

Original Research Article

# Effect of premedication with aceclofenac and ibuprofen on the success rate of two different local anesthetic agents in irreversible pulpitis cases of maxillary posterior teeth (a prospective randomized double-blind clinical trial)


Imrana Tasneem<sup>1</sup>, B.R. Bharat<sup>2\*</sup>, Murari Uday Kumar<sup>3</sup>, Srirekha A<sup>4</sup>

<sup>1</sup>Consultant Endodontist, Siddipet, Telangana State, India

<sup>2,3</sup>Senior Lecturer, MNR Dental College, Sangareddy, India

<sup>4</sup>HOD, Dept. of Endodontics, Oxford Dental College, Bangalore, India

\*Corresponding author email: [bharattheknight@gmail.com](mailto:bharattheknight@gmail.com)

	International Archives of Integrated Medicine, Vol. 6, Issue 5, May, 2019. Copy right © 2019, IAIM, All Rights Reserved. Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a> ISSN: 2394-0026 (P)                      ISSN: 2394-0034 (O)	
	Received on: 03-04-2019 Source of support: Nil	Accepted on: 20-04-2019 Conflict of interest: None declared.
<b>How to cite this article:</b> Imrana Tasneem, B.R. Bharat, Murari Uday Kumar, Srirekha A. Effect of premedication with aceclofenac and ibuprofen on the success rate of two different local anesthetic agents in irreversible pulpitis cases of maxillary posterior teeth (a prospective randomized double-blind clinical trial). IAIM, 2019; 6(5): 40-45.		

## Abstract

A double blind, randomized controlled clinical trial was done to investigate the effect of analgesics aceclofenac and ibuprofen in reducing pre-operative pain following local anesthesia with lidocaine and articaine. One hundred and twenty patients with irreversible pulpitis of the maxillary premolars and first molar region were randomly divided into 2 groups with group 1, 2% lidocaine with 1:200000 epinephrine and group 2, 4% articaine with 1:100000 epinephrine. The two groups were again subdivided into 3 subgroups in which patients were given identical capsules containing ibuprofen 600 mg, aceclofenac 100 mg, placebo (vitamin tablets), half an hour before the administration of buccal infiltration anesthesia. Patients indicated their pain scores on a Heft Parker Visual analog scale (VAS). Infiltration anaesthesia was given under sterile condition. 1 min after the injection, electric

pulp test and cold test were done and testing was repeated after every 2 minutes for a total of 10 minutes. Premedication with ibuprofen (600 mg) and aceclofenac (100 mg) resulted in statistically significant increase in onset of action for both the anesthetic agents. There was no significant difference in the time of onset of anesthesia between the two local anesthetic solution (chi-square test/ One way ANOVA).

## Key words

Local anesthesia, Lidocaine, Articaine, Infiltration anesthesia, Irreversible pulpitis, Non-steroidal anti-inflammatory drugs.

## Introduction

According to a survey by the American Dental Association, fear of pain is the greatest factor that prevents patients from visiting their dentists [1]. In patients with irreversible pulpitis the pain is excruciatingly severe, sharp and stabbing in character [2]. The pain is partly due to the pressure on the irritated nerve endings by inflammatory infiltrate within the rigid pulp chamber and partly due to release of pain-producing substances from the damaged tissue [3]. Nerves arising from inflamed tissues have altered resting potentials and decreased excitability thresholds. Hence adequate local anesthesia is essential for successful patient management in endodontic therapy.

The initial amide local anaesthetic, lidocaine, is most popularly used for pain control in dentistry worldwide [4]. But articaine was introduced as a better alternative to lidocaine [5, 6]. Studies have shown that use of preoperative analgesia with Non-Steroidal Anti Inflammatory Drugs (NSAIDs) increases the success of infiltration anaesthesia in irreversible pulpitis [7]. It is hypothesized that premedication with these drugs will affect the success rate of local anaesthesia in patients with irreversible pulpitis by reducing nociceptor activation [8, 9].

