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POST-OPERATIVE ANALGESIC REQUIREMENT IN PATIENT UNDERGOING MINOR ORAL SURGERY USING BUPRENORPHINE WITH LIGNOCAINE VERSUS LIGNOCAINE

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ABSTRACT

Aim: The aim of this study is comparative analysis of post-operative analgesic requirement in patient undergoing minor oral surgery using 2% Lignocaine with 1:200000 Adrenaline and Buprenorphine versus 2% lignocaine with 1:200000 Adrenaline. **Materials and Method:** One hundred and four patients requiring minor oral surgery were included in the study. 1 ml of Buprenorphine Hydrochloride injection I.V which contains an equivalent of 0.3 mg Buprenorphine was withdrawn into a syringe and injected into a 30 ml vial of 2 % Lignocaine with Adrenaline 1:200000. Thus each ml of local anaesthetic contained 0.01 mg of Buprenorphine. This solution was labelled and used for the study. **Results:** The duration of analgesia in Group I and II was found to be 36.02 ± 1.5 h and 13.39±1.4 h. The average consumption of NSAIDs was found to be 1.42 as compared to Group II mean value of 2.32 ($P < 0.0001$). **Conclusion:** The results of the present study showed that addition of small amounts of buprenorphine to 30 ml lignocaine with adrenaline 1:200000 for minor oral surgery results in significant improvement in postoperative analgesia up to 36 h and markedly reduce the need for excessive analgesic intake. Thus reducing the adverse effects associated with excessive use of NSAIDs.

KEYWORD: Adrenaline, Buprenorphine, Hydrochloride, Analgesia.

INTRODUCTION

Over the past, several studies have suggested that addition of certain opiates to the local anesthetic solution used for block anesthesia may provide effective and prolonged postoperative analgesia.[1-3] The presence of opioid receptors in peripheral nervous system offers the possibility of providing postoperative analgesia in ambulatory surgical patients. Over the past decades many investigators have studied this approach and have compared the efficacy of various opioids added to the local anesthetics injected into inflamed dental tissues[4-6] and also in brachial plexus blocks.[7-10] Most of the studies pertaining to use of opioids mixed with local anesthetics were performed using 0.5 % bupivacaine which has longer duration of action. Most importantly the longer acting local anesthetic such as 0.5 % bupivacaine may overlap or obscure the analgesia provided by the opioids. This study was designed to utilize intermediately acting anesthetic such as lignocaine to determine the duration of postoperative analgesia after minor oral surgery.

The present study was under taken to determine efficacy of buprenorphine added 2 % lignocaine 1:200000 in providing post-operative analgesia in patients undergoing minor oral surgery and concomitantly evaluate its role in reducing the need for administration of non-steroidal anti-inflammatory drugs (NSAIDs).

MATERIALS AND METHOD

The present study was conducted in the Department of Oral & Maxillofacial Surgery, Maulana Azaad Dental College & Hospital. The protocol for the study was approved by the ethical committee of the institutional review board and written informed consent was obtained from every patient. One hundred four patients requiring minor oral surgery were included in the study. The patients were randomized by a third party and allocated to one of the two study groups. This allowed the patients and the operators to remain unaware of the group allocations.

Method of Preparation of the Solution

1 ml of Buprenorphine Hydrochloride injection I.P which contains an equivalent of 0.3 mg Buprenorphine was withdrawn into a syringe and injected into a 30 ml vial of 2 % lignocaine with adrenaline 1:200000. Thus each ml of local anesthetic contained 0.01 mg of Buprenorphine. This solution was labelled and used for the study.

Study Design

The patients selected for the study were divided randomly into 2 groups, based solely on whether buprenorphine was to be added to the local anesthetic agent or not. Patients in Group I underwent the oral surgical procedure after administration of lignocaine 2 % with adrenaline 1:200000 to which 0.3 mg (1 ml) buprenorphine was added. Patients in Group II underwent the oral surgical procedure after administration of lignocaine 2 % with adrenaline 1:200000 alone. Double blinding of the operator and patient was achieved by appointing a custodian who was not be a participant in this study in any way. The custodian prepared and dispensed the solution to the operator allocating the patient into two groups, A and B randomly, He maintained a record of the patient details and the solution dispensed in custodian record, a copy of which is attached as Annexure 1. One of the solutions had 2 % Lignocaine Hydrochloride with 1:200000 Adrenaline Bitartrate along with Buprinorphine 0.3mg and other had 2 % Lignocaine Hydrochloride with 1:200000 Adrenaline Bitartrate for intra oral nerve block to achieve local anesthesia.

