



# A Systematic Record Review of a Local Quality Improvement Impacts on Anesthesia Provider Knowledge and Attitudes Following a Presentation of Current Evidence-Based Practices Involving Intrathecal Mepivacaine Use in Total Joint Arthroplasty Surgical Patients



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## Background

- A level 2 rural 420-bed healthcare facility's quality improvement department and orthopedic surgeon noticed an increase in length of stay and admissions from the total joint arthroplasty (TJA) program.
- Over 1000 TJA cases performed annually
  - Include: robotic, anterior approach for hip and traditional surgical intervention.
- Patients undergoing spinal anesthesia for TJA must urinate and ambulate within 1-hour before discharge from PACU to indicate a healthy return of lower body neuro-function after spinal administration.
- Most common and preferred spinal medication used is bupivacaine, a local anesthetic that provides partial motor blockade lasting 2.5 to 3 hours with longer sensory blockade.
  - Complications: postoperative urinary retention (POUR), altered proprioception, delayed ambulation, and prolonged motor block, resulting with increased cost and length of stay.
- One alternative solution: Mepivacaine, an intermediate local anesthetic, lasting 1.5 to 2.5 hours with comparative surgical blockade but a quicker return of motor and sensory function.
- Research suggests mepivacaine is just as safe and effective with less occurrences of POUR, delayed ambulation, increased LOS, and overall care costs than Bupivacaine.

## Problem

- Despite evidenced-based benefits, one hospital was not utilizing mepivacaine for TJA patients due to provider preference-based decisions.
- Consequently, standard benchmarks for patient discharge were not being met.
  - Reports of increased PACU LOS due to POUR and delayed ambulation in TJA patients receiving spinal bupivacaine anesthesia occurred.
  - Congested PACU, delayed cases, strained PACU and OR resources, increased costs poor patient and surgeon satisfaction.

## Purpose & Aims

- Purpose:** to ensure safe, quality, evidenced-based practice anesthesia care of patients undergoing TJA surgeries
- Primary aim:** to conduct a systematic record review of anesthesia provider questionnaire responses to evaluate the effects on provider knowledge and attitudes following a presentation of current evidence-based practices involving intrathecal mepivacaine use in TJA surgical patients at risk for postoperative POUR, delayed ambulation, and increased PACU LOS

## PICO(T) Question

- In (P) TJA/TKJ/THA patients receiving spinal anesthesia, how does the (I) use of mepivacaine spinal compared (C) to the current practice of bupivacaine spinal anesthesia affect the (O) LOS, urinary retention, and delayed ambulation over (T) three months?

## Methods

### Plan-Do-Study-Act Quality Improvement Framework & Project Objectives

- 1) Plan:** Recognize an opportunity and plan the change.
  - Reviewed and appraised evidence from the literature evaluating the safety, efficacy, and differences of effects regarding spinal administration of mepivacaine compared to spinal bupivacaine anesthesia on urinary retention (urinary catheterizations), ambulation (return of motor function) and LOS in the PACU for postoperative TJA patients,
- 2) Do:** Test the change. Carry out a small-scale study/project.
  - Provided a scholarly presentation using evidence from research and EBP literature on spinal mepivacaine anesthesia use (compared to spinal bupivacaine) to anesthesia providers and assess their knowledge and attitudes regarding their decision to use or not use mepivacaine or bupivacaine in spinal anesthesia in TJA patients,
- 3) Study:** Review the test findings, analyze the results, identify what was learned.
  - Conducted a retrospective, review of provider questionnaire responses following EBP presentation regarding mepivacaine use in TJA patients, comparing pre-and post-presentation questionnaire findings (e.g., knowledge and attitudes, regarding incorporating the use of mepivacaine into clinical practice and care of TJA patients); and lastly...
- 4) Act:** Take action, based on what was learned. If change worked, incorporate the learning and plan to sustain it. If improvements are still needed, then revise plan in PDSA step 1) Plan.
  - Provided project findings, identified barriers, and clinical practice guideline recommendations for implementation and continued monitoring of mepivacaine and bupivacaine spinal anesthesia use in TJA patients using a SWOT analysis briefing and discussion format to the key stakeholders and leaders

## Sample

- Participants:** 72 anesthesia providers (e.g., 40 full-time employees, six locums, eight per diem, and 18 anesthesiologists)
- Setting:** large regional, urban, 420 bed level-two trauma surgical center and teaching hospital located in the South-Central Michigan area of the United States, which also houses an outpatient orthopedic surgery center, performing thousands of surgeries annually
- Protection of Human Subjects:** project reviewed and determined **APPROVED** in accordance with federal regulations and the Otterbein University **INSTITUTIONAL REVIEW BOARD, (HS # 22/23-77)** 4/1/23

## Results

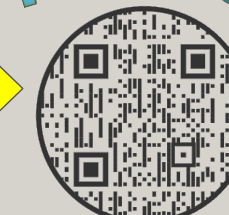
- A 5-point Likert scaled questionnaire was administered before and after the educational presentation to evaluate the knowledge received and whether providers would utilize the alternative mepivacaine in their practice.