Pain is subjective and experienced differently by each individual, for this purpose many tools are there to assess pain. In this study the parameters to assess pain intensity was VAS. Hence, this study aims to compare the efficacy of premedication with ibuprofen (600 mg) and

aceclofenac (100 mg) on the success rate of two different local anesthetic agents (2% lidocaine and 4% articaine) in cases of irreversible pulpitis in maxillary posterior teeth.

## Materials and methods

Patients with irreversible pulpitis in maxillary first molars and premolars which required emergency root canal therapy were selected for the study. Randomization of patients was done by a third person not related to the study. Ethical clearance was obtained from the institutional ethical committee of The Oxford Dental College and Hospital. (Reg. no: 02\_D026\_46230; 25/11/2013)

All 120 patients were divided into 2 groups. Group I (n=60) with 2% lidocaine, Group II (n=60) with 4% articaine.

All the groups were subdivided into subgroups; subgroup A, subgroup B and subgroup C.

Subgroup 1A, IIA (n=20) with placebo.

Subgroup 1B, IIB (n=20) with premedication of Ibuprofen tablet.

Subgroup 1C, IIC (n=20) with premedication of Aceclofenac tablet.

After explanation of treatment procedure, for administration of infiltration anesthesia the tissue at the injection site was cleaned with sterile dry gauze. Infiltration anesthesia was given holding the syringe parallel with the long axis of the tooth, bevel of the needle facing bone and then inserting the needle into the mucobuccal fold over the target tooth.

1.7 ml of the local anesthetic solution to be tested was slowly deposited over 60 seconds using 2 ml, single use, disposable and sterile luer lock plastic syringe which was attached to the needle. One minute post injection, patients were questioned regarding numbness in the area of administration to determine soft tissue anesthesia.

At this point first electric pulp test and cold test reading were taken (following the similar method as described before). The testing was continued every 2 minutes for a total of 10 minutes using a stopwatch. The teeth were considered anesthetized when two consecutive negative readings were obtained with the pulp tester and no response with cold test.

No response from the patient at the maximum output current flow from the pulp tester and no response after cold test were used as the criteria for pulpal anesthesia and a total number of minutes taken to obtain this kind of response from patient after administration of infiltration

anesthesia were recorded. If pain persisted during the access cavity preparation intra pulpal anesthesia was used as supplemental anesthesia. Under rubber dam isolation endodontic access cavity opening was initiated (Dentsply Endodontic Access Bur). The presence of bleeding from the pulp chamber was checked to assure vitality of pulp and efficacy of anesthesia was assessed by patient's response as severe pain, mild discomfort or no pain during access opening by using VAS.

The collected data was analyzed by chi-square test, One Way ANOVA test.

### Results

Frequency distribution of Pain factor in the three subgroups for 2% lidocaine was as per **Table – 1a**. All subgroups B and C showed significant pain reduction compared to subgroup A with placebo (p=0.001).

**Table - 1a:** Frequency distribution of Pain factor in the three subgroups for 2% lidocaine.

Pain	Placebo		Ibuprofen		Aceclofenac		$\chi^2$	P-Value
	N	%	N	%	N	%		
No	7	35%	17	85%	18	90%	18.886	0.001*
Mild discomfort	10	50%	3	15%	2	10%		
Pain	3	15%	0	0%	0	0%		
<b>Total</b>	<b>20</b>	<b>100%</b>	<b>20</b>	<b>100%</b>	<b>20</b>	<b>100%</b>		

\* denotes significant association

**Table - 1b:** Frequency distribution of Pain factor in the three subgroups for 4% articaine.

Pain	Placebo		Ibuprofen		Aceclofenac		$\chi^2$	P-Value
	N	%	n	%	N	%		
No	16	80%	20	100%	20	100%	8.571	0.014*
Mild discomfort	4	20%	0	0%	0	0%		
Pain	0	0%	0	0%	0	0%		
<b>Total</b>	<b>20</b>	<b>100%</b>	<b>20</b>	<b>100%</b>	<b>20</b>	<b>100%</b>		

\* denotes significant association

Frequency distribution of Pain factor in the three subgroups for 4% articaine was as per **Table – 1b**. Subgroups B and C showed significant pain reduction compared to subgroup A with placebo (p=0.014).

