

Comparative Evaluation of Articaine and Lidocaine as Local Anesthetic Agents in Patients Suffering from Hot Tooth (Endodontic Challenge during Treatment)

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Abstract

Pain management is one of the key factors in Endodontic treatment and whole dentistry treatment in world. Profound anesthesia in patients suffering from hot tooth is very difficult to obtain. So in this paper a short study was carried out to compare the anaesthetic efficacy in the treatment of patients which are suffering from hot tooth. Hot tooth is basically the initial stage of irreversible pulpitis with moderate to severe intensity of pain which disturbed the patient during sleep. Pain is so severe that patient is unable to sleep in the night.

Keywords: Hot tooth, Articaine, Lidocaine, irreversible pulpitis, Root canal treatment.

Introduction

Painless Dentistry---merely a phrase to lure patients into our offices- is no longer a myth, but a reality.

Local Anaesthesia normally fails in the Endodontic treatment of hot tooth. To maintain proper anaesthetic effect during root canal treatment is very much

important for procedure⁽¹⁶⁾. Maintenance of proper anesthesia gains the patient confidence during root canal procedure and carries out the treatment smoothly¹⁶. Hot tooth is Endodontic challenge for dental treatment as most of Endodontic procedure fails because we can't attain the profound anesthesia in hot tooth. Hot tooth is the irreversible pulpitis having spontaneous moderate to severe pain. The patients which are sitting in the dental clinics carry a bottle of cold water against his face are definitely a case of hot tooth³.

Lidocaine is the amide anesthesia which is available with or without Epinephrine¹. Plain Lidocaine is ineffective in hot tooth as it lacks vasoconstrictive effects. Lidocaine with Epinephrine is selected for Hot tooth as in hot tooth already there is rapid blood supply which cause profound pain. So local Anesthesia with Epinephrine was selected. Lidocaine available as 1:100,000 and 1: 50,000 Epinephrine in 2 percent².

Articaine is the amide type of local anesthesia which contain thiophene ring as compared to benzene ring which is present in all other amide group of anesthesia³. Incidence of allergy occur with Articaine is very less as compared to other amide group of anesthesia. Articaine was first introduced in Brazil in 1976. First use of Articaine was done in USA in year 2000. Maximum use of Articaine occurs in Canada and other European countries. Articaine is the generic name of Articaine³. Other difference between Articaine and other amide anaesthetic is extra ester linkage which is present in Articaine so its hydrolysis occurs by plasma hydrolases that is the main cause of its rapid inactivation from the body⁴. So, it does not cause over anaesthetic dose effects. In hot tooth there is profound inflammation which cause the normal Ph low so free base form is less available to transfer against plasma which cause failure of anesthesia¹⁶. Also patients suffering from hot tooth there is formation of tetrodotoxin resistant sodium channels which are resistant to Anesthetics. So in hot tooth there is increase inflammation and also more prostaglandin stimulated tetrodotoxin resistant sodium channel formation⁵.

In this article presented the short study in which patients of hot tooth anaesthetized with Articaine and Lidocaine and compare the pain score during Endodontic treatment.

Material and methods

- Lidocaine
- Articaine
- Rubber Dam Kit
- Rotary files
- Saline
- Sealer
- Gutta percha points

Method

100 patients are randomly selected from the department complaining of severe to moderate spontaneous pain. Patients were diagnosed with initial stage of irreversible pulpitis (Hot tooth). Patients complained of severe pain having history of recent restoration, Traumatic tooth with Ellis class 3 fracture (vital). Patient gave the history of pain of short duration (Acute) with spontaneous continues pain. There is no periodontal widening of the teeth in radiographic examination. All these patients were diagnosed and advised for single visit Root Canal Treatment.

Randomly 50 patients were anaesthetized with Lidocaine and 50 with Articaine. As it was double blind study so both doctor and patient was unaware for type of anesthetic solution as vials were covered with plastic strips. Single visit Root canal treatment was done and pain score was calculated with VAS score (visual Analogue scale).

Comparison between different groups was done using the Kruskal Wallis test (non-parametric test) and Mann Whitney U test was used for inter group comparison of pain score.

Results

Articaine showed less pain as compared to lignocaine during root canal treatment in hot tooth.

Group I (Ar) Group 2(Ld.)

S.no.	Pain score during pulpectomy (vas) articaine	Pain score during pulpectomy (vas) lidocaine
1.	0	1
2.	1	2
3.	0	1
4.	1	0
5.	1	0

6.	0	1
7.	2	0
8.	0	0
9.	0	1
10.	0	1
11.	0	1
12.	0	0
13.	0	1
14.	0	1
15.	0	1
16.	1	2
17.	0	2
18.	0	1
19.	1	2
20.	0	0
21.	1	2
22.	1	0
23.	1	1
24.	0	1
25.	1	0
26.	0	0
27.	0	1
28.	0	0
29.	0	1
30.	0	1
31.	0	1
32.	0	0
33.	1	2
34.	0	2
35.	0	0
36.	0	1
37.	1	0
38.	0	1
39.	0	1
40.	2	1

