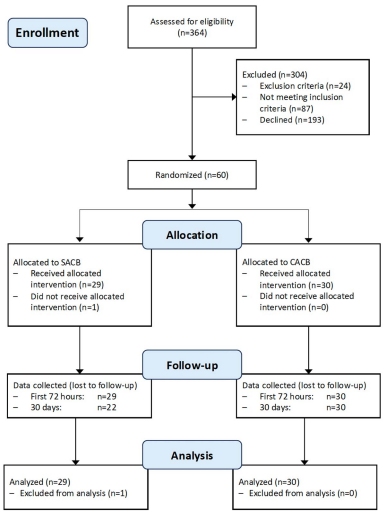
# Outpatient Continuous Adductor Canal Block in Total Knee Arthroplasty: A Double Blinded Randomized Controlled Trial

Jesse Isaac Wolfstadt, Hermann dos Santos Fernandes, Sharon C Peacock, Javiera Vargas, Christine Ma, Carlson Asanghanwa, Fernanda Septimio Lanza oliveira, NAVEED T SIDDIQUI, Yehoshua Gleicher[1]
[1]Anaesthesia

INTRODUCTION:
The adductor canal block (ACB) has shown to reduce pain intensity, decrease opioid consumption, and enhance functional recovery after total knee reaplcement (TKA). However, despite its effectiveness, the analgesic duration of ACB is typically limited to 18–24 hours. Continuous adductor canal blocks (CACB), which use a catheter-based technique, extend the duration of analgesia. However, they are technically more complex and require additional resources such as infusion systems. Previous studies on CACB have produced mixed findings. While one meta-analysis found only limited additional benefit from CACB, another meta-analysis reported lower pain scores and reduced opioid rescue analgesia at 72 hours post-TKA. Despite the increasing shift toward outpatient and short-stay TKA, clinical trials comparing continuous adductor canal blocks (CACB) with single-injection adductor canal blocks (SACB) have been limited to inpatients. To fill this gap, we conducted a study examining SACB vs. CACB in the outpatient setting. Our primary objective was to determine which technique offers superior analgesia and recovery, as assessed by the Quality of Recovery-15 (QoR-15) score at 48 hours post-op.
METHODS:
This was a single-center, randomized, double-blind controlled trial conducted on patients undergoing primary TKA, registered at ClinicalTrials.gov. Enrolment was conducted from September 1, 2023, to December 9, 2024. Eligible participants were patients scheduled for primary TKA in an outpatient or short-stay setting (defined as estimated discharge on postoperative day (POD) 0 or 1). Exclusion included chronic opioid use equivalent to ≥30 mg oral morphine/day, contraindications to CACB such as anatomic abnormalities at the insertion site or coagulopathy, or known allergy to ropivacaine. Randomization was performed using a computer-generated random number table. Participants were allocated in a 1:1 ratio to either 0.2% ropivacaine (intervention) or 0.9% normal saline (control). Providers, patients, and research team were blinded. In the post-anesthesia care unit (PACU), a CACB catheter was inserted by a regional anesthesia fellow using the ISAFE technique and connected to a Baxter elastomeric pump (Baxter International, Deerfield, Illinois). The pumps delivered a continuous infusion of 5 mL/h for 60 hours. Patients were discharged home once they met hospital discharge criteria and passed a physiotherapy assessment. The primary outcome was QoR-15 score at 48 hours postoperatively. Secondary outcomes included total opioid consumption (oral morphine equivalent doses), at 24, 48, and 72 hours post-op. For all time-related outcomes, time zero was defined as the time of spinal anesthetic administration. Additional secondary outcomes were numerical rating scale (NRS) pain scores at rest and during movement (transition from sitting to standing) at the predefined postoperative time points, hospital length of stay (LOS) and complications related to the CACB catheter, such as catheter dislodgement or disconnection, leakage, and any signs or symptoms of LAST. The sample size was calculated based on a previous study that showed a mean 40-item quality of recovery score (QoR-40) for knee replacement, at hospital discharge, of 164.7 (SD 22.4), equivalent to a QoR-15 score of 123.52. Considering an increase of 20 points at POD3 of QoR-15 as clinically relevant, with α=0.05 and a power of 90%, 28 subjects were needed in each group.
RESULTS:
A total of 60 patients were recruited and randomized. One patient experienced an unsuccessful spinal anesthetic, necessitating conversion to general anesthesia, which constituted a protocol violation. As a result, this patient was excluded from the per-protocol analysis but included in the intention-to-treat analysis. The demographics and baseline characteristics between the two groups were similar. There was a significant difference in QoR-15 scores between the groups at 24, 48, and 72 hours, favoring CACB, as shown in Table 2. QoR-15 items impact the greatest were ability to resume home activities, ability to look after personal hygiene, moderate and severe pain, nausea, sleep quality, feeling worried or anxious, and feeling in control. Secondary outcome results are presented in Tables 3 and 4. Median cumulative opioid consumption during the first 48 hours was lower in the CACB group (median OME 14.3 mg [range: 0–63.0]) compared to the control group (median OME 40.0 mg [range: 0–152.0]). NRS pain scores, both at rest and with movement, were significantly lower in the CACB group at 24, 48, and 72 hours. However, no significant differences were observed between the groups for opioid consumption or pain scores at POD 30. Additionally, there was no significant difference in mean hospital LOS between the CACB group (1.40 days, SD 0.96) and the SACB group (1.81 days, SD 1.46; $P = 0.21$). 27/30 and 24/29 patients from the CACB and SACB groups respectively, were successfully discharged home with an outpatient CACB within the first 48 hours ($P = 0.47$). The remaining patients completed their CACB infusion while in hospital. There were no differences noted between the two groups with regards to catheter related complications. No suspected or confirmed local anesthetic systemic toxicity events were observed.

DISCUSSION AND CONCLUSION:

The results of this study demonstrate that for patients undergoing primary TKA, a CACB provides superior quality of recovery and analgesia over a SACB during the first 72 hours.




| | ***Treatment*** | | |
|---|---|---|---|
| ***N = 60*** | ***CACB (N = 30)*** | ***SACB (N = 30)*** | ***P Value*** |
| **TOTAL QoR 15 - POD 1** | | | |
| Mean (SD) | 128.83 (12.36) | 109.00 (15.90) | <0.001*** |
| **TOTAL QoR 15 - POD 2** | | | |
| Mean (SD) | 131.27 (10.23) | 110.86 (15.37) | <0.001*** |
| **TOTAL QoR 15 - POD 3** | | | |
| Mean (SD) | 131.97 (13.94) | 111.18 (18.28) | <0.001*** |