

Liposomal Bupivacaine for Regional Anesthesia in Adolescents undergoing Orthopedic Surgery: A Single Institution Experience

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INTRODUCTION

- Liposomal Bupivacaine (LB, EXPAREL, Pacira) is bupivacaine, a long-acting amide local anesthetic, formulated in multivesicular liposomes.¹
- Approved by FDA for interscalene, adductor canal, and popliteal sciatic peripheral nerve blocks (PNB) in adults and single-dose surgical infiltration in children ≥ 6 years.
- We describe and characterize the blocks in a cohort of adolescents who received LB PNBs, providing a framework of questions to be addressed in future prospective interventional studies.

METHODS

- Children (<18 years) who received at least one PNB using LB from February 2020 to December 2022 were identified using SlicerDicer tool within Epic.
- Demographic data, surgery type, PNB type, LB dosage, bupivacaine concentration, and use of general anesthesia (GA) were retrospectively reviewed.
- Parent or legal guardian of patients who met inclusion criteria to ask five yes or no questions about their child's experience with the PNB(s) were called and verbally consented (Table 1).

Table 1: A series of 5 survey questions was developed to gather more information regarding the length of the blockade, satisfaction with the PNB with regards to duration and analgesia, and if any complications were noted. These questions were part of an IRB approved phone script.

Question	Response
1. Do you feel the block lasted longer than ONE day?	Yes/No
2. Do you feel the block lasted longer than TWO days?	Yes/No
3. Were you satisfied with the block's duration?	Yes/No
4. Did you experience any side-effects or complications? (LAST symptoms, failed block, persistent paresthesias)?	If Yes, what?
5. Were you satisfied with the analgesia provided by the block?	Yes/No

