# Evaluation of an Opioid Reduction Protocol on Discharge Readiness in Orthopedic Patients

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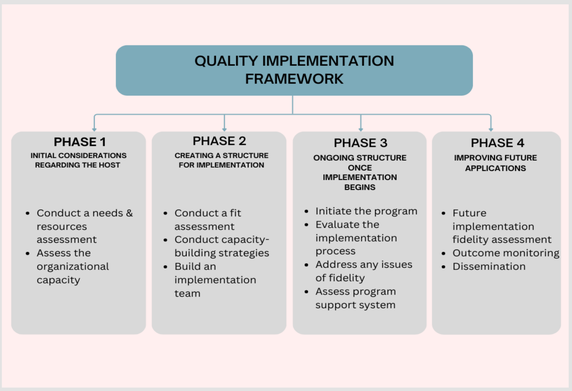
## Background

- Hydromorphone is a long-acting opioid frequently used for perioperative pain control in total hip (THA) & total knee arthroplasty (TKA).
- Hydromorphone's prolonged duration may contribute to delayed PACU recovery and discharge.
- Ambulatory surgery centers require efficient PACU throughput to maintain workflow & patient satisfaction.
- Opioid-sparing strategies may improve discharge readiness while maintaining adequate analgesia.
- **Purpose**: evaluate whether the implementation of opioid-reduction protocol was associated with reduction in PACU LOS in TKA & THA patients.

## Methodology

- Design: Retrospective quality improvement chart review
- Setting: Center for Advanced Ambulatory Surgery
- Sample: ~500 adult patients who underwent TKA or THA
- Control group: Received perioperative hydromorphone
- Exposure group: Managed with opioid-sparing protocol using short-acting opioids & adjuncts
- Outcomes: PACU phase 1 & phase 2 LOS, postoperative pain scores
- Analysis: Descriptive statistics & paired t-test ($p < 0.05$)

## Theory




## Results

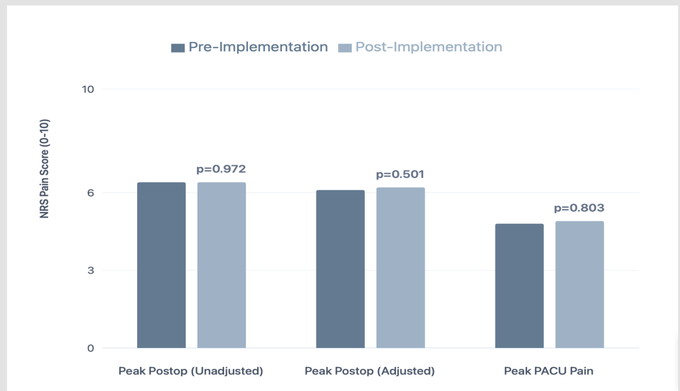
- Total of 556 patients were included in the analysis (pre-implementation $n = 284$, post-implementation $n = 272$)
- Baseline preoperative pain scores were similar between (**mean difference 0.43, $p = 0.073$**)

**Recovery Outcomes**
- Unadjusted Outcomes


- Adjusted for age, BMI, operative duration, ASA:
  - Protocol implementation was independently associated with reduction in Phase 1 time **(adjusted difference 3.8 minutes, $p = 0.042$)**
  - Larger effect was observed for Phase 2 recovery duration noted in post-implementation cohort **(adjusted difference 23.0 minutes, standardized β= 0.52, p < 0.001)** Estimated marginal means demonstrated adjusted Phase 2 recovery times of **93 minutes in post-implementation group** compared with **116 minutes in the pre-implementation group.**
  - Combined recovery model evaluating total recovery duration (Phase 1 + Phase 2) demonstrated a significant independent association between protocol implementation and reduced overall recovery time **(adjusted difference 26.8minutes, standardized β= 0.52, p < 0.001; model $R^2$= 0.20)**

**Intraoperative and Postoperative Analgesic outcomes**
- Implementation of the protocol was associated with significant changes in analgesia administration patterns
- Intraoperative hydromorphone decreased substantially **(Cohen's $d$ = -1.20, $p < 0.01$)**
- Intraoperative fentanyl administration modestly increased **($p < 0.01$)**
- Postoperative fentanyl and oxycodone increased where hydromorphone use decreased **($p$ <0.01)**
- Ketamine administration did not differ significantly between groups

**Pain Outcomes**
- Despite changes in analgesia strategy and improved recovery efficiency, peak pain scores were unchanged between groups




## Strengths & Limitations

Strengths:
- ✓ Strict inclusion & exclusion criteria
- ✓ Consistency in data collection
- ✓ Standardized measurement for opioids
- ✓ Control & exposure groups statistically similar
- ✓ Large data set, well-powered

Limitations:
- ✓ Limited generalizability due to population & single center design
- ✓ Preoperative pain baseline not standard
- ✓ Does not account for long-term postoperative pain scores
- ✓ Does not consider proximity of opioid administration to pain score documentation time
- ✓ Potential bias-stakeholder involved in data collection & protocol design
- ✓ Variability in effect & duration of spinal block

## Discussion

- Reducing perioperative long-acting opioids may improve PACU efficiency in ambulatory orthopedic surgery
- Adequate pain control can be maintained using short-acting opioids & multimodal adjuncts
- Opioid-sparing protocols represent a feasible strategy to enhance patient flow & recovery outcomes in high-volume, fast-paced surgical settings

## Future Research

- Supports anesthesia led opioid stewardship initiatives
- May improve patient satisfaction, staff workflow & operational efficiency
- Aligns with multimodal analgesia & quality improvement efforts
- Future prospective evaluation of opioid-sparing protocols
- Multi-center studies in orthopedic & other populations
- Assessment of patient satisfaction & cost outcomes

## References