

## Original Research

### Ropivacaine versus lignocaine with adrenaline for implant surgery anesthesia

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#### ABSTRACT:

**Background:** There has been continuous research to find the ideal local anesthetic solution with a prolonged duration of action, good postoperative analgesia, and low toxicity. The present study compared ropivacaine and lignocaine with adrenaline for implant surgery anesthesia. **Materials & Methods:** 86 patients elected for implant surgery in posterior mandible of both genders were divided into 2 groups. Group I comprised 43 implant surgeries in which lignocaine with adrenaline was used on one side (control group). Group II included 43 implant surgeries in which ropivacaine was used on the other side (test group). 0.5 mL of 0.75% ropivacaine was intradermally infiltrated. Pain score assessment was recorded before injecting the drugs, at intervals of 30 min, 1, 3, 6, 9, and 12 hours immediately after surgery and on the first and second days postoperatively. Other parameters studied were amount of LA, duration of surgery and quality of anaesthesia. **Results:** There were 42 males and 44 females. Age group 20-30 years had 28, 30-40 years had 34 and >40 years had 24 patients. The mean LA volume required was 3.20 ml in group I and 3.12 ml in group II. Duration of surgery was 71.2 minutes in group I and 70.8 minutes in group II and quality of anesthesia was 210.4 in group I and 386.2 in group II. The mean pain score at baseline in group I and II was 3.80 and 3.26, at 30 minutes was 2.98 and 2.45, at 1 hour was 2.65 and 1.76, at 3 hours was 2.15 and 1.36, at 6 hours was 1.28 and 0.85, at 12 hours was 0.80 and 0.34, at 1 day was 0.28 and 0.09 and at 2 days was 0.0 in both groups. **Conclusion:** Ropivacaine 0.75% can be used as an alternative to lignocaine in implant surgeries as it provided longer duration of anaesthesia.

**Key words:** lignocaine, Ropivacaine, implant surgery

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#### INTRODUCTION

The clinical application of local anesthetics marked the beginning of a new era in clinical dentistry, providing patient comfort and acceptance for extensive and invasive dental procedures. Local anesthetics (LA) provide reversible anesthesia and analgesia during surgery or for the management of other acute and chronic pain conditions that last for a few hours.<sup>1</sup> Lignocaine is perhaps the most commonly used local anesthetic agent; it is used either in local or regional anesthesia or epidural or spinal blockade.<sup>2</sup> Nonetheless, epinephrine containing local anesthetic solution is contraindicated in hyperthyroidism and significant cardiovascular diseases (American Society of Anesthesiologists physical status grade 3-4).<sup>3</sup> Furthermore, adding vasoconstrictor reduces the pH of the solution (acidic), rendering the injections

uncomfortable to the patients. Hence, search for a long-acting local anesthetic agent with inherent vasoconstrictive property still endures.<sup>4</sup>

There has been continuous research to find the ideal local anesthetic solution with a prolonged duration of action, good postoperative analgesia, and low toxicity.<sup>5</sup> The duration of action of a local anesthetic is dependent on two factors: protein binding and redistribution of the local anesthetic. introduced in 1996 and was found suitable for peripheral nerve blocks in the medical field. Limited data are available concerning the dental use of ropivacaine.<sup>6</sup> The present study compared ropivacaine and lignocaine with adrenaline for implant surgery anesthesia.

**MATERIALS & METHODS**

This prospective study consisted of 86 patients elected for implant surgery in posterior mandible of both genders. All were enrolled with the written consent. Those did wish or not giving consent were excluded. Data of each patient was entered in case history sheet. Patients were divided into 2 groups. Group I comprised 43 implant surgeries in which lignocaine with adrenaline was used on one side (control group). Group II included 43 implant surgeries in which

ropivacaine was used on the other side (test group). 0.5 mL of 0.75% ropivacaine was intradermally infiltrated. Pain score assessment was recorded before injecting the drugs, at intervals of 30 min, 1, 3, 6, 9, and 12 hours immediately after surgery and on the first and second days postoperatively. Other parameters studied were amount of LA, duration of surgery and quality of anaesthesia. Results were studied statistically. P value was set significant at 0.05.

