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Comparison of Prilocaine and Bupivacaine for Post-Arthroscopy Analgesia: A Placebo-Controlled Double-Blind Trial

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Summary: Arthroscopic surgery requires early postoperative analgesia for early discharge and early rehabilitation of patients. To accomplish the effectiveness of intraarticular application of local anesthetics, a placebo-controlled double-blind trial was performed. Results were evaluated using the visual analog scale on a blind basis. The mean pain scores were generally lower in the bupivacaine group than in the control or prilocaine group. There were no statistically significant differences between the oral intake of analgesics and the level of analgesia obtained in all three groups. We consider the local application of analgesics to be ineffective for postarthroscopy analgesia. **Key Words:** Bupivacaine—Prilocaine—Intraarticular analgesia.

Surgeries performed through the arthroscope can be considered to be minimally invasive interventions that can be performed on an out-patient basis. In order to evaluate the decrease in the amount of pain experienced by the patients after an arthroscopic intervention, we injected a local anesthetic agent through one of the arthroscopic portals and correlated the results with a control group.

MATERIALS AND METHODS

Thirty consecutive patients undergoing an arthroscopic procedure between August 1992 and December 1992 at the Ankara University Medical Faculty Department of Orthopaedic Surgery and Traumatology were randomized into three groups. Patients who were uncooperative, were undergoing a ligamentous reconstruction, and required suction drainage after their operation (such as lateral retinacular release) were not included in this study. Also, patients that had more than two incisions for the portals (such as meniscal repairs) were excluded. Demographic data on the patients can be seen in Table 1.

Groups were randomized after being given spinal anesthesia (5 ml 2% prilocaine) and after undergoing the arthroscopic operation, but 5 min before the release of the tourniquet the trial medication was given through an arthroscopic portal intraarticularly. The arthroscopic portals were not infiltrated with the local anesthetic. Instead of a local anesthetic, 20 ml isotonic saline was given to the control group. Ten milliliters 2% prilocaine (Citanest) diluted with 10 ml isotonic saline was given to the prilocaine group. Ten milliliters 0.5% bupivacaine

TABLE 1. *Demographic data (n = 30)*

Group	Female	Male	Mean age ± SD (yr)	Mean weight ± SD (kg)
Control	2	8	23.9 ± 3.93	76.1 ± 3.43
Prilocaine	3	7	22.1 ± 3.87	77.3 ± 4.25
Bupivacaine	1	9	25.7 ± 4.13	69.5 ± 3.97

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TABLE 2. *VAS values (n = 30)*

Group	Values	First pain	6 h	12 h	24 h
Control	Mean ± SD	3.78 ± 2.7760	3.5 ± 2.8507	3.91 ± 3.0120	1.75 ± 1.9817
	Minimum	0.8	0.8	1.0	0
	Maximum	10	10	10	4.8
Prilocaine	Mean ± SD	3.01 ± 2.8827	3.51 ± 2.2278	3.7 ± 2.2121	1.33 ± 1.6486
	Minimum	0	0	0.3	0
	Maximum	7.4	7.2	7.7	5.0
Bupivacaine	Mean ± SD	1.12 ± 1.1526	2.76 ± 3.0927	1.71 ± 1.7006	0.22 ± 0.4733
	Minimum	0	0	0	0
	Maximum	3.0	8.1	5.2	1.5

(Mercain) diluted with 10 ml isotonic saline was given to the bupivacaine group.

Before recovering from spinal anesthesia, patients were instructed on the use of the Visual Analog Pain Scale (VAS) by a physician blind to the medication given. All the patients were told that an anesthetic was applied to their knee for the relief of pain.

Patients were instructed to record their pain on the VAS after they could feel their feet and 6, 12, and 24 h thereafter. They were permitted to use oral analgesics but were required to record their use.

The results were statistically evaluated using the Mann-Whitney U test. A p value of <0.05 was considered significant.

RESULTS

There were no significant differences between groups on the use of oral analgesics. The control and the bupivacaine groups consumed 10 tablets each; the prilocaine group consumed 13 tablets. None of the patients consumed more than two tablets.

At the first evaluation, mean VAS scores were 1.12 in the bupivacaine group, 3.78 in the control group, and 3.01 in the prilocaine group.

There was no difference between groups at 6 h, but the mean scores were lower in the bupivacaine group at 12 and 24 h (Table 2).

The differences were not calculated as statistically significant but were in the range of $p > 0.054$ and $p < 0.07$ between bupivacaine and the other groups at the first VAS value and at 12 and 24 h; $p > 0.07$ at 6 h.

DISCUSSION

Local anesthetics are frequently applied for arthroscopy (1). The increase in knowledge of its pharmacokinetics, evaluation for postoperative analgesia led to various studies (2–4).

The use of morphine for postoperative local analgesia has led to mixed results. Joshi (5) has reported morphine to be effective, with low serum levels delineating a peripheral morphine receptor, but his study was not reproducible (6,7).

For this reason the use of local anesthetics in the knee joint has been considered, supported by the superior results obtained with bupivacaine in a trial against morphine (7). These studies failed to demonstrate the superior effects of bupivacaine (3), but showed reduced analgesic consumption (4).

Studies on pharmacokinetics have shown a very rapid absorption of prilocaine and a sudden peak in serum level (2). We think that bupivacaine will have similar pharmacokinetics with longer resorption time.

We have performed our study between three groups in order to assess the effectiveness of short- and long-acting local anesthetics and whether there was any superiority against a control group. We have found the long-acting bupivacaine not to be superior to prilocaine or the control group. There were no statistically significant differences between the three groups.

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