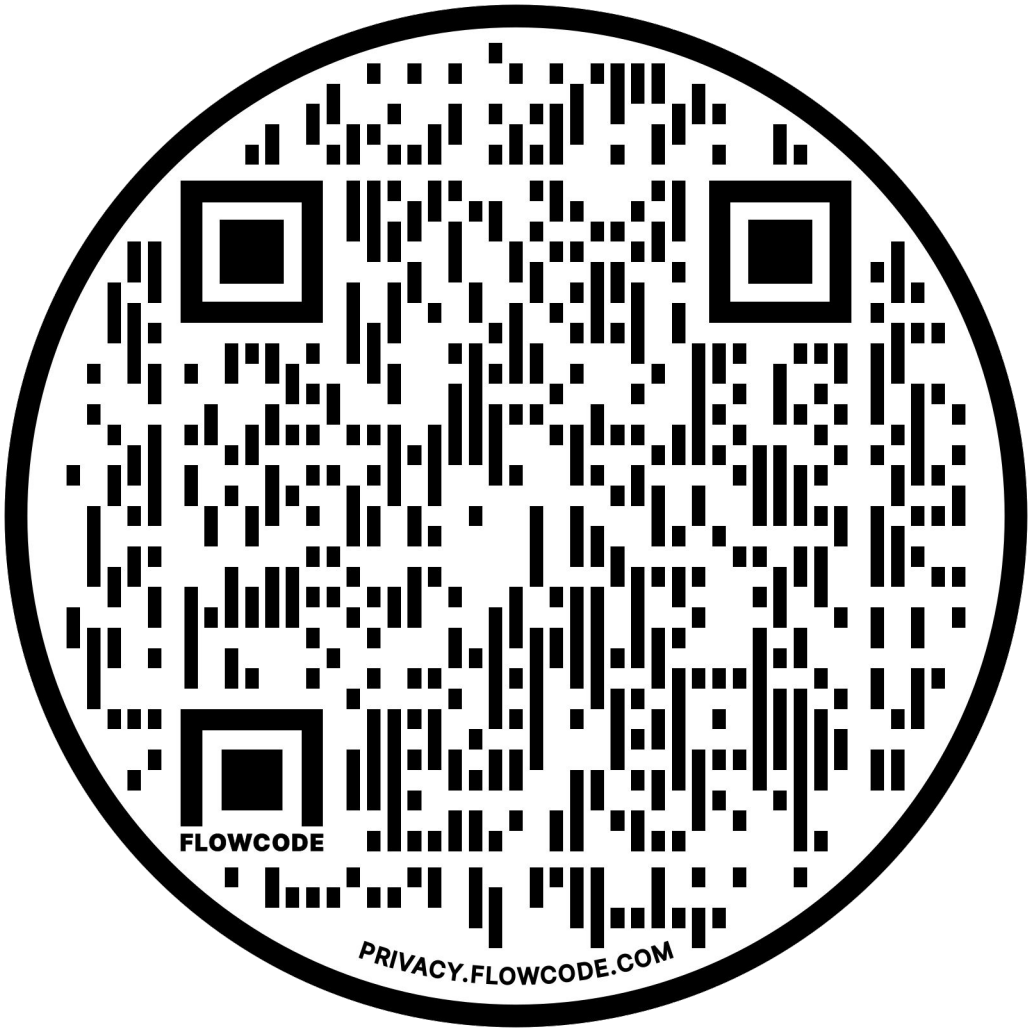
Translation to Clinical Practice

- PNBs reduce opioid consumption
- Creation of standardized protocol is recommended by researchers with use of multimodal anesthesia adjuncts to aid in decreasing opioid consumption
- Streamlined documentation practices in EMR is advised
- Increase provider knowledge on anesthesia techniques is integral to increasing PNB usage
- Continue the use of the following PNBs for proximal hip fractures: PENG, Fascia Iliaca, Femoral Nerve Block, Erector Spinae Block

Conclusions

- The use of PNBs in traumatic hip fractures is an evidence-based practice intervention to improve outcomes and optimize patient recovery
- This EBP project showed how PNBs can lower opioid consumption without altering pain scores

References



Thank You