Frequency distribution of Pain factor in the two groups was as per **Table – 1c**. Group I and II showed significant difference in pain reduction (p=0.01).

Comparison of Time recorded in the two groups was as per **Table – 2**. Higher mean time was recorded in 2% lidocaine when compared to 4% articaine. The difference in mean time recorded between the two groups was not statistically significant ( $P>0.05$ ).

Premedication with ibuprofen and aceclofenac increases the success of anesthesia and reduces

the onset time of anesthesia. Percentage of pain reduction with ibuprofen was 85% and aceclofenac was 90% compared to placebo 35% ( $p=0.001$ ). Results of the inter group comparison between 2% lignocaine (35%) and 4% articaine (80%) showed that there was statistically significant difference in pain reduction with articaine when compared to lidocaine ( $p=0.01$ ) (**Table - 1c**).

**Table - 1c:** Frequency distribution of Pain factor in the two groups.

Pain	2% lidocaine		4% articaine		$\chi^2$	P-Value
	n	%	N	%		
No	7	35%	16	80%	9.093	0.011*
Mild discomfort	10	50%	4	20%		
Pain	3	15%	0	0%		
<b>Total</b>	<b>60</b>	<b>100%</b>	<b>60</b>	<b>100%</b>		

**Table - 2:** Comparison of Time recorded in the two groups.

Group	Mean	Std Dev	SE of Mean	Mean difference	T	P-Value
2% lidocaine	3.300	1.197	0.155	0.200	0.907	0.366
4% articaine	3.100	1.217	0.157			

## Discussion

In irreversible pulpitis, breakdown of damaged cell membranes and release of arachidonic acid (AA) occurs. This AA is acted on by cyclooxygenase (COX) enzyme and gets converted into 20-carbon chain molecules called eicosanoids. These are converted by cell-specific isomerases and synthases to produce five biologically active PGs: PGD<sub>2</sub>, PGE<sub>2</sub>, PGF<sub>2a</sub>, prostacyclin (PGI<sub>2</sub>), and thromboxane A<sub>2</sub> (TxA<sub>2</sub>). These PGs sensitize nerve endings to bradykinins and histamines and cause the allodynia and hyperalgesia associated with inflammation [10].

Several hypothesis for incomplete anesthesia in the patients with irreversible pulpitis are: Ion trapping of local anesthesia molecule due to lower pH, altered membrane excitability of peripheral nociceptor, altered activity of the tetrodotoxin-resistant, class of sodium channels, increase expression of sodium channels in pulps diagnosed with irreversible pulpitis, epinephrine

containing local anesthetics with their associated lowered pH, are thought to be associated with injection discomfort [3].

In this present study, without premedication success rate of anesthesia was 80% with 4% articaine and 35% with lidocaine in maxillary infiltration  $p=0.01$  (**Table - 1c**).

In both the groups, success rate of anesthesia was greater with premedication with aceclofenac (100 mg) and ibuprofen (600 mg). Success rate of anesthesia in 2% lidocaine group was 90% with aceclofenac 100 mg, 85% with ibuprofen (**Table - 1a**). In articaine group success rate of anaesthesia was 100% with both the premedications (aceclofenac (100 mg) and ibuprofen (600 mg). There was no statistically significant difference in success rate of anaesthesia with aceclofenac 100 mg and ibuprofen 600mg in both the groups. ( $p=0.001$ ) (**Table - 1a**) ( $p=0.014$ ) (**Table - 1b**) respectively.

Similar studies were done by L Dou, et al. [11], Parirokh, et al. [12], Ramchandran, et al. [13] and Joseph Paul, et al. [9]. Results of their studies showed that success rate of anaesthesia were 100%, when articaine was given with premedication.

