The analgesic efficacy of local infiltration analgesia versus peripheral nerve block after anterior cruciate ligament reconstruction: a systematic review and meta-analysis.

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Background and Goal of Study

Many authors consider blockade of the femoral nerve distribution the gold standard analgesic treatment after anterior cruciate ligament reconstruction. However, some argue an alternative approach of local infiltration analgesia, using local anesthetics injection into the surgical site, has similar efficacy. The objectives of this meta-analysis were to compare the analgesia and functional outcomes of both treatments following anterior ligament reconstruction.

Materials and Methods

The methodology followed the PRISMA statement guidelines. The primary outcomes were pain scores at rest (analogue scale, 0-10) in the early (0-2 postoperative hours), intermediate (3-12 postoperative hours), and late postoperative periods (13-24 postoperative hours). Secondary outcomes included range of motion, quadriceps muscle strength, and complication rates (neurologic events, cardiovascular events, falls, knee infections, or knee chondrolysis).

Results and Discussion

Ten trials, including 588 patients, were identified. Pain scores in the early (mean difference: 1.6; 95%CI: 0.2, 2.9mg; I2=97%; p=0.02), intermediate (mean difference: 1.2; 95%CI: 0.4, 1.5; I2=85%; p=0.002) and late (mean difference: 0.7; 95%CI: 0.1, 1.4; I2=82%; p=0.03) postoperative periods were significantly lower in patients who received a femoral nerve block (table 1). The quality of evidence for our primary outcomes were moderate to high according to the Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) Working Group System. Regarding the functional outcomes, only one trial reported range of motion at 48 postoperative hours, which was found to be similar between groups (mean difference: -5°; 95%CI: -14, 4°; p = 0.27). No trials sought to record side-effects such as neurologic events, cardiovascular events, falls, knee infections, or knee chondrolysis.

Conclusion

Femoral nerve block provides superior postoperative analgesia after anterior cruciate ligament reconstruction when compared to local infiltration analgesia. The impact of improved analgesia on function remains unanswered due to the lack of functional outcomes reported in existing literature.

Table 1. Pain scores at rest in the early, intermediate and late postoperative periods (analogue scale, 0 – 10). CI, confidence interval; n, number of events; N, total number of participants; SD, standard deviation.

Outcomes	References	Group						Mean difference [95% CI] or Relative risk [95% CI]	I ² (%)	p value	Quality of evidence (GRADE)
		Local infiltration analgesia			Femoral nerve block						
		Mean or n	SD	N	Mean or n	SD	N				
Early postoperative period (analogue scale, 0-10)	Dauri 2009 ²¹	0.1	0.2	25	0.3	1.0	25	1.6 [0.2, 2.9]	97	0.02	Moderate
	Iskandar 2003 ⁵	5.0	1.5	40	3.1	0.6	40				
	Mayr 2007 ⁷	3.6	1.5	53	3.2	1.9	55				
	Russo 2003 ²³	0.6	0.8	21	0.5	0.5	20				
	Sahni 2015 ²⁴	6.1	0.7	20	1.0	1.8	20				
	Tran 2005 ²⁵	3.9	2.5	18	1.5	1.9	16				
Intermediate postoperative period (analogue scale, 0-10)	Dauri 2003 ⁴	1.5	3.9	20	0.1	2.1	20	1.2 [0.4, 1.5]	85	0.002	High
	Dauri 2009 ²¹	6.0	3.0	25	2.0	2.0	25				
	Iskandar 2003 ⁵	2.7	1.4	40	2.7	1.1	40				
	Kristensen 2014 ⁶	3.5	2.1	28	3.0	2.0	27				
	Mayr 2007 ⁷	3.0	2.0	53	2.8	2.2	55				
	Mehdi 2004 ²²	1.8	1.5	25	2.0	2.3	25				
	Russo 2003 ²³	2.5	0.1	21	1.4	0.8	20				
	Sahni 2015 ²⁴	5.4	1.9	20	2.0	2.1	20				
Tran 2005 ²⁵	2.8	2.4	18	1.7	2.3	16					
Late postoperative period (analogue scale, 0-10)	Dauri 2003 ⁴	4.0	2.2	20	2.9	2.5	20	0.7 [0.1, 1.4]	82	0.03	High
	Dauri 2009 ²¹	3.0	2.0	25	2.0	2.0	25				
	Iskandar 2003 ⁵	2.2	1.1	40	2.4	0.9	40				
	Kristensen 2014 ⁶	2.5	1.8	28	2.9	1.8	27				
	Mayr 2007 ⁷	2.2	1.8	53	2.6	2.3	55				
	Mehdi 2004 ²²	2.0	2.0	25	1.9	1.8	25				
	Russo 2003 ²³	3.8	0.9	21	2.9	0.8	20				
	Sahni 2015 ²⁴	4.3	2.3	20	1.9	2.2	20				
	Tran 2015 ²⁵	4.7	2.5	18	1.0	1.4	16				
	Woods 2006 ²⁶	2.7	2.4	45	2.7	2.8	45				

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