RESULTS

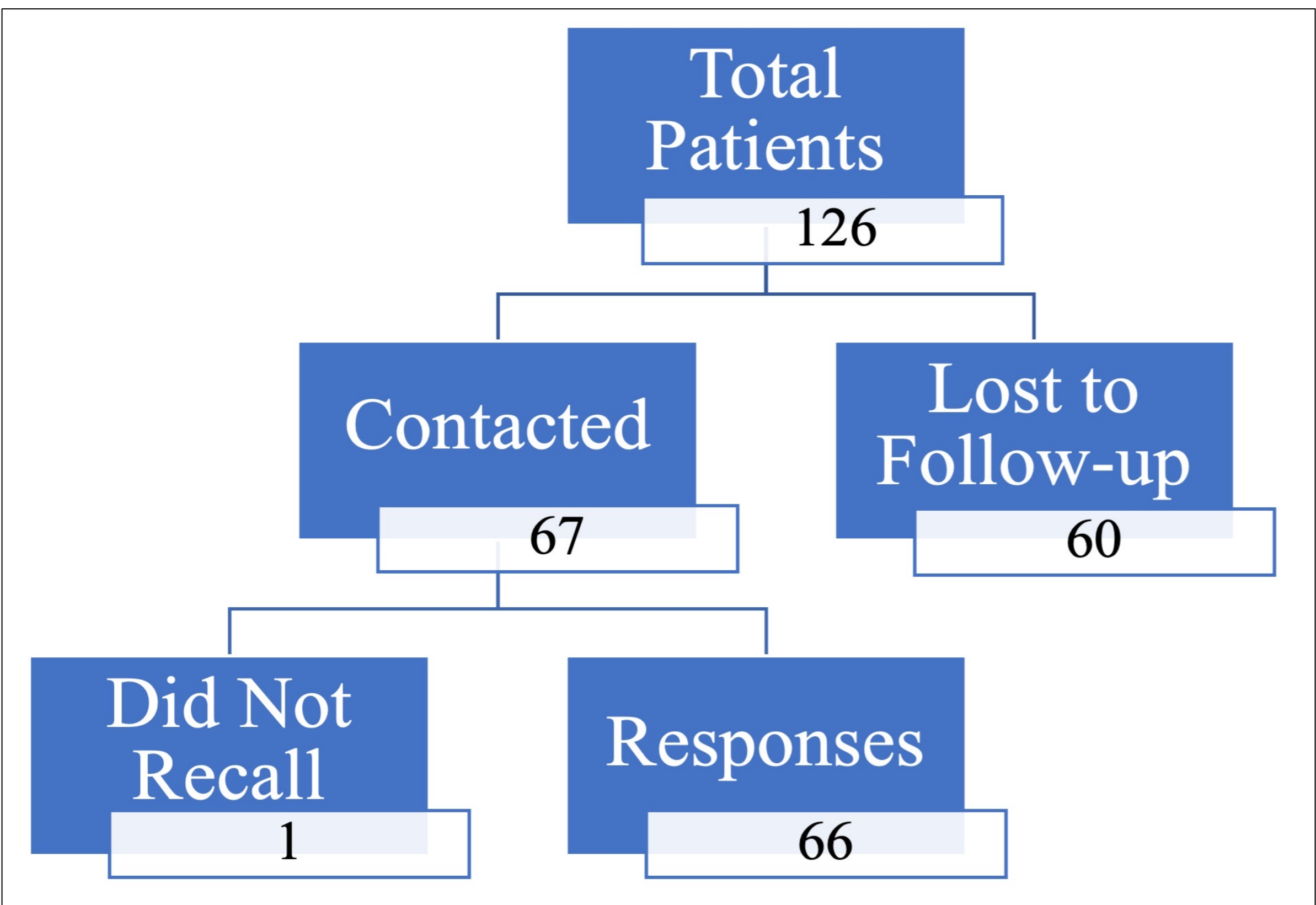


Figure 1: A total of 126 patients under 18 who underwent LB peripheral nerve blockade were identified using the SlicerDicer tool within the EPIC electronic health record. Of those 126 patients, 67 were able to be successfully contacted. One of the 67 patients could not recall the effects of the block.