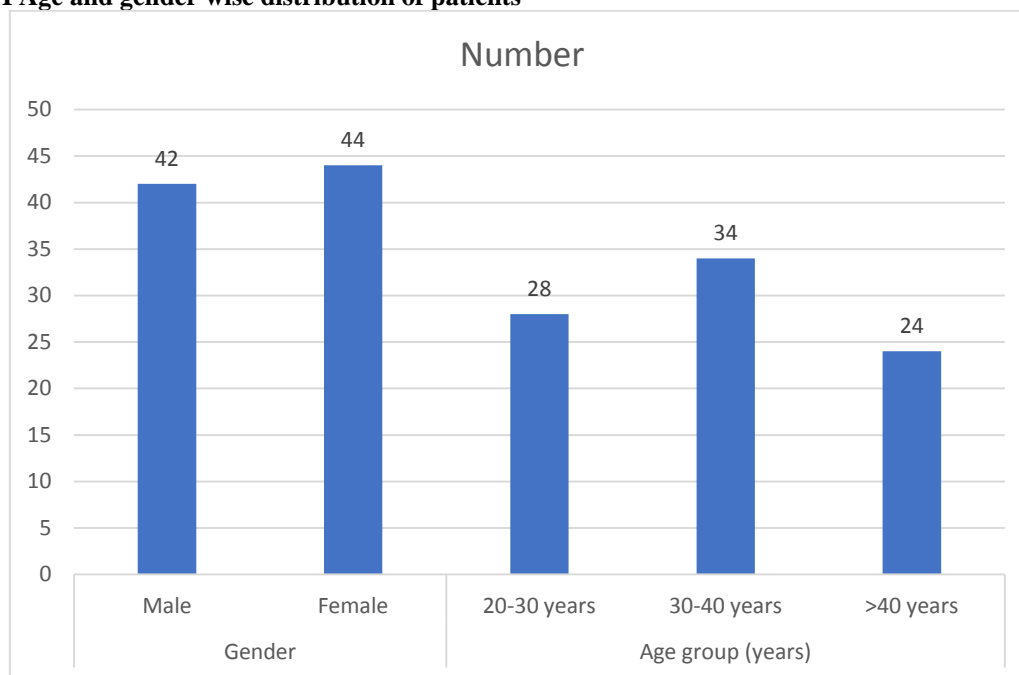
**RESULTS**

**Table I Age and gender wise distribution of patients**

Parameters	Variable	Number	P value
Gender	Male	42	0.86
	Female	44	
Age group (years)	20-30 years	28	0.03
	30-40 years	34	
	>40 years	24	

Table I, graph I shows that there were 42 males and 44 females. Age group 20-30 years had 28, 30-40 years had 34 and >40 years had 24 patients. The difference was significant (P< 0.05).