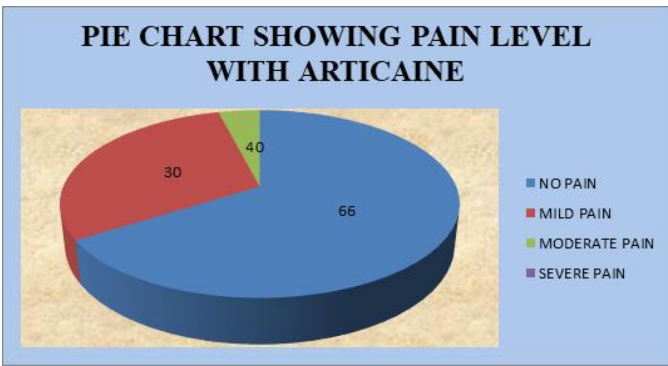
41.	1	0
42.	0	1
43.	1	0
44.	0	1
45.	1	1
46.	0	0
47.	1	1
48.	0	0
49.	0	3
50.	0	0

0-no pain, 1-mild pain, 2-moderate pain, 3-severe pain

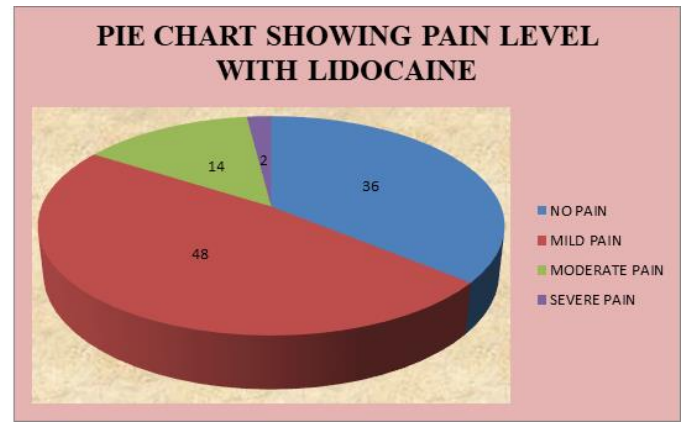
Discussion

In Endodontic Hot tooth does not mean a tooth with greater temperatures resulted from the ongoing exothermic reaction¹⁶ rather a hot tooth is the condition of the tooth having initiation of irreversible pulpitis with severe to moderate continues pain⁶. Achieving Anesthesia in such tooth during root canal treatment is the challenge for Endodontist. A patient which is sitting in the waiting area carry a glass of cold water against the tooth is the example of hot tooth¹⁶.

Pain management is the main aim of Endodontist⁷. So patients suffering from hot tooth are the great challenge. In this study we used two anesthetic solutions for Endodontic treatment in patients of hot tooth and concluded that Articaine showed very less pain during and after single visit Endodontic treatment as compared to lidocaine⁸. The less pain score may be due to additional thiophene ring present in Articaine⁹. Due to presence of thiophene ring there is more lipid solubility. So more particles penetrate through nerve membrane¹⁰. That's the main reason for less pain with Articaine as compared to Lidocaine.



Graph 1: pie chart showing pain level with articaine.

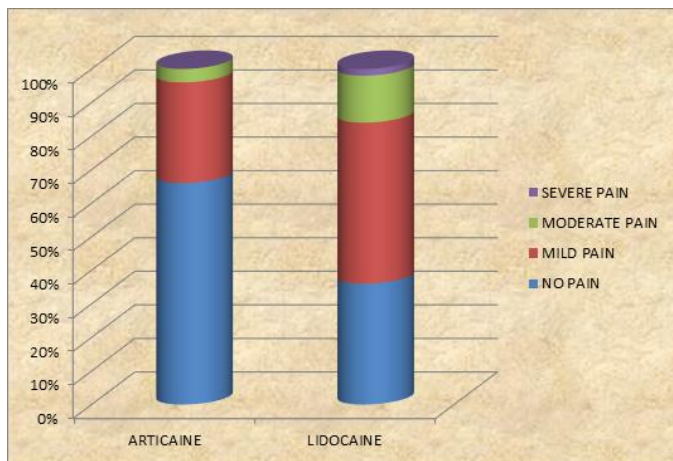


Graph 2: pie chart showing pain level with lidocaine

Table 1: Comparison between GP I (AR) AND GP II (LD.) During Pulpectomy.

	Group I(AR)				Group II(LD)			
	No pain	Mild pain	Moderate pain	Severe pain	No pain	Mild pain	Moderate pain	Severe pain
N	33 (6%)	15 (30%)	2 (4%)	-	18 (36%)	24 (48%)	7 (14%)	1 (2%)
Mean Rank	68.81				99.13			
Z value	3.161							
P value	0.002 ^S							

*p> 0.05; non-Significant, **p< 0.05; Significant, ***p<0.001; Highly Significant



Graph 3: Comparison between articaine and lidocaine during pulpectomy

Conclusion

Keeping all the limitations of present study in mind

Articaine appears to be better anesthetic for management of teeth having Hot tooth. It seems like a promising alternative to Lidocaine, the current gold standard in local Anesthesia.

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