Research Article
Open Access
CrossMark

The effect of Paracetamol addition on Lidocaine and Prilocaine in intravenous regional anesthesia

Abstract

Background and aim: This study aimed to investigate the effect of paracetamol added as an adjuvant to intravenous regional anesthesia (IVRA) with lidocaine and prilocaine on patient satisfaction in patients applying for hand and forearm surgery.

Materials and methods: This study was approved by the Ethical Committee of KTU Medical Faculty. After obtaining written informed consent 46 patients between the ages of 18-65, ASA 1-2 physical status undergoing hand and forearm surgery were included in this study.

Patients were divided into 2 groups: Group Control (n=23) and Group Paracetamol (n=23). Group C was administered intravenous regional anesthesia (IVRA) with 1.5 mg/kg 1% of lidocaine and 1.5 mg/kg 1% of prilocaine. Group P was administered IVRA with the same local anesthetics and 1 mg/kg paracetamol. The study solutions were completed to 40 ml with saline. Mann-Whitney U test is used for numeric parameters without normal distribution and the student's t test is used for numeric parameters with normal distribution. Q square was used for ordinal parameters. A p value <0.05 is regarded as statistically significant.

Demographic data, onset recovery of motor and sensorial block, durations of tourniquet and operation, VAS values, analgesic requirements, and patient satisfaction were recorded.

Results: There was no significant difference between the groups in terms of demographics, onset and recovery of motor and sensory block times, duration of operation, duration of tourniquet, VAS values analgesic requirements ($p>0.05$).

Patient satisfaction was higher in Group P when compared with Group C ($p<0.01$).

Conclusion: We conclude that the addition of 1 mg/kg paracetamol into the mixture of lidocaine and prilocaine in IVRA may improve patient satisfaction.

Keywords: Intravenous Regional Anesthesia (IVRA), paracetamol, patient satisfaction

Volume 16 Issue 6 - 2024

Ahmet Eroglu, Mehmet Ali Özer
Anesthesiology and Reanmation, Karadeniz Technical University, Turkey

Correspondence: Ahmet Eroglu, Anesthesiology and Reanmation, Karadeniz Technical University, Turkey, Tel +904623775900, Email aheroglu@hotmail.com

Received: December 12, 2024 | **Published:** December 26 2024

Introduction

Intravenous regional anesthesia (IVRA) is widely used in hand and forearm surgeries in patients with a high risk of general anesthesia or in patients who do not want general anesthesia. IVRA provides a bloodless surgical field, rapid onset of anesthesia, rapid recovery period less need for postoperative analgesia. Lidocaine and prilocaine are used as local anesthetics for safe and rapid onset in IVRA. Studies have reported that the addition of analgesics to local anesthetics provides some advantages in IVRA.[1-5] This study aims to investigate the effect of paracetamol added as an adjuvant to intravenous regional anesthesia (IVRA) with a mixture of lidocaine and prilocaine on the block, analgesic need and patient satisfaction in patients applying for hand and forearm surgery.

Materials and methods

After approval was obtained from the KTU Medical Faculty ethics committee, 46 patients aged between 18 and 65 years who would undergo hand and forearm surgery were included in the study. Among the patients examined at the anesthesia outpatient clinic, patients with ASA physical status I and II who came for hand and forearm operations were included in the study. Exclusion criteria included patients who received analgesic treatment within the last 24 hours, those who were allergic to study drugs, those who had neurological deficits in the upper extremity, and those who had any contraindications to IVRA.

Patients were divided into 2 groups: Group Control (n=23) and Group Paracetamol (n=23). Group C was administered intravenous regional anesthesia (IVRA) with 1.5 mg/kg 1% of lidocaine and 1.5 mg/kg 1% of prilocaine. Group P was administered IVRA with the same of (omit of) local anesthetics and 1 mg/kg paracetamol (Perfalgan 1000 mg/100 ml). The study solutions were completed to 40 ml with saline. Demographic data, heart rates, arterial blood pressures, onset and recovery of motor and sensorial block, durations of tourniquet and operation, VAS values, analgesic requirements, and patient satisfaction were recorded. The tourniquet pressure was maintained at 100-150 mmHg above systolic blood pressure or around 250-300 mmHg. Sensory block was assessed with a pinprick test, and the motor block was assessed with the Modified Bromage Scale. The tourniquet was not deflated before 40 minutes or after 1 hour. Sensory block and motor block termination were measured after the tourniquet was deflated.

