Adductor canal block is superior to femoral neve block for early postoperative pain relief after single-bundle anterior cruciate ligament reconstruction with hamstring autograft

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INTRODUCTION: This study aimed to compare the combination of a lateral femoral cutaneous nerve (LFCN) block with a femoral nerve block (FNB, FNB group) and an adductor canal block (ACB, ACB group) for postoperative pain control in patients undergoing anterior cruciate ligament (ACL) reconstruction.

METHODS:

A non-randomized, prospective, controlled clinical trial was conducted. The FNB and ACB groups comprised 41 and 40 patients, respectively. Thirty minutes prior to surgery under general anesthesia, the patients received an ultrasound-guided LFCN block with FNB or ACB. The numerical rating scale (NRS) score was recorded 30 min and 4, 8, 12, 24, 48, and 72 h after surgery.

Pain levels and average suppository use were compared between the FNB and ACB groups at each time point using the Wilcoxon rank-sum test. The endpoint was defined as pain relief when the NRS score was less than two. These endpoints were analyzed as time-to-event outcomes using survivorship methods, including Kaplan-Meier estimation and the Cox proportional hazards model. Using the Cox proportional hazard model, factors for pain relief (NRS<2) were evaluated, including block type, age, sex, body mass index (BMI), and suppository use. All survival estimates and hazard ratios (HRs) were reported with 95% CIs.

RESULTS:

There were no demographic differences in age, sex, height, body weight, BMI, and the interval between injury and surgery between the two groups (Table 1). No significant difference was found in suppository use between the groups.

Pain scores were significantly lower in the ACB group at 30 min, 4 h, 24 h, and 48 h after surgery (p=0.034, 0.030, 0,018 and 0.005, respectively) (Table 2).

Kaplan-Meier survival estimates, with pain relief (NRS<2) as the endpoint, are shown in Figure. In the FNB and ACB groups, the probabilities of NRS>1 were 83% (95% CI: 67.5%-91.5%) and 53% (95% CI: 36.1%-66.5%) at 30 min, 61% (95% CI: 44.4%-74.0%) and 30% (95% CI: 16.8%-44.4%) at 12 h, 44% (95% CI: 28.6%-58.2%) and 15% (95% CI: 6.1%-27.6%) at 48 h, respectively.

The Cox proportional hazard regression model identified ACB as a significant factor for pain relief (hazard ratio: 1.77; 95% confidence interval: 1.05-2.89; p=0.03) after controlling age, sex, BMI, and suppository use (Table 3).

DISCUSSION AND CONCLUSION:

The combination of ACB with LFCN block during ACL reconstruction significantly reduced pain in the early postoperative period compared to FNB with LFCN block.

Figure. Kaplan-Meier curve shows the percentages of patients who have NRS scores of more than 1 during the study period.

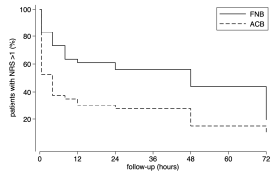

Table 1. Patients' demographic data for each group

Variables	FNB group (N=41)	ACB group (N=40)	p value
Age (years)	22.4 ± 12.2	23.5 ± 13.7	n.s.
Sex	M 18, F 23	M 18, F 22	n.s.
Height (cm)	163.9 ± 7.9	165.0 ± 8.6	n.s.
Weight (kg)	63.0 ± 14.3	63.6 ± 12.5	n.s.
BMI (kg/m²)	23.3 ± 4.3	23.3 ± 3.3	n.s.

Table 2. Knee pain NRS scores represented as medians and lower quartiles

Time	FNB group (N=41)	ACB group (N=40)	p value
30 min	3 (2)	2 (0)	0.034
4 h	4 (3)	2.5 (2)	0.030
8 h	3 (2)	3 (2)	0.424
12 h	3 (2)	3 (2)	0.803
24 h	3 (2)	3 (0)	0.018
48 h	2 (1)	1 (0)	0.005
72 h	0 (0)	0 (0)	0.897

Table 3. Cox Proportional Hazard Ratio of each factor for pain relief (NRS<2)

Factor	p value	Hazard Ratio (95% CI)
ACB	0.030	1.77 (1.05-2.89)
Age	0.547	1.01 (0.99-1.03)
BMI	0.329	1.03 (0.97-1.10)
Sex (male)	0.453	0.85 (0.59-1.36)
Suppository use	0.801	0.96 (0.71-1.31)