



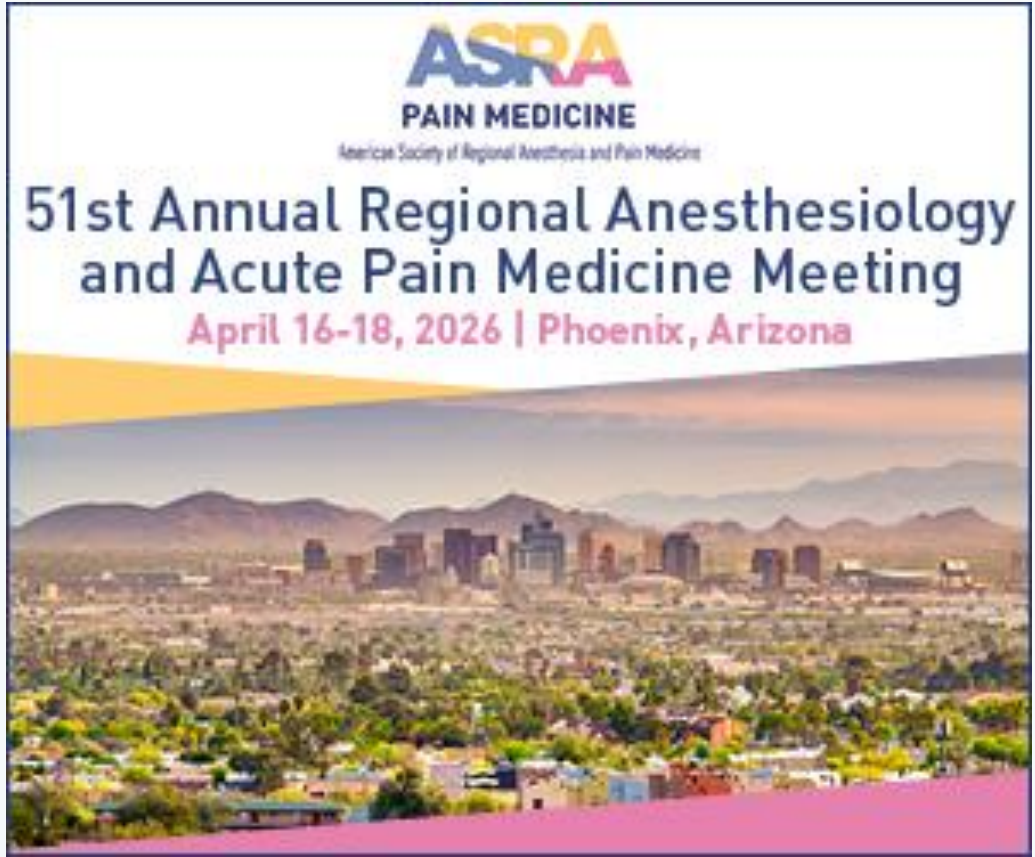
Surgeon-Administered Genicular Nerve Block Versus Periarticular Injection for Total Knee Arthroplasty

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INTRODUCTION

- Objective:** To compare perioperative outcomes of adding PAI or surgeon-administered GNB to a multimodal regimen for TKA.