Pain scores were measured and recorded with a Numeric Analog Scale (NAS) ranging from 1 to 10 as before the tourniquet, when the tourniquet was inflated, when the surgery started, at 10 and 30 minutes after surgery, when the tourniquet was deflated, 10 and 30 minutes after the tourniquet was deflated, and 2 hours postoperatively. Patient satisfaction was also evaluated with a Visual Analogue Scale (VAS) from 1 to 10. If VAS values were above 3, 500 mg oral parol was used as a rescue analgesic. 50 mg contramal was added when necessary. All side effects that developed were recorded and treated.

In a power analysis, a VAS 1 difference in patient satisfaction scores between the two groups was determined as the primary endpoint. When alpha error was taken as 5% and beta error was 10%, when the standard deviations were SD1 0.8 and SD2 1.2, it was calculated that at least 22 patients in each group should be included to determine 1 difference between the two groups. Mann-Whitney U test is used for numeric parameters without normal distribution and student's t test is used for numeric parameters with normal distribution. Q square was used for ordinal parameters. A p value <0.05 is regarded as statistically significant.

Results

There was no statistical difference between the two groups in terms of age, height, weight, body MASS index, gender, ASA status, surgical time tourniquet time (Figure 1) (Tables 1-4).

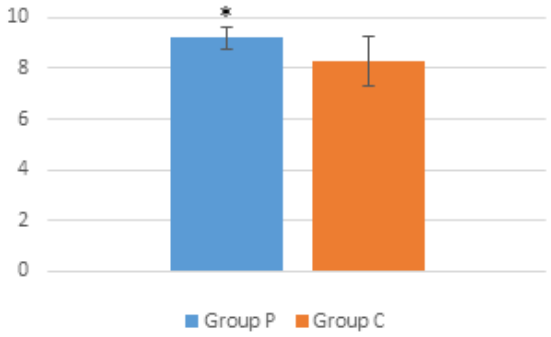

Figure 1 Comparison of the patient satisfaction scores of two groups.

*P < 0,01

Table 1 Comparison of demographics, surgery tourniquet times of both groups

	Group C (n=23)	Group P (n=23)	p
Age (year)	46,2±12	51.4±13	0,165
Height (cm)	169,7±10	167,2±9	0,377
Weight (kg)	87,3±17	78,8±12	0,056
BMI (kg/m2)	30,3±6	28,2±4	0,169
Gender (F/M)	11/13	10/14	0,56
ASA-I	7	6	
ASA-II	16	17	
Surgical time (min)	39,2±8	40,4±9	0,635
Tourniquet time (min)	53,4±9	56,2±10	0,323

Table 2 Types of surgical procedures performed

	Group C (n=23)	Group P (n=23)
Trigger finger	9	8
Carpal tunnel syndrome	6	7
Tendon release	4	6
Cyst excision	4	2

Table 3 Sensory and motor block onset and termination times of both groups

	Group C (n=23)	Group P (n=23)	p
Sensory block onset time (sec)	284±92	296±102	0,677
Sensory block termination time (sec)	260±102	250±110	0,750
Motor block onset time (sec)	580±263	605±160	0,698
Motor block termination time (sec)	280±140	266±190	0,777

Table 4 Comparison of the patient Visual Analogue Scale (VAS) scores of two groups

	Group C (n=23)	Group P (n=23)	p
Before tourniquet	0±0,3	0±0,3	1,0
Tourniquet inflated	1,5±1,5	1±1	0,190
surgery started	2,2±1.5	2,0±1,7	0,674
surgery started 10 min	2,1±1,5	1,8±1,2	0,457
surgery started 30 min	3,4±1,8	3,2±1,7	0,700
Tourniquet deflated	1,4±1,2	1,2±1,2	0,574
Tourniquet deflated 10 min	2,6±1,6	2,4±1,5	0,664
tourniquet deflated 30 min	2,4±1,5	2,2±1,4	0,642
Postoperative 2 h	2,5±1,7	2,3±1,7	0,691

Discussion

In this study, it was observed that paracetamol at a dose of 1 mg/kg added to the intravenous regional anesthesia solution made with a mixture of lidocaine and prilocaine in hand and forearm surgeries increased patient satisfaction. In IVRA, paracetamol additions have been used in many studies for reasons such as shortening the onset of sensory and motor blockade, accelerating recovery, providing intraoperative analgesia, and reducing the amount of rescue analgesic consumption. Sen et al.[6] reported that the addition of 300 mg paracetamol in IVRA performed with 3 mg/kg lidocaine reduced tourniquet pain, improved the quality of anesthesia, and reduced postoperative analgesic consumption. However, in this study, it was observed that the addition of paracetamol did not make a difference in the onset of sensory and motor block compared to the control group.