Pain Assessment

After the surgical procedure, patients were given a self-analysis form to evaluate the degree of post-surgical pain. They were instructed to note the intensity of pain and the number of postoperative analgesics consumed during the next 72 hours, at intervals of 2, 4, 6, 12, 24, 36 and 48h, 72h. Patients daily rating of discomfort was done on a 4-point, (VAS scale), interpreted as:

- ❖0 No pain
- ❖1 Mild pain
- ❖2 Moderate pain
- ❖3 Severe pain

Patients were instructed to document the number of rescue medication consumed and the timing of first analgesic intake during the study period. 3ml of solution was used for every nerve block given in this study.

DATA ANALYSIS

The data obtained were evaluated based on the pain level as marked by the patient in the study group and control group using the Visual Analog Scale at intervals of 2, 4, 6, 12, 24, 36, 48 and 72 h interval. Total number of Diclofenac tablets taken in the 72 h period was also documented. Patients were considered to have completed the study at the time of first analgesic intake. Results were calculated by SPSS 22.0 using the mean value and standard deviation for each of the parameters considered and checked for statistical significance.

RESULTS

The mean onset of subjective symptoms for Solution A was 43.49 seconds and the mean onset of subjective symptoms for Solution B was 47.76 seconds with statistical insignificant difference.

The mean of total number on analgesic tablets taken for Solution A was 1.42 tablets and the mean of total number on analgesic tablets taken for Solution B in minutes was 2.32 tablets with statistical significant difference which indicates that there was a significant difference in the requirement of postoperative pain control for solution B as compared to solution A. The patient who received solution B took more tablets for pain control as compared to those who receive solution A gives more post-operative analgesia.

Table. 1: Types of minor surgical performed in patients of two groups.

Type Of Procedure	No Of Patients	
	Group I	Group II
Orthodontic Extraction	32	30
Impaction	6	16
Extraction	6	8
Alveoloplasty	3	3
Total	47	57

Table. 2: No of different nerve Blocks given in two groups.

Nerve Block	Section A	Section B
Infra orbital	15	15
Inferior alveolar	18	17
Naso palatine	3	1
Greater palatine	18	19
Posterior superior alveolar	5	7
Long buccal	3	8
Total	62	67

Table. 3: Time at Which First Rescue Medication Taken (Duration of Analgesia).

Time Interval	Group 1 Study Group		Group 2 Control Group		p value
	Mean	SD	Mean	SD	
2h	1.48	0.65	2.3	0.81	<0.01
4h	1.54	0.73	2.3	0.81	<0.01
6h	1.52	0.65	2	0.73	0.022
12h	1.64	0.85	2.26	0.92	0.01
24h	1.36	0.63	2.04	1.03	0.01
36h	1.36	0.69	2.76	0.62	0.001
48h	1.24	0.52	2.46	0.65	0.11
72h	1.2	0.45	2.46	0.64	0.11
Total No of Pain Killers	**1.42**	**0.53**	**2.32**	**0.71**	**<0.01**

DISCUSSION

In recent years, there has been an increase awareness of the importance of effective pain management. Although the currently available armamentarium of analgesic drugs and techniques is impressive, postoperative pain is not always effectively treated. Routinely the patients undergoing minor oral surgical procedures are prescribed some form of NSAIDs to overcome the sequel of postoperative pain.

Although these drugs have been proven efficient in management of post-operative pain, adverse effects and associated morbidity pose a serious problem. It is therefore the duty of the clinician to reduce such problems associated with increased number of analgesic intake in the postoperative period. It has long been known that NSAIDs may have a range of side effects, of which the commonest are gastrointestinal. Hence arises, the need for an agent which reduces postoperative pain and additional intake of NSAIDs which in turn shall help in negating the adverse effects resulting due to excessive use of NSAIDs.

