Prospective Comparison of Postoperative Pain and Opioid Consumption Between Primary Repair and Reconstruction of the Anterior Cruciate Ligament

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Background: Anterior cruciate ligament (ACL) reconstruction (ACLR) is associated with postoperative pain and necessitates using perioperative nerve blocks and multimodal analgesic plans.

Purpose: To assess postoperative pain and daily opioid use after ACL repair versus ACLR and to assess whether ACL repair could be performed successfully without using long-acting nerve blocks.

Study Design: Cohort study; Level of evidence, 2.

Methods: All eligible patients who underwent ACL surgery between 2019 and 2022 were prospectively enrolled. Patients were treated with primary repair if proximal tears with sufficient tissue quality were present; otherwise, they underwent single-bundle ACLR with either hamstring tendon or quadriceps tendon autograft. The patients were divided into 3 groups: ACLR with adductor canal nerve block (up to 20 mL of 0.25% bupivacaine with 2 mg dexamethasone), primary repair with nerve block, and primary repair without nerve block. Pain visual analog scale and number of opioids used were recorded during the first 14 postoperative days (PODs). Furthermore, patients completed the Quality of Recovery-15 (QoR-15) survey, and range of motion was assessed. Group differences were compared using Mann-Whitney *U* test and chi-square test.

Results: Seventy-eight patients were included: 30 (39%) underwent ACLR, 19 (24%) ACL repair with nerve block, and 29 (37%) ACL repair without nerve block. Overall, the ACL repair group used significantly fewer opioids than the ACLR group on POD 1 (1 vs 3, $P = .027$) and POD 2 (1 vs 3, $P = .014$) while also using fewer opioids in total (3 vs 8, $P = .038$). This difference was even more marked when only analyzing those patients who received postoperative nerve blocks (1 vs 8, $P = .029$). Repair patients had significantly higher QoR-15 scores throughout the first postoperative week, and they had greater range of motion (all $P < .05$). There were no significant differences in pain scores, opioid usage, or QoR-15 scores between patients who underwent repair with versus without nerve block.

Conclusion: The ACL repair group experienced less postoperative pain during the first 2 weeks after surgery and used significantly fewer opioids than the ACLR group. Furthermore, they had improved knee function and higher recovery quality than patients who underwent ACLR during the initial postoperative period. Postoperative nerve blocks may not be necessary after ACL repair.

Keywords: anterior cruciate ligament; primary repair; reconstruction; pain; opioid use; postoperative

Anterior cruciate ligament (ACL) tears are one of the most common surgically treated sports injuries, with over 200,000 procedures performed in the United States each year.[4] Currently, the surgical standard for patients with these injuries is ACL reconstruction (ACLR).[13,32,34] Nevertheless, this procedure is associated with significant pain postoperatively, especially during the first days of surgery, necessitating the use of perioperative nerve blocks and multimodal analgesic plans.[3,8] Effective postoperative pain management, however, is essential for early mobilization, quick recovery, and patient satisfaction in patients treated for ACL injuries.[14]

In recent years, arthroscopic primary ACL repair has gained traction as an alternative to reconstruction for a select group of patients with proximal ACL tears.[11,29] By preserving native tissue and avoiding donor site morbidity, this procedure is considered significantly less invasive than reconstructive surgery.[16,27] As a result, patients undergoing repair might experience less postoperative pain than those undergoing ACLR.[5] Given the potential risks of

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prolonged postoperative analgesic use and the current opioid epidemic in the United States,[15,19] it therefore seems intuitive to pursue less invasive surgical treatments, such as primary repair, that limit pain and avoid the need for excessive opioid use.

This study aimed to prospectively assess postoperative pain scores and daily opioid use between ACL repair and ACLR, as well as to further assess if ACL repair could be performed without using long-acting nerve blocks and without increasing postoperative opioid usage. The hypothesis was that due to less postoperative pain, primary repair would reduce the need for opioid use as compared to ACLR but that perioperative nerve blocks would still be needed for optimal postoperative pain management after this procedure.