METHODS

- Design and setting:** Retrospective cohort study, #IRB 2022-2392. May 2023-December 2024, Hospital for Special Surgery, 90-day follow-up
- Participants:** Inpatient primary elective unilateral TKA for primary OA. Senior author was the anesthesiologist in all cases. **Exclusion criteria:** Chronic pain service consult, ASA >3, general anesthesia
- Perioperative protocol:** spinal anesthesia 3-4.5 mL of 1.5% mepivacaine, ACB with 20 mL 0.25% bupivacaine, iPACK 20mL 0.25% bupivacaine, tourniquet 250 mm Hg until cementation, intraoperative opioids and dexamethasone.
Postoperative analgesia: acetaminophen (650 mg PO/ 4-6 hours or 10 mg/mL IV) and 15 mg/mL IV ketorolac. Breakthrough pain (NRS ≥ 4) → 5-10 mg oxycodone PO or 0.5 mg/0.5 mL hydromorphone injection syringe. If insufficient→ PCA → consultation with APS
- Interventions:** **GNB:** 30 mL 0.25% plain bupivacaine after cementation (MLP), **PAI:** 30 mL of 0.25% plain bupivacaine (superficial); 30 mL of 0.25% bupivacaine with epinephrine 1:200,000 (deep) before closing (five fellowship-trained arthroplasty surgeons)
- Study aims:** pain management in the **PACU** and **Floor**, **PT Clearance**, **Opioids at discharge** and **refills within 90 days**.
- Clinically meaningful difference:** ≥ 2 NRS for pain, ≥ 10 OMEs/24 hours for opioid consumption
- Statistical methods:** **Weight-adjusted regression models.** Weights calculated based on: age, race/ethnicity, BMI, sex, recreational drug use, active opioid use at admission, ASA, history of depression/anxiety, OSA

PAI was associated with a clinically meaningful lower opioid consumption than surgeon-administered intraoperative GNB to achieve a clinically similar functional and analgesic result.

	Comparison	Effect size	Lower CL	Upper CL	p-value	significance threshold
PACU						
Median pain; NRS, adjusted mean difference	GNB - PAI	1.2	0.4	2.0	0.005	0.0125
Highest pain; NRS, adjusted mean difference	GNB - PAI	1.6	0.8	2.3	<0.001	
Opioid consumption; OME, adjusted mean difference	GNB - PAI	13.4	6.7	20.1	<0.001	
Length of stay; hours, adjusted mean difference	GNB - PAI	0.9	-0.2	2	0.120	
Floor						
Opioid consumption; OME/hour, adjusted mean difference	GNB - PAI	0.7	0.2	1.1	0.006	0.01
Median pain; NRS, adjusted mean difference	GNB - PAI	0	0	0	0.334	
Highest pain; NRS, adjusted mean difference	GNB - PAI	0.8	0.3	1.3	0.001	
Acute pain service consultation, adjusted odds ratio	GNB vs PAI	0.7	0.2	2.2	0.534	
Patient-controlled analgesia, adjusted odds ratio	GNB vs PAI	0.9	0.6	1.2	0.473	
Physical therapy clearance						
Physical therapy first visit; pass, adjusted odds ratio	GNB vs PAI	0.9	0.6	1.2	0.469	0.0167
Clearance from physical therapy, adjusted odds ratio	GNB vs PAI	0.8	0.4	1.9	0.682	
Time to clearance from physical therapy; hours, adjusted mean difference*	GNB - PAI	-6.2	-16.6	4.2	0.244	
Discharge						
Opioid prescription at discharge (%)	GNB vs PAI	0.7	0.2	3.1	0.683	0.025
Opioid refill within 90 days (%)	GNB vs PAI	0.9	0.5	1.7	0.760	

RESULTS

- Participants:** 104 patients receiving GNB and 156 receiving PAI were analyzed. After weighting; 106.6 GNB versus 131 PAI
- Main findings:**
GNB (versus PAI) was associated with clinically meaningful lower opioid consumption in the PACU and on the floor
No clinically meaningful difference in pain intensity
No difference in PT milestones
- Adverse events:** A unilateral common peroneal nerve block was observed in six cases, four (2.6%) in the PAI group and two (1.9%) in the GNB group. Lasted for max 8h, all patients were cleared for discharge within 24h.

DISCUSSION

- While GNB theoretically targets genicular nerve branches, it is unclear whether the nerve branches are effectively anesthetized.
- The wider spatial distribution of PAI and the higher anesthetic dose probably allows for:
 - More complete coverage of periarticular tissues
 - Enhanced diffusion into tissues (greater concentration gradient)
 - Extended duration
 - Enhanced dose-dependent systemic analgesic effects of local anesthetics
- Low practical risk for adverse events (60 mL of 0.25% plain bupivacaine is substantially below toxicity thresholds described)

References →

