

INTRODUCTION

- Osteoarthritis (OA), a debilitating and life-altering condition, presents an escalating health challenge as populations in the United States and other developed nations experience increased life expectancy and body mass index (BMI)^{1,2}.
- Intrathecal morphine (ITM) provides effective postoperative analgesia in patients undergoing total knee arthroplasty (TKA) under spinal anesthesia when compared to control³.
- However, the ideal dose at which maximal analgesic effects can be delivered with minimal side effects is not clearly known.
- This retrospective study is aimed to compare two different doses of ITM with respect to analgesia benefits and side effects.

Methods

- Retrospective, descriptive, single-center study approved by the Institutional Review Board (IRB) at the University of Alabama at Birmingham.
- Three patient groups were selected: a control group receiving continuous adductor canal block (CCACB) under spinal anesthesia, and two experimental groups receiving single-dose adductor canal block (SSACB) under spinal anesthesia with either 100 mcg or 150 mcg of ITM.
- The sample size included 75 patients (25 per group) who were 18 years and older, American Society of Anesthesiology (ASA) class 1-3 who were undergoing primary TKA.
- Exclusion criteria: Patients with chronic pain or opioid use exceeding 30 days and those undergoing surgeries other than primary TKA.
- Outcome data, including opioid use (from which post-operative oral morphine equivalents (OME) were calculated), antiemetic use, visual analog pain scale (VAS) scores, distance ambulated at 24 hours, and length of hospital stay, were extracted by chart review.

Results

- In the post-anesthesia care unit (PACU), patients in both ITM groups experienced significantly lower opioid consumption and pain scores compared to the control group (p <0.001)
- Furthermore, cumulative OME at 24 hours was significantly less in the ITM groups compared to the control
 - However, there was no difference between ITM doses (p=0.004; mean cumulative OME for control was 77.2 OME vs 43.4 OME for 100 mcg ITM vs 42.6 OME for 150 mcg ITM).
- Antiemetic usage did not increase in the ITM groups.
- No statistically significant difference in ambulation at 24 hours, both ITM groups exhibited a trend toward greater average ambulation distance compared to the control group (p=0.095; mean distance walked for control was 67.6 feet, 76.6 feet for 100 mcg ITM vs 98.8 feet for 150 mcg ITM).
- Hospital length of stay did not significantly differ between the groups.

Outcome	Control (n = 25)	100 mcg morphine (n = 25)	150 mcg morphine (n = 25)	p*
OME, mean (SE)				
PACU	34.26 (6.49)	3.40 (1.16)	1.50 (1.06)	< 0.0001
6 hours	10.54 (2.76)	9.73 (1.67)	4.10 (1.30)	0.054
12 hours	11.19 (2.33)	8.50 (1.64)	7.80 (1.42)	0.392
24 hours	22.38 (3.67)	21.81 (3.53)	27.99 (5.21)	0.520
24 hours (cumulative)	77.21 (10.28)	43.44 (5.90)	42.59 (7.33)	0.004
Pain score, mean (SE)				
PACU	5.92 (0.72)	1.04 (0.53)	0.16 (0.16)	< 0.0001
6 hours	4.28 (0.64)	3.18 (0.79)	1.80 (0.59)	0.017
12 hours	4.00 (0.77)	3.78 (1.04)	3.52 (0.69)	0.869
24 hours	5.43 (0.71)	5.71 (0.59)	6.00 (0.76)	0.853
Ambulation distance at 24 hours (feet), mean (SE)	67.56 (12.91)	76.61 (13.38)	98.88 (11.82)	0.095
Use of antiemetic, N (%)	8 (32.0%)	12 (48.0%)	7 (28.0%)	0.153
Length of stay (hours), mean (SE)	37.96 (5.42)	47.38 (7.78)	33.20 (3.45)	0.175

TABLE 2: Outcome measures

PACU: Post-anesthesia care unit; OME: Oral morphine equivalent

DISCUSSION

- ITM doses of 100 mcg and 150 mcg provide effective analgesia for patients undergoing lower extremity total knee arthroplasty under spinal anesthesia.
 - Notably, no statistically significant differences in analgesia were observed between the 100mcg and 150mcg groups
- Patients receiving ITM had better pain scores in the immediate post-operative period and had overall less oral morphine equivalent consumption when compared to control.
- In addition, the safety and side effect profile for ITM is similar for both doses as there was no incidence of respiratory depression and antiemetic usage did not differ between all study arms.

CONCLUSION

- Future studies should explore the use of higher ITM doses and consider a broader patient population to further understand the advantages and potential drawbacks of ITM in TKA surgery.
- The study acknowledges that the specific patient population and surgical context may influence the optimal ITM dosage, highlighting the need for further research in different surgical populations

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