METHODS

Patient Selection

After institutional review board approval, we conducted a prospective cohort study at a single institution. Between December 2019 and July 2022, all patients were treated using a previously described treatment algorithm in which patients with proximal ACL tears and sufficient tissue quality underwent primary ACL repair, while a standard ACLR was performed otherwise.[24] Inclusion criteria were patients (1) aged between 18 and 55 years (2) and treated with primary repair or ACLR (either with quadriceps tendon [QT] or hamstring tendon [HT] autograft). Exclusion criteria were patients with (1) a history of preoperative opioid use (defined as opioid use within 3 months of surgery), (2) ACL revision surgery, (3) multiligament knee injuries, (4) bilateral knee injuries, (5) or insufficient follow-up.

During this period, 207 patients presented with isolated ACL injuries. Of these patients, 126 met the inclusion criteria and consented to participate in the study. Follow-up could not be obtained for 45 patients, and 3 additional patients were excluded as they misinterpreted the prescribing regimen (as they took all prescribed narcotics rather than only using them while experiencing significant pain), leaving 78 patients included in the final analysis.

At our institution, most patients treated with ACLR receive a peripheral adductor canal block (standard of care). For patients undergoing repair, however, this decision was based on anesthesiologist preferences. To determine clinical outcomes, patients were therefore divided into 3 groups: ACLR with a nerve block (group A; n = 30), primary repair with a nerve block (group B; n = 19), and primary repair without a nerve block (group C; n = 29). For final analysis, patients treated with ACLR with a nerve block were first compared with patients treated with primary repair with and without nerve block (group A vs groups B + C). Then, outcomes were compared between ACLR and primary repair with nerve block (group A vs B). Last, patients treated with repair with and without nerve blocks were compared (group B vs C) to assess if nerve blocks are actually needed after this procedure.

Surgical Techniques

All surgeries were performed by the senior author (G.S.D.) either at the main hospital or at an ambulatory surgery center. Primary ACL repair using dual-suture anchor fixation with suture augmentation was performed as previously described.[23] In brief, both bundles of the ACL were first identified and then sutured separately from distal to proximal in an alternating and interlocking Bunnell-type pattern. Subsequently, two 4.5 × 20–mm holes were drilled or punched depending on the density of the bone and then tapped. Then, the posterolateral (PL) suture anchor was deployed in the femoral cortex retensioning the PL bundle back to its origin. Next, the anteromedial (AM) suture anchor was preloaded with a suture augmentation and was subsequently used to refixate the AM bundle back to its origin. After the AM anchor was deployed, the suture augmentation was channeled through a small 2.5-mm tunnel, drilled from the AM cortex of the tibia to the central aspect of the anterior third of the tibial footprint. Finally, another suture anchor was then deployed for fixation of the suture augmentation into the AM cortex of the tibia.

For irrepairable ACL tears (ie, midsubstance tears or ligaments with poor tissue quality), a standard single-bundle anatomic ACLR was performed using AM drilling with either a QT or an HT autograft.[7,33] Graft choice was based on surgeon and patient preference, and it should be noted that a tourniquet was used during the graft harvesting.

Pain Management Protocol

As perioperative analgesia, all patients received spinal anesthesia (either 0.5% bupivacaine or 1.5% mepivacaine), intravenous Tylenol (acetaminophen; up to 1 mg), and intravenous Toradol (ketorolac; up to 30 mg). Those patients receiving a postoperative nerve block received a peripheral adductor canal block that consisted of up to 20

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Ethical approval for this study was obtained from the Hospital for Special Surgery (No. 2019-1403-CR2).

mL of 0.25% bupivacaine with 2 mg dexamethasone. For local anesthetics injected at the portal and incision sites, patients who underwent reconstruction received up to 30 mL of 0.25% bupivacaine, while those undergoing ACL repair received up to 10 mL. Finally, all patients were prescribed 5 mg Roxicodone (oxycodone; 1 or 2 tablets every 4-6 hours as needed), 7.5 mg meloxicam (1 tablet/d up to 15 days), and 500 mg acetaminophen (1 or 2 tablets every 6 hours as needed) after surgery.

