

LOCAL ANALGESIA

COMPARISON OF PREMIXED LIGNOCAINE AND ADRENALINE WITH FRESHLY PREPARED LIGNOCAINE AND ADRENALINE

ORIGINAL
PROF-1791

DR. KHALID ZAEEM
CMH, Sialkot

DR. ABDUL HAMEED BHATTI
CMH, Sialkot

DR. RAHEEL AZHAR KHAN
CMH, Multan

ABSTRACT... Objective: To compare the analgesic effect of commercially available premixed injection of lignocaine 2% and adrenaline in 1:100,000 dilution with that of freshly prepared solution by mixing adrenaline in suitable quantity to 2% plain lignocaine just before the time of injection for tooth extraction in patients of dental caries. **Design:** Descriptive Interventional Study. **Place and Duration:** Armed Forces Institute of Dentistry (AFID) Rawalpindi from March 2006 to August 2006. **Patients and Methods:** A total of 50 patients of dental caries, who were scheduled for tooth extraction, were divided into 2 groups of 25 each. Group A was provided analgesia with commercially available premixed injection of lignocaine and adrenaline and group B was provided analgesia with freshly prepared solution of plain lignocaine and adrenaline. **Results:** In group A, good quality analgesia sufficient enough for tooth extraction, was achieved in 19 patients whereas in group B good quality analgesia was achieved in 23 patients. **Conclusions:** Freshly prepared mixture of plain lignocaine and adrenaline gives better analgesic effect than that of commercially available solution of lignocaine with adrenaline.

Key words: Lignocaine with adrenaline, dental caries, good quality analgesia, tooth extraction.

INTRODUCTION

Tooth extractions in dental practice are mainly done under local analgesia. General anesthesia is discouraged as far as possible in modern practice. In a report of Health Department of UK, it is recommended that general anesthesia in dental practice should be avoided wherever possible¹. Instead use of sedative techniques is advocated to permit dental procedures to be carried out under local analgesia in patients who are anxious or are undergoing more invasive procedures². The agent most commonly used for providing local analgesia is lignocaine and lignocaine with adrenaline is preferred as the addition of adrenaline increases neuronal uptake of local anesthetic, enhances the quality of analgesia, prolongs duration of action and limits systemic toxic side effects of lignocaine because vasoconstriction provided by the adrenaline at the site of injection limits absorption of lignocaine in to the systemic circulation³. One disadvantage of this addition is that the pH of this commercially prepared solution is lowered as the adrenaline is only stable at low pH (4.5). As a consequence, this solution has a lower concentration of free base and a slower onset of analgesic effect especially in infected tissues, where the pH is already acidic and the buffering capacity of the tissues is limited. One way of avoiding this problem is addition of adrenaline to plain lignocaine just before the time of use⁴.

Freshly prepared solution of local anesthetic and adrenaline is very useful especially when carious tooth is to be extracted.

This study was conducted at Armed Forces Institute of Dentistry (AFID), Rawalpindi to compare the local analgesic effect of commercially available premixed solution of lignocaine and adrenaline with that of freshly prepared solution when adrenaline was added to plain lignocaine at the time of injection.

PATIENTS AND METHODS

This descriptive interventional study was conducted at AFID Rawalpindi during the period from March 2006 to August 2006. A total of 50 patients, having dental caries of molar tooth scheduled for tooth extraction, were included in the study. Out of these patients, 32 were male and 18 were female, having ages between 18 and 45 years. Patients having hypertension or any cardiac disease were excluded from the study. Two groups, each having 25 patients (n-25), were labeled as group A and group B. Analgesia to group A patients was provided with 1.8ml of commercially available premixed injection of lignocaine 2% and adrenaline in 1:100,000 dilution to which 0.2 ml of normal saline was added, whereas analgesia to group B patients was provided with 1.8 ml injection plain lignocaine 2% to which 0.2 ml adrenaline in 1:10,000 dilution was added soon before the time of

injection. Tooth extraction of those patients was done in whom local block was achieved and those in whom analgesia was not effective, were given next appointment.

Comparison of pH

Solution	pH
Lignocaine plain	6.5-7.0
Adrenaline	4.5
Lignocaine with adrenaline	4.0-5.0
Lignocaine to which adrenaline is added before time of injection	6.7

RESULTS

On the basis of analgesic effect achieved, the results were plotted in a table. Patients in whom good quality analgesia was achieved and tooth extraction was possible, were placed on one side, whereas those patients in whom effect was poor or there was no effect at all, were placed on other side. In group A, good quality effect was achieved in 19 (76%) patients and very weak or no effect was achieved in 6 (24%) patients. In group B, 23 (92%) patients had good quality effect where tooth extraction was possible and 2(8%) did not get any effect or had poor effect.

