

Comparative Efficacy of Local Infiltration Analgesia Alone Versus Combined with Adductor Canal Block in ACL Reconstruction: A Double-Blind Randomized Trial

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INTRODUCTION

Background: Effective postoperative analgesia is crucial for early mobilization and recovery following ACL reconstruction¹. Both Adductor Canal Block (ACB) and Local Infiltration Analgesia (LIA)² are utilized to manage pain but have not been extensively compared in combination.

Objective: This study aims to compare the efficacy of LIA alone versus LIA combined with ACB in reducing perioperative opioid use and improving early postoperative outcomes in ACL reconstruction patients.

METHODS

Study Design: A double-blind randomized controlled trial was conducted involving 262 patients undergoing outpatient arthroscopic ACL reconstruction.

Participants: Inclusion criteria were patients with ASA I-III, ages 18-50, with a BMI ≤ 40 kg/m². Patients were randomized to receive either LIA alone or LIA combined with ACB. Patients and surgeons were blinded to the allocations.

Interventions: Both groups received 20 ml 0.25% intra-articular ropivacaine intraoperatively. The LIA group received US guided 0.5 ml normal saline (sham) preoperatively. The LIA + ACB group received US guided ACB with 20 ml 0.25% ropivacaine preoperatively.

Outcome Measures: Primary outcomes were perioperative morphine consumption and postoperative motor function as assessed by the straight leg raise (SLR) test. Secondary outcomes included recovery quality and knee function measured by QoR-15 and KOOS scores.

Statistical Analysis: Data were analyzed using SPSS version 26.0, employing Student's t-tests, Mann-Whitney U, and Chi-square tests with significance set at $p < 0.05$.

RESULTS

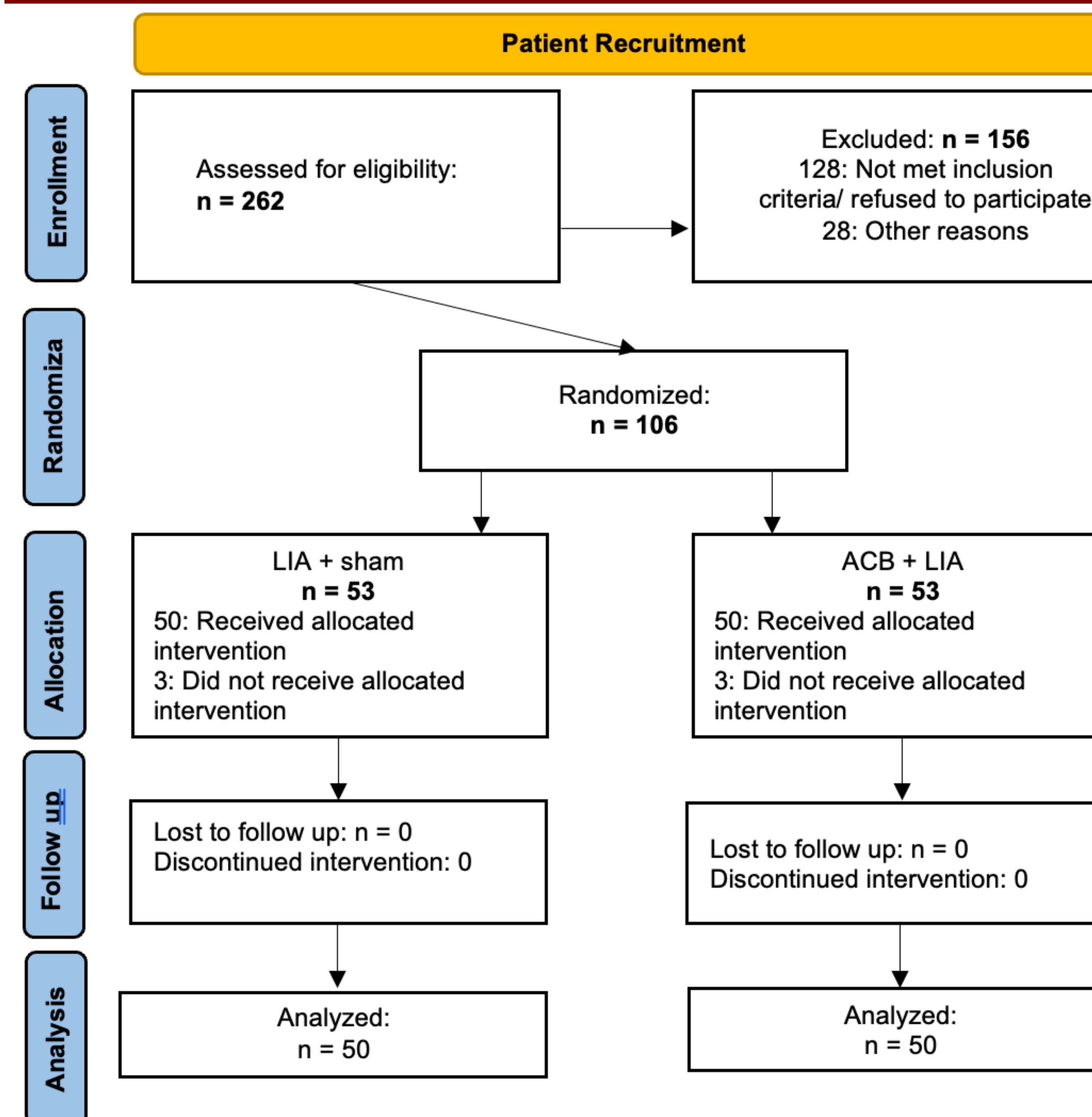
Participant Enrollment and Demographics:

In our study, 262 individuals were assessed for eligibility, with 134 meeting inclusion criteria. After exclusions due to surgery cancellation and other factors, 106 participants were randomized into two groups: Local Infiltration Analgesia (LIA) and LIA combined with Adductor Canal Block (LIA + ACB). Demographics such as weight, height, BMI, and age were similar across both groups, indicating uniformity (p -values > 0.1).

Surgical Procedure Duration:

The mean duration of surgical procedures was not significantly different between the groups, with 82 minutes for LIA and 78.86 minutes for LIA + ACB ($p = 0.53$).

RESULTS



Morphine Consumption:

Intraoperative morphine consumption significantly decreased in the LIA + ACB group (15.68 mg) compared to the LIA group (23.46 mg, $p < 0.05$). Postoperative morphine use at 24 hours showed no significant differences (p -values > 0.25) (Fig 1).

Recovery and Pain Outcomes:

There was no statistically significant difference in the Quality of Recovery-15 (QoR-15) scores ($p = 0.0622$) and Visual Analog Scale (VAS) pain scores at 24 hours ($p = 0.344$).

Motor Function and Knee Injury Outcomes:

There were no significant differences in postoperative motor function or knee outcomes between the groups, as measured by straight leg raise (SLR) and Knee Injury and Osteoarthritis Outcome Score (KOOS) (p -values > 0.3).