Postoperative Management

All patients followed the same rehabilitation protocol. Patients' knees were placed in a hinged brace, which was locked in extension, in the operating room. The main focus during the first postoperative days (PODs) was edema control and regaining early range of motion (ROM). Gentle ROM exercises were initiated immediately after surgery to avoid quadriceps atrophy, and weightbearing was allowed as tolerated, depending on concomitant meniscal treatment. Once quadriceps control was regained roughly 4 weeks after surgery, the brace was unlocked for ambulation. From that point, formal ACL rehabilitation using a milestone-based protocol was followed. When muscle strength (>90% isokinetic strength compared with the contralateral leg) and full ROM were restored, gradual return to sports was allowed, usually between 6 months and 1 year postoperatively.[30]

Data Collection

All patients provided consent before participating. To compare outcomes, all patients were asked to complete 6 short surveys on PODs 1, 2, 3, 4, 7, and 14. First, patients were asked to complete their pain scores on a visual analog scale (VAS; 0 = no pain, 100 = unbearable pain).[10] Patients rated their pain both at rest, on average, and at its highest over the previous 24 hours. Second, patients recorded the number of analgesics used over the previous 24 hours for PODs 1 to 4, while this was reported over the previous 3 and 7 days for PODs 7 and 14, respectively. This included the usage of 5 mg oxycodone, 7.5 mg meloxicam, 500 mg acetaminophen, and others. In addition, on PODs 1, 4, 7, and 14, patients were asked to complete the Quality of Recovery-15 (QoR-15) survey. The QoR-15 is a validated 15-item patient-reported outcome survey that measures the quality of recovery after surgery and is scored between 0 and 100 (a higher score indicates a higher quality of recovery).[21] All patient-reported data were collected using the mobile application MyCAP, which allows the patient to complete surveys associated with REDCap projects (Research Electronic Data Capture; Vanderbilt University).[18] Finally, charts were reviewed to assess patient demographics, including age, sex, side of injury, time from injury to surgery, meniscal or chondral injuries, and ROM at the first postoperative visit (approximately 1 week after surgery and measured using a goniometer).

Statistical Analysis

SPSS Version 25 (SPSS, Inc) was used for all statistical analysis. Data were first tested for normal distribution using Shapiro-Wilk test. As data were not normally distributed, descriptive analysis of continuous variables was presented as medians with interquartile ranges, while discrete variables were reported as numbers with percentages. Univariate analysis was conducted using the Mann-Whitney *U* test for continuous variables, while the chi-square or Fisher exact test (in case one of the numbers was <5) was used to compare discrete variables. In case of multiple comparisons, an analysis of variance test with Bonferroni correction was used. Considering an α error of .05 and power of study as 80%, 19 patients per group were needed to detect a 33% difference in the total number of opioid pills taken. Significance of statistical differences was attributed to *P* values <.05.

RESULTS

Patient Demographics

For the 78 included patients, the median age at surgery was 32 years (interquartile range [IQR], 23-43 years), 59% were male, median body mass index (BMI) was 25.1 kg/m^2 (IQR, 22.4-27.1 kg/m^2), and median delay between injury and surgery was 38 days (IQR, 25-82 days). In the 30 patients treated with ACLR, 13 (43%) received an HT autograft, while 17 (57%) received a QT autograft. When comparing patients who underwent ACLR (group A) versus ACL repair (groups B + C), those who underwent reconstruction were significantly younger (22.3 vs 39.6 years, $P < .001$), but there were no other differences in patient or injury characteristics between these groups (Table 1).

When comparing patients undergoing ACLR (group A) and ACL repair with nerve block (group B), patients undergoing reconstruction were younger than those treated with ACL repair (22.3 vs 43.5 years, $P < .001$). There were no differences in any of the other patient demographics. When comparing patients treated with repair with and without block (group B vs C), there were no differences in age, sex, BMI, and chondral lesions. However, patients who did not receive a block had shorter delay between injury and surgery (29 vs 61 days, $P = .011$) and fewer meniscal injuries than those who received a nerve block (55% vs 86%, $P = .037$).

