Does Bupivacaine Liposome Injectable Suspension Further Aid in Decreasing At-Home Narcotic Utilization in Children and Adolescents following Anterior Cruciate Ligament Reconstruction: A Preliminary Report

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INTRODUCTION: Opioid misuse and addiction among children and adolescents is an increasingly concerning problem. Post-surgical opioid prescriptions for commonly performed surgeries such as anterior cruciate ligament reconstruction (ACLR) increase opioid exposure in young athletes. The purpose of this study was to determine if addition of bupivacaine liposome injectable suspension to the admixture administered as a single-shot adductor canal peripheral nerve block (SPNB+BL) would decrease utilization of at-home opioid analgesics after ACLR in adolescents compared to single-shot peripheral nerve block with bupivacaine (SPNB+B) alone.

METHODS: Consecutive patients who underwent ACLR with or without meniscal surgery by a single surgeon were enrolled in this prospective case-series study. All patients received a preoperative single-shot adductor canal peripheral nerve block with either admixture of bupivacaine liposome injectable suspension combined with 0.25% bupivacaine (Group 2, SPNB+BL) or 0.25% bupivacaine alone (Group 1, SPNB+B). Postoperative pain management included cryotherapy, oral acetaminophen, and ibuprofen. A prescription for 10 doses of hydrocodone/acetaminophen (5/325 mg) was provided in a sealed envelope with instructions that the prescription should only be used in the case of uncontrolled pain. Patients were asked to report their pain using the visual analog scale (VAS); number of consumed narcotics, acetaminophen, and ibuprofen; and their satisfaction with pain treatment for the first three days after surgery. Reports of no opioid use were corroborated by the unopened envelope and unfilled prescription. Statistical analysis was performed.

RESULTS: Fifty-eight patients were enrolled in the study, (SPNB+B=32 patients, SPNB+BL=26 patients). Average age was 15 ± 1.5 years. A total of 47 patients (81%) did not require home opioid analgesia after surgery. A significantly lower proportion of patients in the SPNB+BL group required opioids as compared to the patients in the control group (7.7% vs. 28.1%, p=0.048). Average opioid use was 2 MME or 0.4 pills (range, 0-20 MME), with only 2 patients reporting consuming 4 pills. There were no group differences in VAS scores, pain treatment satisfaction scores, other demographics, or other operative data. The groups did statistically differ in distribution of insurance type (p< 0.01), sex (p=0.039), and administering anesthesiologists' years in practice (p=0.014); therefore, an inverse probability of treatment weighting (IPTW) analysis was performed to account for treatment group differences. Resulting analysis of home opioid use between groups remained significantly different (p< 0.001).

DISCUSSION AND CONCLUSION: The findings of this study demonstrate that addition of bupivacaine liposome injectable suspension to the admixture administered as an adductor canal nerve block in children and adolescents undergoing ACLR effectively reduces home opioid usage postoperatively compared to bupivacaine alone.

	Group 1 N=32, n (%)	Group 2 N=26, n (%)	*P-value*
Age (y) (mean ±SD)	15.5 ± 1	15.4 ± 2	0.614
Sex (male/female)	21/11	10/16	**0.039**
Insurance type (commercial/government)	7/25	26/0	**<0.001**
Anesthesiologist years in practice			**0.014**
<5 years	9 (30)	2 (8)	
5-10 years	2 (7)	8 (8)	
10-15 years	15 (50)	8 (32)	
15-20 years	2 (7)	11 (44)	
>20 years	2 (7)	2 (8)	
Surgery time (min) (mean ± SD)	101 ± 21	114 ± 30	0.139
ACLR Graft			0.058
Hamstring	16 (50)	6 (23)	
Hybrid auto/allograft hamstring tendon	1 (3)	0 (0)	
Quadriceps	15 (47)	20 (77)	
Visual analog scale (mean ± SD)			
VAS day 1	6 ± 2	6 ± 2	0.564
VAS day 2	6 ± 2	5 ± 2	0.187
VAS day 3	5 ± 2	4 ± 2	0.157

	Group 1, N=32	Group 2, N=26	*P-value*
MME POD1	1.1 ± 3.04	0	**0.037**
MME POD2	1.3 ± 2.5	0.095 ± 0.49	**0.023**
MME POD3	1.1 ± 3.30	0.2 ± 0.98	0.235
Ibuprofen (mg) POD1	750 ± 698	1076 ± 677	**0.017**
Ibuprofen (mg) POD2	918 ± 808	1192 ± 626	0.065
Ibuprofen (mg) POD3	826 ± 694	1200 ± 792	**0.047**
Ibuprofen (mg) total	2494 ± 2053	3470 ± 1683	**0.016**
Acetaminophen (mg) POD1	1640 ± 1138	2115 ± 1033	0.067
Acetaminophen (mg) POD2	1875 ± 1283	2310 ± 928	0.077
Acetaminophen (mg) POD3	1703 ± 1190	1971 ± 1103	0.381
Acetaminophen (mg) total	5219 ± 3312	6394 ± 2752	0.096