

ORIGINAL RESEARCH

Assessment Of Efficacy Of Lignocaine, Ropivacaine, And Bupivacaine In Control Of Pain During Extraction Of Mandibular Posterior Teeth

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ABSTRACT:

Background: Intraoperative pain control by means of local anesthesia is an intrinsic part of clinical practice in oral surgery. The present study compared efficacy of lignocaine, ropivacaine, and bupivacaine in control of pain during extraction of mandibular posterior teeth.

Materials & Methods: 90 patients of mandibular third molar surgical extractions of both genders were divided into 3 groups. Group I was third molar surgeries performed using 2% lignocaine with 1: 80,000 epinephrine, group II underwent surgical extractions of mandibular third molars under 0.75% ropivacaine local anesthesia. Group III were given bupivacaine. Each group has 30 patients. Subject response for pain was recorded using visual Analog Scale (VAS) and verbal Rating scale (VRS).

Results: Group I had 16 males and 14 females, group II had 15 males and 15 females and group III had 13 males and 17 females. VAS showed no pain in 20, 25 and 22, minimal pain in 10, 5 and 8. VRS showed little pain in 18, 28 and 20, moderate pain in 9, 2 and 10, severe pain in 2 and extreme pain in 1 respectively. The difference was significant ($P < 0.05$).

Conclusion: 0.75% ropivacaine is a better anesthetic when compared to bupivacaine and lignocaine for pain control during third molar extractions.

Key words: ropivacaine, local anesthesia, visual Analog Scale

Introduction

Intraoperative pain control by means of local anesthesia is an intrinsic part of clinical practice in oral surgery. The management of a patient's postoperative pain after ambulatory surgery of impacted wisdom teeth under local anesthesia is one of the essential goals in the overall treatment of patients with impacted teeth. This is because the third molar extraction of wisdom teeth is a very common surgical procedure, with frequent moderate or severe postoperative pain in terms of its intensity.¹ Local anesthesia is definable as the "temporary loss of any sensation or that of pain in any part of a body which is produced by applying or injecting an anesthetic drug or agent which aids in causation of depression of consciousness level." Lignocaine is most widely used local anesthetic agent.²

Bupivacaine was first synthesized by B af Ekenstam. It is a long-acting amide-type local anesthetic which was first introduced for clinical usage in 1963. It has longer duration of

action compared to lignocaine due to higher lipid solubility and protein-binding capability. Its onset of action varies between 1 to 10 min. It has the duration of action that lasts up to 2–9 hours. It has half-life duration of approximately 2.7 hours.³

Ropivacaine is a long-acting amide local anesthetic agent. It is a physicochemical properties similar to that of bupivacaine.⁴ It is 1'-propyl-2',6'-piperidoxylidide structurally and is medium to long duration acting local anesthetic of the class-amino amide. It is a pure S-enantiomer when compared to other local anesthetics which are racemic mixtures.⁵ The present study compared efficacy of lignocaine, ropivacaine, and bupivacaine in control of pain during extraction of mandibular posterior teeth.

Materials & Methods

The present study comprised of 90 patients of mandibular third molar surgical extractions of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Group I was third molar surgeries performed using 2% lignocaine with 1: 80,000 epinephrine, group II underwent surgical extractions of mandibular third molars under 0.75% ropivacaine local anesthesia. Group III were given bupivacaine. Each group has 30 patients. Subject response for pain was recorded using visual Analog Scale (VAS) and verbal Rating scale (VRS). Postoperative pain was analyzed using the assessment of analgesic used. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

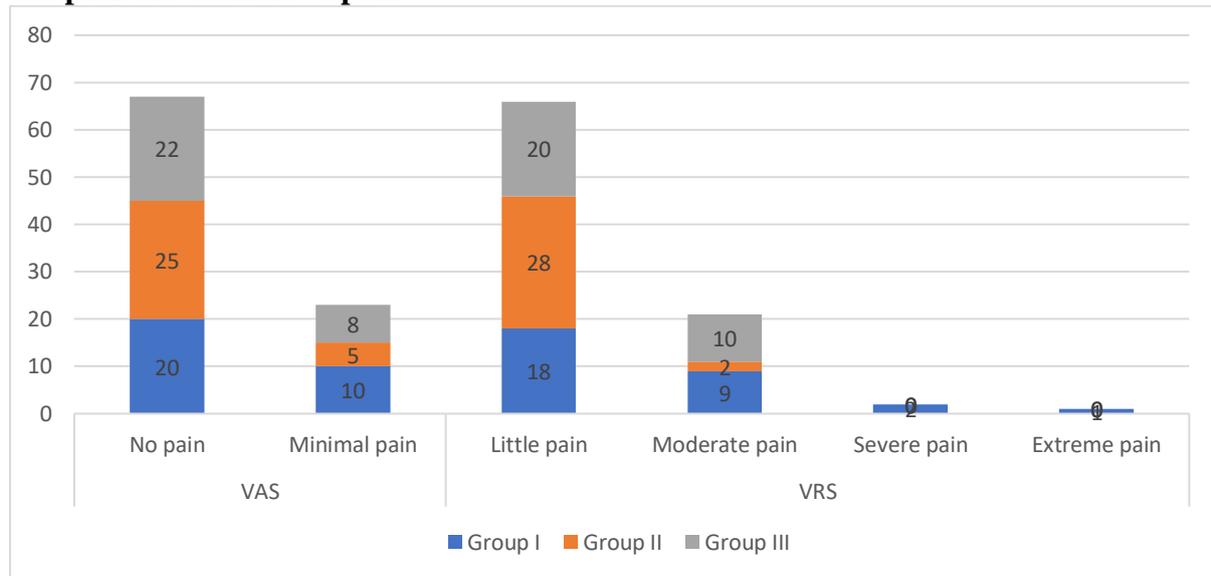
Groups	Group I	Group II	Group III
Agent	lignocaine with 1: 100,000 epinephrine	0.75% ropivacaine	bupivacaine
M:F	16:14	15:15	13:17

Table I shows that group I had 16 males and 14 females, group II had 15 males and 15 females and group III had 13 males and 17 females.