ACLR With Block Versus ACL Repair With and Without Block

Pain Scores

When comparing preoperative VAS pain scores, no statistical differences were found in median pain scores between patients treated with repair and reconstruction (8 vs 10, $P = .399$). Postoperatively, patients treated with repair reported significantly lower mean pain scores compared with those undergoing ACLR on POD 1 (median, 22 vs

TABLE 1
Patient Characteristics After Primary ACL Repair and ACLR[a]

Characteristic	ACLR (n = 30)	ACL Repair (n = 48)	*P*
Age, y	22.3 [20.5-30.7]	39.6 [30.7-47.1]	**<.001**
Male sex	19 (63)	21 (44)	.536
Right side affected	16 (53)	25 (52)	.914
Time from injury to surgery, d	45 [25-88]	35 [25-72]	.444
BMI, kg/m^2	24.7 [22.5-26.5]	25.2 [22.3-28.2]	.307
Follow-up, d	14 [14-14]	14 [14-14]	.519
Concomitant damage			
Meniscus injury	25 (83)	32 (67)	.106
Chondral injury	5 (21)	15 (31)	.276
Meniscal treatment			.734
Partial meniscectomy	8 (27)	10 (21)	
Repair	13 (43)	19 (40)	
Both	3 (10)	2 (4)	
Nonoperative	1 (3)	0 (0)	

[a]Data are presented as median [interquartile range] or number (%). Boldface *P* value indicates statistically significant difference between groups ($P < .05$). ACL, anterior cruciate ligament; ACLR, anterior cruciate ligament reconstruction; BMI, body mass index.

53, $P = .004$), POD 2 (median, 38 vs 51, $P = .005$), POD 3 (median, 25 vs 32, $P = .040$), and POD 4 (median, 20 vs 29, $P = .015$). Although there was no statistical difference in pain scores on POD 7 (median, 15 vs 17, $P = .190$), patients who underwent repair did report lower average pain scores on POD 14 (median, 8 vs 10, $P = .032$) (Table 2).

Analgesic Use

When reviewing analgesic use, it was noted that patients treated with primary repair used significantly fewer opioids than those treated with ACLR on POD 1 (median, 1 vs 3 pills, $P = .027$) and POD 2 (median, 1 vs 3 pills, $P = .014$). In addition, patients who underwent repair used significantly fewer opioids in total (median, 3 vs 8 pills, $P = .038$, respectively) and stopped taking opioids earlier after surgery than those who underwent reconstruction (POD 1.5 vs 3, $P = .015$) (Table 3).

Quality of Recovery

When reviewing QoR-15 scores, those undergoing primary repair reported significantly better quality of their postoperative recovery on POD 1 (71 vs 68, $P = .002$), POD 4 (81 vs 70, $P = .005$), POD 7 (82 vs 75, $P = .016$), and POD 14 (88 vs 82, $P = .008$) (Table 2).

Range of Motion

Patients who underwent primary repair had significantly more knee flexion when compared with patients who underwent reconstruction at 1 week after surgery (90° [IQR, 73°-90°] vs 50° [IQR, 44°-81°], $P < .001$) (Table 4).

Graft Choice

There was no statistical difference in the total number of opioids used between patients treated with QT or HT autografts (6 vs 11 pills, $P = .112$). Furthermore, no statistical differences were found in pain scores and QoR-15 scores during the first 14 days after surgery between both groups, while there was also no difference in ROM, respectively.

ACLR With Block Versus ACL Repair With Block

Pain Scores

No statistical differences were found in median preoperative pain scores between patients treated with repair and reconstruction (10 vs 10, $P = .884$). After surgery, patients treated with repair reported significantly lower mean pain scores compared with those undergoing ACLR on POD 1 (median, 22 vs 53, $P = .012$). Throughout the first 14 PODs, patients who underwent repair reported lower median pain scores, although these did not reach statistical differences (all >.05) except on POD 14 (average pain, 7 vs 10, $P = .043$) (Table 2).

Analgesic Use

Regarding analgesic use, patients treated with primary repair used significantly fewer opioids than those treated with ACLR on POD 1 (median, 0 vs 3 pills, $P = .010$) and POD 2 (median, 1 vs 3 pills, $P = .043$). Overall, patients treated with repair used significantly fewer opioids in total (median, 1 vs 8 pills, $P = .029$, respectively) (Table 3).