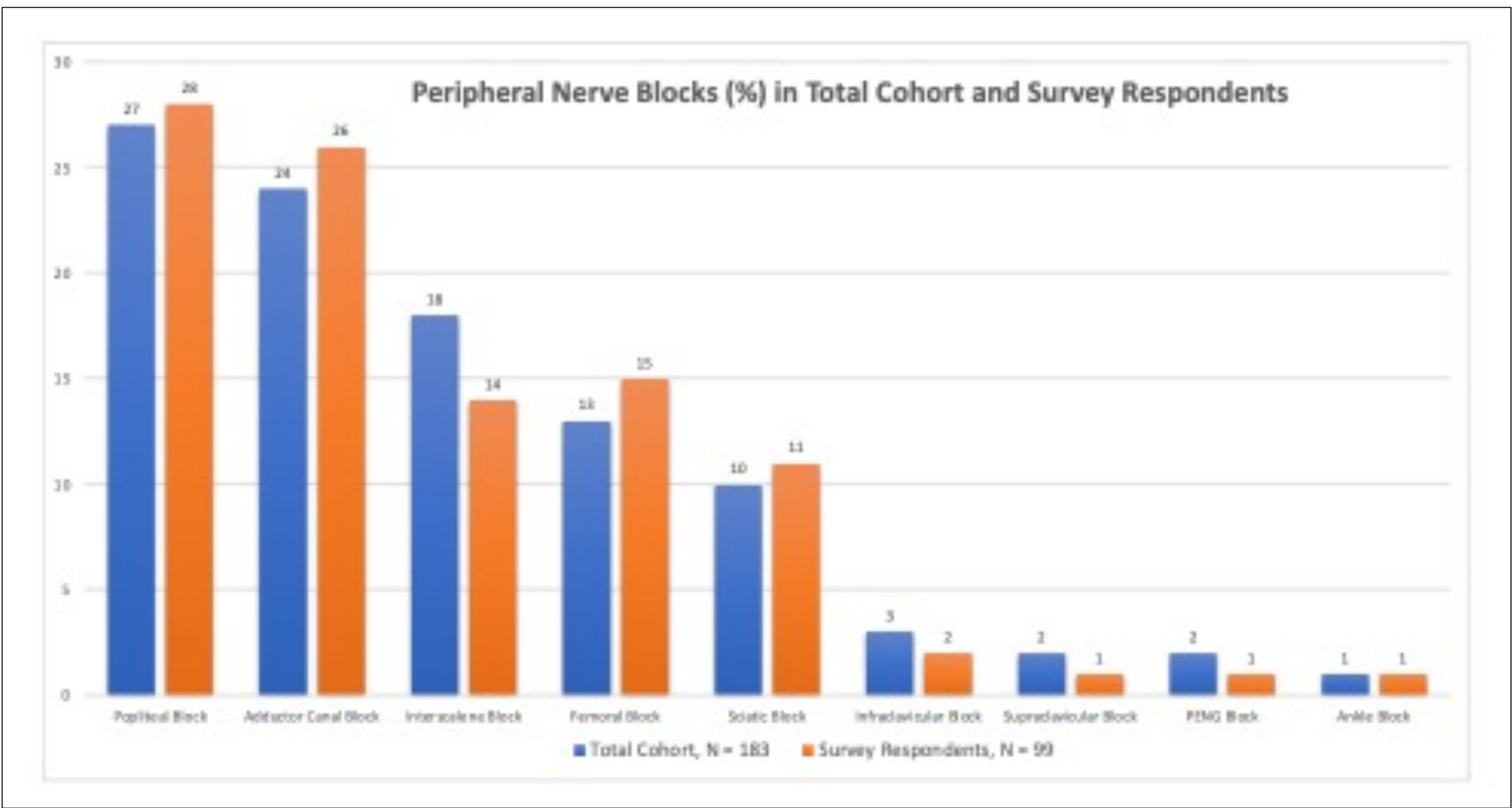


Figure 2: The figure shows that the percentage of each type of peripheral nerve block (PNB) in the total cohort (N = 183 PNBs) and the survey respondents (N = 99 PNBs) were similar. Those patients who responded to the survey were a representative sample of PNBs of the total cohort.

Table 2: Demographic information of both total and contacted cohorts.

Category	Total Cohort (n=126)	Contacted Cohort (n=66)
Sex		
Females	50 (40%)	26 (39%)
Males	76 (60%)	40 (61%)
Race		
White	74 (59%)	31 (47%)
Black	42 (33%)	30 (45%)
Other	10 (8%)	5 (8%)
Ethnicity		
Hispanic	14 (11%)	5 (8%)
Non-Hispanic	112 (89%)	61 (92%)
Age		
Range	12 to 17	12 to 17
Mean	16	16
Weight (Kg)		
Range	37.3-154.3	37.3-154.3
Mean	76.7	77.4
Surgery Location		
Main Hospital	64 (51%)	24 (36%)
Hospital Outpatient Dept	41 (32%)	29 (44%)
ASC	21 (17%)	13 (20%)
Anesthesia		
Sedation	83 (66%)	39 (59%)
General Anesthesia (GA)	41 (33%)	25 (38%)
Sedation to GA	2 (1%)	2 (3%)
*N (%) represents out of total and contacted cohort, respectively.		

Table 3: Among the contacted cohort, a large percentage of patients reported PNB duration longer than 24 hours (96%) and 48 hours (86%) with a high satisfaction of block length (91%) and PNB analgesia (96%). Only 3 complications were noted among the 66 patients. No patient required conversion from MAC to GA due to pain following surgical incision.

Category	Answered Yes	Answered No	Overall Percentage
Longer than 24 Hr	63	3	95%
Longer than 48 Hr	57	9	86%
Satisfaction Duration	60	6	91%
Complications	3	62	5%
Satisfaction Analgesia	63	3	95%

CONCLUSIONS

- Literature on LB for PNB in children and adolescents is poorly described and limited to 3 studies.²⁻⁴
- This retrospective cohort investigation describes 183 upper and lower extremity LB PNBs in 126 adolescent patients.
- Participants reported PNB duration longer than 48 hours and high level of satisfaction with low rates of complications (Table 3).
- Limitations: not a comparative study and may not be relevant to younger children, postoperative analgesic requirements information not collected, and there may be recall bias and inaccuracies with data collection method

FUTURE DIRECTIONS

- Compare efficacy, effectiveness, and safety of LB PNBs with other local anesthetics and nerve catheter systems
- Understand effect of LB PNBs on pain and post-operative opioid use in the pediatric population
- Evaluate use of LB PNBs in age-specific populations including young children

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