Type of solution used	No. of patients getting good quality analgesia	No of patients getting poor quality analgesia
Commercially available premixed solution of lignocaine and adrenaline (group A)	19 (76%)	6 (24%)
Freshly prepared solution of lignocaine and adrenaline (group B)	23 (92%)	2 (8%)

DISCUSSION

Onset of analgesic effect of any local anesthetic is determined by the degree of ionization at the time of injection. If the pH of the local anesthetic is more nearer to the physiological pH (7.4) of the body, it will have more

molecules in unionized form and good lipid solubility, so the solution is absorbed easily and an earlier onset and potent effect is achieved⁵. When the pH of the body part which is to be injected becomes low due to infection or when local anesthetic having low pH (as is the case with commercially prepared premixed solutions of lignocaine and adrenaline) is injected the unionized form and lipid solubility becomes low so less solution is absorbed and onset is delayed. Commercially available plain lignocaine has pH of 6.5-7.0. Because adrenaline is unstable in alkaline medium, the pH of lignocaine to which adrenaline is added, is made acidic having pH of 4.0-5.0. As a consequence these preparations have lower concentration of free base and a slower onset, when injected for providing analgesia. This problem can be solved by the addition of adrenaline in suitable concentration to plain lignocaine soon before the time of injection. In different studies it is a proven fact that local anesthetics, especially those containing adrenaline have a slower onset or they are totally ineffective when injected to block the infected tissues, as is the case with carious tooth^{6,7}. In our study, freshly prepared solution of lignocaine and adrenaline had good quality analgesic effect in 23 (92%) patients as compared to that of commercially prepared solution which was effective in 19 (76%) patients. As observed in this study freshly prepared solution of lignocaine and adrenaline is more effective especially when used in infected tissues. This not only reduces the requirement of general anesthesia but also saves the patients from frequent troublesome needle pricks.

CONCLUSIONS

Mixing of adrenaline and lignocaine by the surgeon just before injecting the solution to the patients of dental caries proved to be a more definitive way of getting analgesia for tooth extraction. More research in this regard is required to be undertaken.

Copyright© 04 August, 2011.

REFERENCES

1. Department of Health – 1991, Report on an expert working party on general anesthesia, sedation and resuscitation in dentistry. Department of Health and Dental Division, London.
2. Department of Health – 2000, **A conscious decision; a**

- review of the use of general anesthesia and conscious sedation in primary dental care.** Department of Health, London.
3. Evers AS, Maze M; **Anesthetic Pharmacology – Physiological principles and clinical practice.** Churchill Livingstone, 2004.
 4. G. Edward Morgan Jr, Maged S. Mikhail, Michael J. Murray. **Local anesthetics in Clinical Anesthesiology**, 4th Edition, McGraw Hill Companies, 2006; 263–275.
 5. Tucker GT; **Pharmacokinetics of local anesthetics.** British Journal of Anesthesia – 58; 717, 1986.
 6. Hardman J, Limbird L, Gilman A; Goodman and Gilman's **The Pharmacological Basis of Therapeutics**, 10th Ed. McGraw Hill, 2002. Chapter 15 has an excellent discussion of local anesthetics.
 7. Datta S. **Pharmacology of local anesthetics.** ASA Refresher Course 21; 241–254, 1993.

Article received on: 01/06/2011

Accepted for Publication: 04/08/2011

Received after proof reading: 02/12/2011

Correspondence Address:
 Brig. Khalid Zaeem
 Consultant Anesthesiologist,
 CMH, Sialkot
 khalidzaem488@yahoo.com

Article Citation:

Zaeem K, Khan RA, Bhatti AH. Analgesic effects; Comparison of commercially available premixed injection of lignocaine and adrenaline with that of freshly prepared injection of lignocaine and adrenaline for extraction of carious tooth. Professional Med J Dec 2011;18(4):684-686.

PREVIOUS RELATED STUDIES

- Prof-856 Muhammad Anwar Ch., Munawar Farooq, Muhammad Ali bukhari, Owais Hameed, Mansoor ul Haq. Local anaesthetics infiltration in wounds. Prof Med Jour 12(1) 69-73 Jan, Feb, Mar, 2005.

**ALWAYS FORGIVE YOUR
 ENEMIES - NOTHING ANNOYS
 THEM SO MUCH.**

OSCAR WILDE