Patients treated with primary repair had a significantly higher likelihood of using <5 narcotic pills in total as compared with those treated with ACLR (odds ratio, 3.3, $P = .041$), while they had a 6.5 higher likelihood of using opioids for <2 days after surgery, respectively ($P = .009$).

Quality of Recovery

When reviewing QoR-15 scores, patients treated with primary repair reported significantly better quality of their

TABLE 2
Pain Scores After ACLR and Primary Repair With and Without Nerve Block[a]

Variable	(A) ACLR With Block (n= 30)	(B) ACL Repair With Block (n= 19)	(C) ACL Repair Without Block (n= 29)	*P*		
				A vs B + C	A vs B	B vs C
Preoperative						
VAS pain: mean	10 [4-19]	10 [0-20]	5 [0-13]	.339	.844	.874
POD 1						
VAS pain: rest	40 [18-60]	20 [1-49]	20 [3-44]	**.010**	**.044**	.728
VAS pain: mean	53 [29-67]	22 [5-54]	21 [7-53]	**.004**	**.012**	.404
VAS pain: max	71 [44-87]	45 [3-77]	53 [25-76]	**.038**	.056	.591
QoR-15	68 [51-68]	75 [63-82]	69 [60-79]	**.002**	**.007**	.276
POD 2						
VAS pain: rest	45 [31-62]	41 [15-57]	30 [13-50]	**.025**	.304	.321
VAS pain: mean	51 [40-65]	46 [20-55]	30 [18-50]	**.005**	.109	.665
VAS pain: max	71 [60-82]	60 [30-80]	50 [36-78]	**.010**	.126	.932
POD 3						
VAS pain: rest	30 [20-42]	19 [0-38]	10 [7-40]	**.014**	.084	.816
VAS pain: mean	32 [22-51]	25 [5-40]	24 [10-48]	**.040**	.134	.665
VAS pain: max	50 [34-70]	45 [9-62]	41 [18-60]	.060	.139	.717
POD 4						
VAS pain: rest	20 [14-43]	8 [0-39]	11 [1-33]	**.024**	.055	.792
VAS pain: mean	29 [20-50]	19 [5-42]	20 [7-33]	**.015**	.082	.783
VAS pain: max	45 [30-65]	30 [10-53]	32 [10-40]	**.027**	.083	.254
QoR-15	70 [64-79]	81 [79-88]	79 [66-87]	**.005**	**.002**	.411
POD 7						
VAS pain: rest	15 [8-20]	6 [0-21]	10 [2-20]	.093	.085	.904
VAS pain: mean	17 [12-30]	15 [4-25]	12 [6-28]	.190	.397	.759
VAS pain: max	30 [17-55]	30 [10-49]	30 [13-42]	.423	.676	.321
QoR-15	75 [69-85]	82 [78-93]	82 [72-89]	**.016**	**.018**	.321
POD 14						
VAS pain: rest	4 [3-10]	4 [0-10]	0 [0-10]	.798	.900	.810
VAS pain: mean	10 [5-18]	7 [0-11]	8 [1-15]	**.032**	**.043**	.461
VAS pain: max	25 [10-33]	10 [2-40]	16 [5-32]	.205	.165	.430
QoR-15	82 [72-87]	88 [81-97]	89 [80-95]	**.008**	.057	.875

[a]Data are presented as median [interquartile range]. Boldface *P* values indicate statistically significant difference between groups ($P < .05$). ACL, anterior cruciate ligament; ACLR, anterior cruciate ligament reconstruction; Max, maximum; POD, postoperative day; QoR-15, Quality of Recovery-15; VAS, visual analog scale.