Table II Assessment of pain

Parameters	Variables	Group I	Group II	Group III	P value
VAS	No pain	20	25	22	0.05
	Minimal pain	10	5	8	
VRS	Little pain	18	28	20	0.04
	Moderate pain	9	2	10	
	Severe pain	2	0	0	
	Extreme pain	1	0	0	

Table II, graph I shows that VAS showed no pain in 20, 25 and 22, minimal pain in 10, 5 and 8. VRS showed little pain in 18, 28 and 20, moderate pain in 9, 2 and 10, severe pain in 2 and extreme pain in 1 respectively. The difference was significant (P < 0.05).

Graph I: Assessment of pain

Discussion

Pain is an unpleasant sensation which has led to devising many pharmacological as well nonpharmacological methods of controlling it. For this, in dental and oral surgical procedures, the use of a variety of local anesthetics has been implicated.⁶ Thus, the contribution of a variety of local anesthetics in the field of dentistry is immense as nearly all branches in dentistry and medicine field make use of them.⁷ For this purpose, these local anesthetic agents have evolved through various synthesized molecules along with various advancements in techniques for pain free treatment.^{8,9} The present study compared efficacy of lignocaine, ropivacaine, and bupivacaine in control of pain during extraction of mandibular posterior teeth.

We found that group I had 16 males and 14 females, group II had 15 males and 15 females and group III had 13 males and 17 females. Nazeer et al¹⁰ compared the efficacy of 2% lignocaine with 1:80,000 adrenaline, 0.75% ropivacaine and bupivacaine in pain control during extraction of mandibular posterior teeth. On analysis of visual analog scale (VAS), it was observed that in Group I (2% Lignocaine with 1:80,000), no pain during the extraction procedure was demonstrated in 30 study participants while minimal or less pain was present in 70 patients, while in Group II (0.75% ropivacaine), 90 patients presented with no pain while ten patients had presented with minimal amount of pain during tooth extraction. While on the other hand, Group III patients whose mandibular third molars were extracted using local anesthesia by injecting bupivacaine, lack of any pain was observed in 69 patients while minimal pain was noted in 31 individuals. While making statistical comparison between three groups, a significant $P = 0.03$ was observed. Also, postoperative pain was noted in 60% of cases who underwent extraction using 2% lignocaine (Group I), 10% patients who had third molar extractions under Bupivacaine anesthesia presented with pain whereas none of the patients (0%), demonstrated the presence of pain following third molar extraction.

We found that VAS showed no pain in 20, 25 and 22, minimal pain in 10, 5 and 8. VRS showed little pain in 18, 28 and 20, moderate pain in 9, 2 and 10, severe pain in 2 and extreme pain in 1 respectively. Tjanic M¹¹ evaluated the anesthetic potencies between ropivacaine and bupivacaine in the surgery of mandibular horizontally impacted teeth. After mandibular conduction anesthesia of 0.75% ropivacaine in group I, 0.5% bupivacaine in group II, and 2% lidocaine with 1:100000 epinephrine in group III, the following anesthetics

variables were measured: quality of anesthesia score (QAS), success rate of local anesthesia (SLA), onset time of anesthesia (OT), duration of anesthesia (DA), intensity of intraoperative pain (IIP) (VAS scale in mm). Blood pressure, and pulse were measured. Ninety patients, divided into three equal groups, were enrolled for the study. Ropivacaine gained statistically significant variables: QAS of 1.77 ± 0.68 and IIP was 18.90 ± 6.11 mm ($p < 0.05$). The SLA of the achieved local anesthesia was 96.6%, 93.3% and, 86.6% for ropivacaine, lidocaine with epinephrine 1:100000, and bupivacaine groups, respectively. OT was 151.50 ± 80.93 , 168.27 ± 79.73 , and 89.80 ± 27.91 sec, for groups I, II and III, respectively. The DA for ropivacaine was 412.17 ± 110.04 min, while the one for bupivacaine and lidocaine with epinephrine 1:100000 was 376.30 ± 98.51 min., and 216.13 ± 47.69 min., respectively. Hemodynamic parameters were insignificant to cause side effects.

El-Sharrawy, Yagiela et al¹² found that the higher concentration of 0.75% ropivacaine could be contributed to better local anesthetic effects, owing to the physiochemical properties of ropivacaine, even though there is evidence that 0.5% ropivacaine is of the same potency as the one of 0.75%, and yields the same final clinical results, but with a greater overall anesthetic efficiency than 0.5% bupivacaine.

The limitation the study is small sample size.

Conclusion

Authors found that 0.75% ropivacaine is a better anesthetic when compared to bupivacaine and lignocaine for pain control during third molar extractions.

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