Time taken for onset of anaesthesia with 4% articaine was 3.0 min, when compared to 2% lidocaine was 3.3 min. ( $p>0.05$ ) (**Table - 2**).

Oliveira, et al. in their study compared the onset of anesthesia between 4% articaine and 2% lidocaine with 1:100,000 epinephrine in maxillary infiltration anesthesia. Onset of anesthesia with 4% articaine was 1.0 minute and with 2% lidocaine was 3.0 minutes.

## Conclusion

It can be concluded that premedication with ibuprofen (600 mg) and aceclofenac (100 mg) resulted in significant increase in onset of action for both the anaesthetic agents. There was no significant difference in the time of onset of anaesthesia between the two local anaesthetic solutions.

## References

1. ADA survey. Influences on dental visits. ADA News, 1998; 11(2): 4.
2. Cohen HP, Cha BY, Spangberg LSW. Endodontic anesthesia in mandibular molars: a clinical study. J Endod., 1993; 19: 370-3.
3. Ingle JI, Bakland LK. Preparation for Endodontic Treatment. In: Endodontics. 5<sup>th</sup> edition, Hamilton (ON): BC Decker; 2002.
4. Covino, BG, Vassallo HG. Local anesthetics: mechanisms of action and clinical use, New York: Grune & Stratton, 1976.
5. Matthews R, Drum M, Reader A, Nusstein J, Beck M. Articaine for supplemental buccal mandibular infiltration anesthesia in patients with

irreversible pulpitis when the inferior alveolar nerve block fails. J Endod., 2009; 35(3): 343-6.

6. Isen DA. Articaine: Pharmacology and clinical use of a recently approved local anesthetic. Dent Today, 2000; 19: 72-7.
7. Ianiro SR, Jeansonne BG, McNeal SF, Eleazer PD. The effect of preoperative acetaminophen or a combination of acetaminophen and ibuprofen on the success of inferior alveolar nerve block for teeth with irreversible pulpitis. J Endod., 2007; 33: 11-14.
8. Singh RD, Khatter R, Bal CS. The effect of preoperative ibuprofen, combination of ibuprofen and acetaminophen, ketorolac versus placebo on the efficacy of the inferior alveolar nerve block in patients with irreversible pulpitis. Indian J Dent Sci., 2010 Sept; 2(4): 4-6.
9. Paul J, Ittyerah A, Kumar S, Chokkalingam, Prasad. Effect of preoperative aceclofenac on the success of inferior alveolar nerve block in patients with irreversible pulpitis. Indian J Dent Sci., 2011 Dec; 3(5): 1-3.
10. Byers MR, Narhi MV. Dental injury models: experimental tools for understanding neuro inflammatory interactions and polymodal nociceptor functions. Crit Rev Oral Biol Med., 1999; 10(1): 4-39.
11. Dou L, Luo J, Yang D. Anaesthetic efficacy of supplemental lingual infiltration of mandibular molars after inferior alveolar nerve block plus buccal infiltration in patients with irreversible pulpitis. Int Endod J., 2013 Jul; 46(7): 660-5.
12. Parirokh M, Ashouri R, Rekabi AR, Nakhaee N, Pardakhti A, Askarifard S, et al. The effect of premedication with ibuprofen and indomethacin on the success of inferior alveolar nerve block for teeth with irreversible pulpitis. J Endod., 2010 Sep; 36(9): 1450-4.

Imrana Tasneem, B.R. Bharat, Murari Uday Kumar, Srirekha A. Effect of premedication with aceclofenac and ibuprofen on the success rate of two different local anesthetic agents in irreversible pulpitis cases of maxillary posterior teeth (a prospective randomized double-blind clinical trial). IAIM, 2019; 6(5): 40-45.

13. Ramachandran A, Khan SI, Mohanavelu D, Kumar KS. The efficacy of preoperative oral medication of paracetamol, ibuprofen and aceclofenac on the success of maxillary infiltration

anaesthesia in patients with irreversible pulpitis: A double blind randomized controlled clinical trial. J Cons Dent., 2012 Oct; 15(4): 310-4.