TABLE 3
Opioid Use After ACLR and Primary Repair With and Without Nerve Block[a]

Variable	(A) ACLR With Block (n = 30)	(B) ACL Repair With Block (n = 19)	(C) ACL Repair Without Block (n = 29)	*P*		
				A vs B + C	A vs B	B vs C
POD 1	3.0 [1.0-5.3]	0.0 [0.0-2.0]	2.0 [0.0-4.5]	**.027**	**.010**	.098
POD 2	3.0 [0.8-5.0]	1.0 [0.0-3.0]	1.0 [0.0-3.5]	**.014**	**.043**	.973
POD 3	0.5 [0.0-2.3]	0.0 [0.0-1.0]	0.0 [0.0-1.5]	.127	.100	.512
POD 4	0.0 [0.0-1.0]	0.0 [0.0-0.0]	0.0 [0.0-0.5]	.389	.195	.388
POD 7[b]	0.0 [0.0-0.0]	0.0 [0.0-0.0]	0.0 [0.0-0.0]	.764	.592	.692
POD 14[c]	0.0 [0.0-0.0]	0.0 [0.0-0.0]	0.0 [0.0-0.0]	.260	.094	.077
Total opioids, No.	8.0 [2.8-13.3]	1.0 [0.0-10.0]	3.0 [0.5-10.5]	**.038**	**.029**	.415
Last POD opioid use	3.0 [2.0-4.0]	1.0 [0.0-4.0]	2.0 [0.5-3.0]	**.015**	.082	.771

[a]Data are presented as median [interquartile range]. Boldface *P* values indicate statistically significant difference between groups ($P < .05$). ACL, anterior cruciate ligament; ACLR, anterior cruciate ligament reconstruction; POD, postoperative day.
[b]Number of pills over the previous 3 days.
[c]Number of pills over the previous 7 days.

TABLE 4
Range of Motion After ACLR and Primary Repair With and Without Nerve Block[a]

ROM, deg	(A) ACLR With Block (n = 30)	(B) ACL Repair With Block (n = 19)	(C) ACL Repair Without Block (n = 29)	*P* A vs B + C	*P* A vs B	*P* B vs C
Extension	0 [0-0]	0 [0-0]	0 [0-0]	**.004**	.063	>.999
Flexion	50 [44-81]	90 [60-90]	90 [85-95]	**<.001**	**.016**	**.017**

[a]Data are presented as median [interquartile range]. Boldface *P* values indicate statistically significant difference between groups ($P < .05$). ACL, anterior cruciate ligament; ACLR, anterior cruciate ligament reconstruction; ROM, range of motion.

postoperative recovery on POD 1 (75 vs 68, $P = .007$), POD 4 (81 vs 70, $P = .002$), and POD 7 (82 vs 75, $P = .018$), while the difference did not reach significance on POD 14 (88 vs 82, $P = .057$) (Table 2).

Range of Motion

Those patients undergoing primary repair had significantly more knee flexion when compared with patients who underwent reconstruction at 1 week (90° [IQR, 60°-90°] vs 50° [IQR, 44°-81°], $P = .016$) (Table 4).

ACL Repair With Versus Without Block

There were no statistical differences in pain scores, opioid use, and QoR-15 scores during the first 14 days after surgery between patients who underwent repair treated with and without nerve block (all $P > .05$ (Tables 1-3). However, patients without nerve blocks had significantly more knee flexion than patients with blocks at the first postoperative visit, but this was not considered clinically relevant (90° [IQR, 85°-95°] vs 90° [IQR, 60°-90°], $P = .017$) (Table 4).

DISCUSSION

The main finding of this study was that patients treated with primary repair had lower pain scores and used significantly fewer opioids than those treated with ACLR during the first 2 weeks after surgery. Furthermore, patients undergoing ACL repair experienced better quality of their recovery and had an earlier return of ROM when compared with patients who underwent reconstruction. Finally, it seemed that patients treated with primary repair did not experience enough pain to benefit from a postoperative nerve block.