**Graph I Age and gender wise distribution of patients**

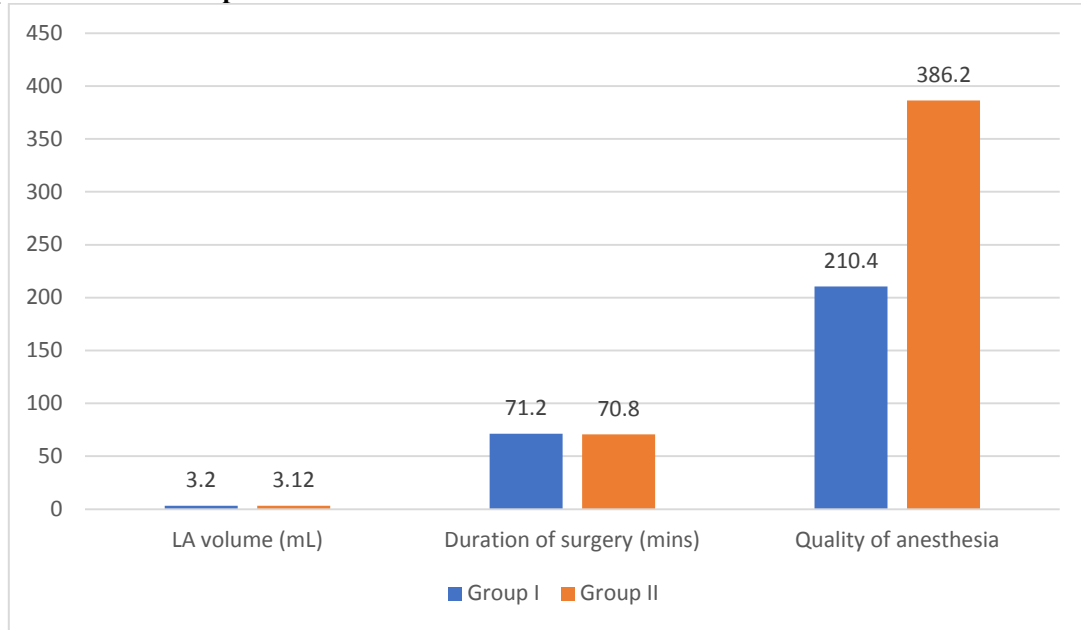


**Table II Assessment of parameters**

Parameters	Group I	Group II	P value
LA volume (mL)	3.20	3.12	0.95
Duration of surgery (mins)	71.2	70.8	0.80
Quality of anesthesia	210.4	386.2	0.01

Table II, graph II shows that mean LA volume required was 3.20 ml in group I and 3.12 ml in group II. Duration of surgery was 71.2 minutes in group I and 70.8 minutes in group II and quality of anesthesia was 210.4 in group I and 386.2 in group II. The difference was significant (P< 0.05).

**Graph II Assessment of parameters**

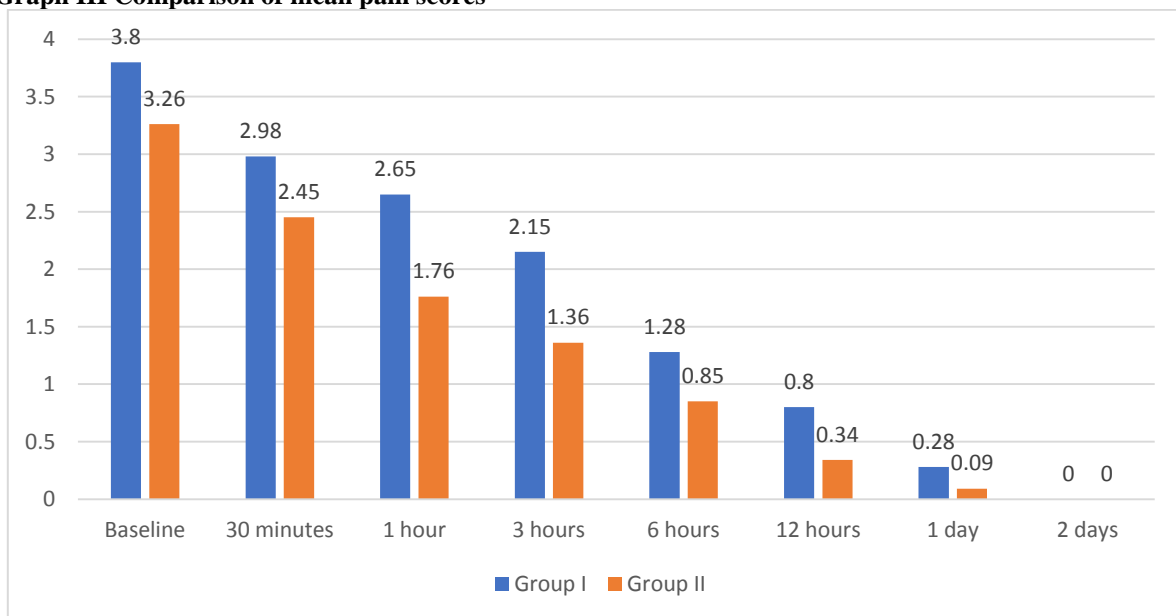


**Table III Comparison of mean pain scores**

Duration	Group I	Group II	P value
Baseline	3.80	3.26	0.93
30 minutes	2.98	2.45	0.81
1 hour	2.65	1.76	0.01
3 hours	2.15	1.36	0.03
6 hours	1.28	0.85	0.04
12 hours	0.80	0.34	0.02
1 day	0.28	0.09	0.05
2 days	0.0	0.0	1

Table III, graph III shows that mean pain score at baseline in group I and II was 3.80 and 3.26, at 30 minutes was 2.98 and 2.45, at 1 hour was 2.65 and 1.76, at 3 hours was 2.15 and 1.36, at 6 hours was 1.28 and 0.85, at 12 hours was 0.80 and 0.34, at 1 day was 0.28 and 0.09 and at 2 days was 0.0 in both groups. The difference was significant ( $P < 0.05$ ).