In the study of Ko et al.,[7] it was reported that the addition of 300 mg paracetamol in IVRA with 40 ml of 0.5% lidocaine shortened the onset of sensory block, delayed the onset of tourniquet pain, and reduced postoperative analgesic consumption. In Akdogan and Eroglu's[8] study, 3 mg/kg paracetamol and 50 mg dexketoprofen added as adjuvants were compared in a total of 40 ml IVRA performed with 3 mg/kg 2% lidocaine. In this study, there was no difference in the onset and termination times of sensory block between the paracetamol and dexketoprofen groups. In addition, there was no difference between the paracetamol and dexketoprofen groups in terms of intraoperative and postoperative VAS values.

We could not find any study investigating the effect of adding paracetamol as an adjuvant in IVRA on patient satisfaction. In our study, we observed that the addition of paracetamol increased patient satisfaction in IVRA performed with a mixture of lidocaine and prilocaine. The results of a study reported that the addition of 50 mg ketamine in IVRA performed with 3 mg/kg lidocaine improved

Citation: Eroglu A, Özer MA. The effect of Paracetamol addition on Lidocaine and Prilocaine in intravenous regional anesthesia. *J Anesth Crit Care Open Access.* 2024;16(6):1–6. DOI: 10.15406/jaccoa.2024.16.00610

patient satisfaction without causing side effects.[9] In another study, patient satisfaction was recorded to be high and comparable for IVRA with 300 mg lidocaine and axillary block with 280 mg mepivacaine in patients applying for ambulatory hand surgery.[10]

Conclusion

As a result, the addition of paracetamol to IVRA performed with a mixture of lidocaine and prilocaine does not have a significant effect on block and analgesia in patients applying for hand and forearm surgery, but it increases patient satisfaction.

Acknowledgments

None.

Conflicts of interest

None.

References

1. Reuben SS, Steinberg RB, Kreitzer JM, et al. Intravenous regional anesthesia using lidocaine and ketorolac. *Anesth Analg.* 1995;81(1):110–113.
2. Simon MA, Gielen MJ, Alberink N, et al. Intravenous regional anesthesia with 0.5% articaine, 0.5% lidocaine, or 0.5% prilocaine. A double–blind randomized clinical study. *Reg Anesth.* 1997;22(1):29–34.
3. Pitkänen MT, Xu M, Haasio J, et al. Comparison of 0.5% articaine and 0.5% prilocaine in intravenous regional anesthesia of the arm: a cross–over study in volunteers. *Reg Anesth Pain Med.* 1999;24(2):131–135.
4. Niemi TT, Neuvonen PJ, Rosenberg PH. Comparison of ropivacaine 2 mg/ml and prilocaine 5 mg/ml for i.v. regional anaesthesia in outpatient surgery. *Br J Anaesth.* 2006;96(5):640–644.
5. Eroglu A. Regional Anesthesia Techniques in Orthopedic Surgery. *J Anesth Crit Care Open Access.* 2016;5(2): 00182.
6. Sen H, Kulahci Y, Bicerer E, et al. The analgesic effect of paracetamol when added to lidocaine for intravenous regional anesthesia. *Anesth Analg.* 2009;109(4):1327–1330.
7. Ko MJ, Lee JH, Cheong SH, et al. Comparison of the effects of acetaminophen to ketorolac when added to lidocaine for intravenous regional anesthesia. *Korean J Anesthesiol.* 2010;58(4):357–361.
8. Akdogan A, Eroglu A. Comparison of the effect of lidocaine adding dexketoprofen and paracetamol in intravenous regional anesthesia. *Biomed Res Int.* 2014;2014:938108.
9. Abdel–Ghaffar HS, Kalefa MA, Imbaby AS. Efficacy of ketamine as an adjunct to lidocaine in intravenous regional anesthesia. *Reg Anesth Pain Med.* 2014;39(5):418–422.
10. Teunkens A, Vermeulen K, Belmans A, et al. Patient satisfaction with intravenous regional anaesthesia or an axillary block for minor ambulatory hand surgery: A randomised controlled study. *Eur J Anaesthesiol.* 2020;37(10):847–856.