An important factor influencing patient satisfaction after surgery is postoperative pain.[17] Although several improvements in surgical techniques and postoperative pain protocols have improved ACLR outcomes, patients often struggle with and complain of severe postoperative pain, leading to extensive postoperative analgesic use.[6,12] Nevertheless, since pain in the immediate postoperative period can be a significant restraint to starting an early rehabilitation program, adequate pain management enables immediate weightbearing and ROM exercises, lowering the risk of postoperative complications, including arthrofibrosis and quadriceps atrophy.[20,22] Therefore, it is important to assess surgical options that may reduce early postoperative pain, thereby improving patient outcomes and potentially leading to an earlier return to full activities.[30]

This prospective study noted that patients who underwent arthroscopic primary ACL repair experienced lower pain scores and used significantly fewer opioid pills than those treated with reconstructive surgery (median, 3 vs 8 pills). It should be noted that this difference was even more significant when only analyzing patients who received a postoperative nerve block (median, 1 vs 8 pills). Due to lower pain levels, this study also showed that primarily repairing a torn ACL leads to earlier return of ROM of the knee joint, confirming the results of a previous retrospective study assessing the same outcome.[25] As a result, patients treated with repair seem to have improved quality of recovery as compared with those treated with ACLR. The less invasive nature of ACL repair surgery likely plays an important role in these differences. With ACL repair, the native tissues of the ligament are preserved, only small tunnels are drilled (3.5 vs 7-11 mm),[28] and there is no need for graft harvesting, thus eliminating graft site morbidity.[9,31]

When reviewing the literature, only 2 studies have assessed pain and postoperative opioid use after primary ACL repair. In 2021, Connolly et al[5] reported similar outcomes in a retrospective study in which patients who underwent ACL repair experienced less short-term postoperative pain and were prescribed fewer narcotics than those treated with ACLR. Similar to the present study, patients treated with repair also underwent fixation using suture anchors. On the contrary, Barnett et al[1] did not find differences in pain scores and overall opioid intake between patients treated with repair as compared with ACLR. When looking closely at their results, however, these patients underwent bridge-enhanced ACL repair, performed via arthrotomy, that likely results in more pain than an arthroscopic ACL repair procedure. Therefore, it seems that based on the currently available evidence, repairing a torn ACL, rather than reconstructing it, leads to significantly lower pain scores, less overall opioid use, and improved physical comfort.

Interestingly, this study showed that patients treated with ACLR used 8 times more narcotics than those undergoing primary repairs with a block and 2.5 times more than those without a block. When reviewing those patients treated with repair, patients without long-acting nerve blocks had similar quality of recovery compared with those with a nerve block. However, it is important to note that patients with a block used fewer opioids than those who did not receive this block on POD 1 (0 vs 2 pills) and in total (1 vs 3 pills), but this was not significant. This can obviously be explained by the use of nerve blocks, which can reduce reported postoperative pain scores for up to 12 hours after surgery.[6] Furthermore, it should be noted that although there was a significant difference in knee flexion between both groups, this was not considered clinically relevant. Therefore, although the optimal pain management for patients undergoing ACL repair seems to include using long-acting nerve blocks, this procedure can be performed without while still effectively controlling postoperative pain due to the minimally invasive nature of surgery.

Limitations

There are limitations to this study. First, although VAS scores have been proven reliable in assessing acute pain, determining pain perception remains relatively subjective and can be influenced by pain tolerance, anxiety, and psychological stress. Second, the nonrandomized nature of this prospective study could have induced potential selection bias, although the decision of administering a nerve block was based on the preference of the anesthesiologist. Third, it should be noted that patients who underwent repair were older than those undergoing reconstruction (39.6 vs 22.3 years), which can be explained by the fact that proximal tears occur more often in older patients.[26] Nevertheless, this could have influenced the outcomes of this study due to the possible better pain tolerance in older patients. In addition, using a tourniquet during graft harvesting could have influenced the pain scores in this study, as this is associated with increased pain during the first 24 hours after surgery.[2] It should also be noted that the main goal of this study was to report the differences in pain and opioid use between patients who underwent repair and reconstruction rather than reporting the optimal pain management strategy and that 36% of patients were lost to follow-up. Finally, although subgroup analysis between both groups did not show any statistical differences, patients undergoing ACLR were treated with 2 types of soft tissue grafts (HT and QT autograft), which might have influenced the outcomes of this study.

CONCLUSION

Patients who underwent ACL repair experienced less postoperative pain during the first 2 weeks after surgery and used significantly fewer opioids than those treated with ACLR. Furthermore, they had improved knee function and higher recovery quality than patients treated with ACLR during the initial postoperative period. Postoperative nerve blocks might not be necessary after ACL repair.

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