**Graph III Comparison of mean pain scores**



## DISCUSSION

Ropivacaine is a newer amide long-acting local anesthetic with chemical similarity to bupivacaine and mepivacaine.<sup>7</sup> Ropivacaine belongs to pipercoloxylidide group of local anesthetics.<sup>8</sup> Chemically ropivacaine is the monohydrate of the hydrochloride salt of 1-propyl-20, 60 - pipercoloxylidide. Ropivacaine is available as an enantiomerically pure form (S-enantiomer), contrasting to bupivacaine which is a racemic mixture of (R)- and (S)-enantiomers.<sup>9</sup> There are reports supporting the use of ropivacaine as a long acting local anesthetic in oral and maxillofacial surgical procedures requiring surgical anaesthesia and post-operative analgesia.<sup>10,11</sup> The present study compared ropivacaine and lignocaine with adrenaline for implant surgery anaesthesia.

In present study, there were 42 males and 44 females. Age group 20-30 years had 28, 30-40 years had 34 and >40 years had 24 patients. Kalath et al<sup>12</sup> in their study fifteen healthy patients (ASA 1) with bilateral partial edentulism indicated for implant placement were randomly selected from both sexes (male and female) aged 20–60 years. Group I (control group) comprised 15 implant surgeries in which lignocaine with adrenaline was used on one side. Group II (test group) included 15 implant surgeries in which ropivacaine was used on the other side. The duration of anesthesia was significantly higher in the test group than in the control group. Ropivacaine was found to be superior to lignocaine in terms of the quality of anesthesia. The comparison of mean visual analog scale scores showed ropivacaine to have better anesthetic and analgesic effects than the control group.

We found that mean LA volume required was 3.20 ml in group I and 3.12 ml in group II. Duration of surgery was 71.2 minutes in group I and 70.8 minutes in group II and quality of anesthesia was 210.4 in group I and 386.2 in group II. Bhargava et al<sup>13</sup> assessed the efficacy of 0.5 and 0.75 % ropivacaine for inferior alveolar nerve block in surgical extraction of impacted mandibular third molars. A total of 60 procedures were performed, of which thirty patients received 0.5 % and thirty received 0.75 % concentration of the study drug. All the patients in both the study groups reported subjective numbness of lip and tongue. The time of onset was longer for 0.5 % ropivacaine when compared to 0.75 % solution. 90 % of the study patients in 0.5 % ropivacaine group reported pain corresponding to VAS C3 during bone guttering and 93.3 % patients reported pain corresponding to VAS [4 during tooth elevation. None of the patients in 0.75 % ropivacaine group reported VAS [3 at any stage of the surgical procedure. The duration of soft tissue anesthesia recorded with 0.75 % ropivacaine was average  $287.57 \pm 42.0$  minutes.

We observed that mean pain score at baseline in group I and II was 3.80 and 3.26, at 30 minutes was 2.98 and 2.45, at 1 hour was 2.65 and 1.76, at 3 hours was 2.15

and 1.36, at 6 hours was 1.28 and 0.85, at 12 hours was 0.80 and 0.34, at 1 day was 0.28 and 0.09 and at 2 days was 0.0 in both groups. Ranjan et al<sup>14</sup> in their study 20 patients were divided into two groups according to the right and left sides of patient – side A and side B. The side, where 0.75% ropivacaine was to be administered, was randomly selected by flip coin method. Then, the pterygomandibular and long buccal nerve blocks were administered with 0.75% ropivacaine and necessary dental extraction was performed. After 1 week, the same procedure was repeated using 2% lidocaine hydrochloride with 1:200,000 adrenaline. The mean onset of action for solution A was  $7.15 \pm 4.934$  min and for solution B was  $9.75 \pm 5.128$  min. This was statistically significant. The mean duration of action, pain on injection, and pain during extraction were not significant.

## CONCLUSION

Authors found that ropivacaine 0.75% can be used as an alternative to lignocaine in implant surgeries as it provided longer duration of anaesthesia.

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