### Survey



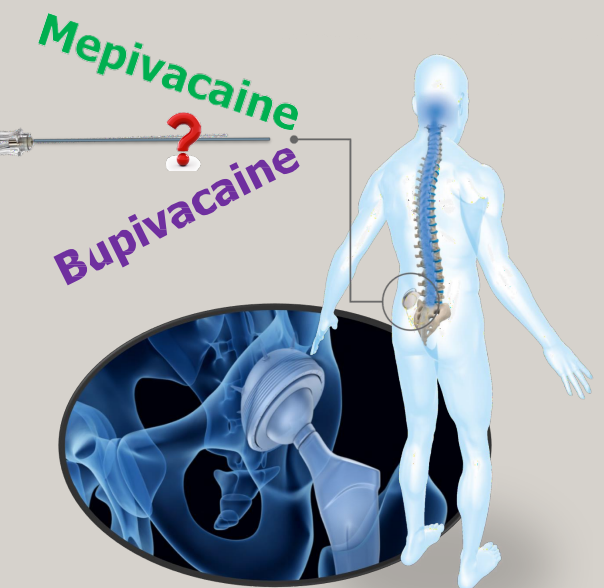
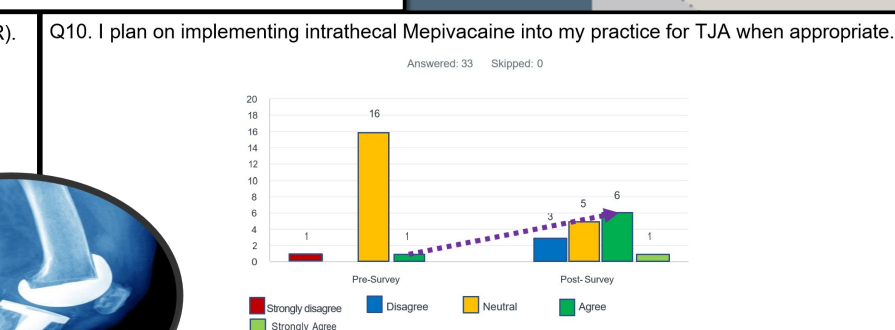
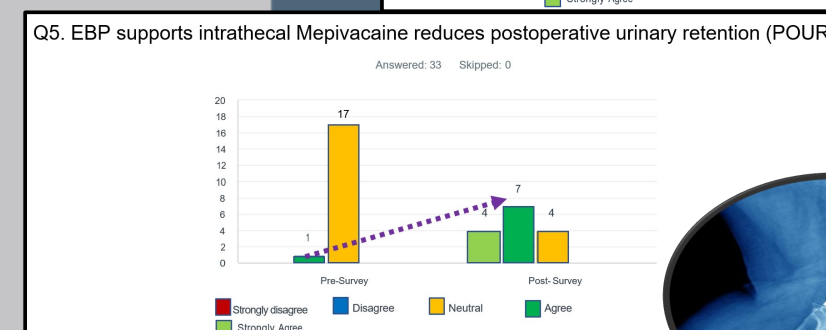
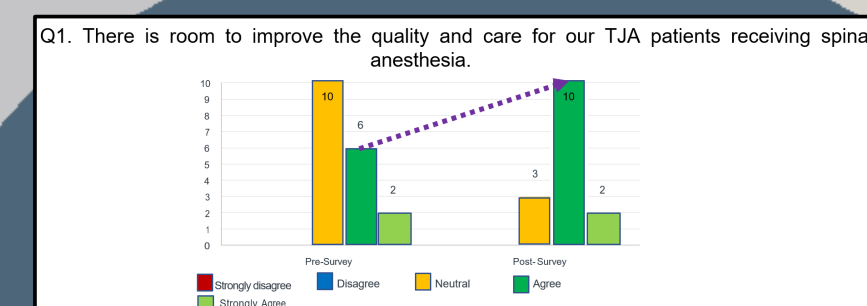
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### Results



- A total of 33 surveys were collected and analyzed (18 pre-education and 15 post-education) with an attendance of 24 individuals, including the Director of Anesthesia, orthopedic surgeon, anesthesia quality improvement manager, CRNA clinical coordinator, and anesthesia providers.
- Results from a retrospective analysis of pre- and post-presentation questionnaire responses indicate a common reported need among providers to improve anesthesia care for TJA patients. Findings demonstrate improved anesthesia providers' knowledge and attitudes and stakeholders reported interest to implement mepivacaine into their TJA program.
- Table 1.**

Pre- & Post EBP Presentation Questionnaire Response Data Highlights



## Conclusion

- Despite its evidenced-based benefits, one hospital was not utilizing mepivacaine for TJA patients due to provider preference-based decisions.
- Standard benchmarks for patient discharge not met in TJA patients receiving spinal bupivacaine (e.g., PACU LOS, POUR and delayed ambulation)
- This project team has undertaken an integral first step in assessing and describing anesthesia provider knowledge and attitudes, regarding use of spinal anesthesia administration in TJA patients.
- Results from a retrospective analysis of pre- and post-presentation questionnaire responses indicated a common reported need among providers to improve anesthesia care for TJA patients.
- Findings demonstrate improved anesthesia providers' knowledge and attitudes and stakeholders reported interest to implement mepivacaine into their TJA program after the presentation.
- This DNP FSP, which utilized best practices from the literature and a systematic approach can serve as a beginning point for future projects which seek to ensure safe, quality, and evidence-based anesthesia care!

## Abstract & References