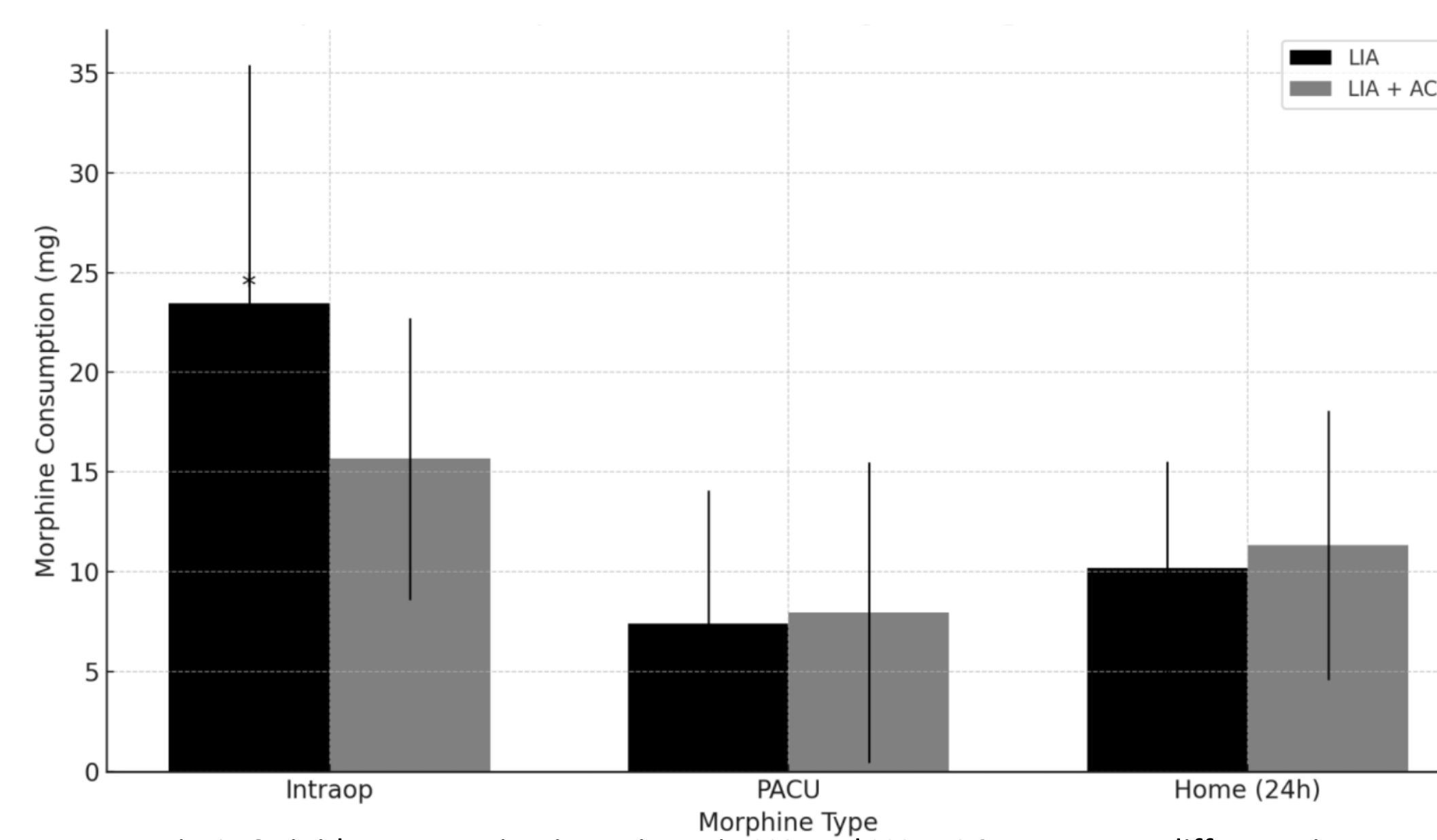


Fig 1. Opioid consumption in patients in LIA and LIA + ACB groups at different times.

Summary of findings:

While ACB combined with LIA significantly reduced intraoperative morphine use, it did not provide additional postoperative benefits over LIA alone neither in opioid use nor in functional outcomes.

DISCUSSION

The addition of Adductor Canal Block (ACB) to Local Infiltration Analgesia (LIA) significantly reduces intraoperative morphine consumption, although it does not impact postoperative opioid use. This finding contrasts with our prior retrospective study³ showing no difference in intraoperative opioid use with or without ACB, highlighting potential biases from non-blinded anesthesiologists administering analgesia to patients with and without ACB. Further, no statistically significant differences were found in opioid use in the PACU or at home between the two groups. This indicates that addition of ACB to LIA does not change the postoperative opioid consumption.

ACB has been proven safe and does not adversely affect postoperative function or quality of recovery, maintaining its non-impairing effects on motor function. Given the lack of significant postoperative benefits, clinicians should carefully consider the routine use of ACB alongside LIA in ACL surgeries, weighing the intraoperative benefits against the absence of postoperative advantages.

CONCLUSION

Addition of ACB to LIA does not decrease postoperative opioid use in patients undergoing ACL reconstruction.

REFERENCES

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