Over the past ten years several studies have suggested that addition of certain opiates to the local anesthetic used for block anesthesia may provide effective and prolonged post-operative analgesia.[7-10] The presence of opioid receptors in peripheral nervous system offers the possibility of providing postoperative analgesia in ambulatory surgical patients. Over the past decades many investigators have studied this approach and have compared the efficacy of various opioids added to the local anesthetic injected in inflamed dental tissues[4-6] and brachial plexus blocks.[7-10] The results of these studies showed that buprenorphine was effective perineurally and longer in duration of action in the management of post-operative pain in ambulatory surgical patients.

We have chosen lignocaine 2 % with adrenaline 1:200000 as an anesthetic solution since it is easily available and used in most dental setups. 2 % lignocaine with adrenaline 1:200000 produces anesthesia for 1½ h which is of sufficient duration to complete routine minor oral surgical procedures. We have used buprenorphine as the opioid drug mixed with local anesthetic for the following reasons:

A. Buprenorphine is highly lipophilic; hence it better diffuses into the perineurium and produces longer effect of analgesia compared to morphine and sufentanil.

B. Buprenorphine hydrochloride is at least 50 times more potent than morphine sulphate and has substantially longer duration of action.[11-13]

Bazin et al[3] studied the effect of addition of morphine, buprenorphine and sulfetanil to local anesthetic in brachial plexus block. The results obtained showed that addition of morphine or buprenorphine to local anesthetic produced significant difference in duration of analgesia when compared to the control group, wherein only local anesthetic was used. Similar results were found in our study, where Group I patients had significantly lesser mean pain scores at varying time intervals postoperatively (up to 36 ± 1.5 h) compared to Group II patients. Mean pain scores obtained at 48 and 72 h postoperatively did not vary significantly in Group I compared to the Group II (refer Table 3).

Candido et al[8] have studied the effect of buprenorphine added local anesthetic for brachial plexus block in patients undergoing upper extremity surgeries. The results obtained in their studies showed that the patients who received buprenorphine added local anesthetic had mean duration of postoperative analgesia which was 3 times greater than the group of patients who received local anesthetic alone. The results obtained by the authors suggested that 75 % of the patients who received buprenorphine added local anesthetic were completely pain free at the end of 30 h post-operatively and also the number of analgesics consumed by patients in whom the modified local anesthetic was used were significantly lower compared to the control group.[8]

Similarly in our study 74 % of the patients in Group I were completely pain free at the end of 36 h time interval postoperatively compared to only 34 % in Group II. The total number of analgesic intake in Group I (mean value of 1.42) compared to Group II patients (mean value of 2.32) is significantly less which is similar to the author's results.[8] None of the patients in the study reported any

opioid related side effects such as nausea, vomiting, and pruritus or showed any evidence of respiratory depression.

Candido et al[9] carried out a study to specifically delineate the role of buprenorphine in peripherally mediated opioid analgesia as the previous study conducted by them did not control for potentially confounding factors such as the possibility that buprenorphine was affecting analgesia through intramuscular absorption or via spinal mechanism. The results of the above study showed that buprenorphine produced 3 times longer analgesia than local anesthetic block alone and twice as long as buprenorphine given by intramuscular injection plus local anesthetic block alone[9]. The present study did not evaluate the intramuscular effect, since it was already proven in many investigations carried out previously.[14-16]

In our study there were no significant changes related to the time of onset of anaesthesia. And also no adverse effects related to use of buprenorphine. Absence of side effects may be attributed to the fact that 1 ml of the solution contained as little as 0.01 mg of buprenorphine.

CONCLUSION

With the limitations of the above study it can be concluded that addition of 0.3 mg of buprenorphine to 30 ml of 2 % lignocaine with adrenaline 1:200000 for use in minor oral surgery produces significant pain relief up to 36 h postoperatively. It can be concluded that buprenorphine added local anesthetic has definite benefits for relief of postoperative pain and in reducing analgesic intake after minor oral surgery.

REFERENCES

1. Stein C. The control of pain in peripheral tissue by opioids. N Engl J Med., 1995; 332: 1685–1690.
2. Stein C, Millan MJ, Shippenberg TS, Peter K, Herz A. Peripheral opioid receptors mediating antinociception in inflammation. Evidence for involvement of mu, delta and kappa receptors. J Pharmacol Exp Ther., 1989; 248(3): 1269–1275.
3. Bazin JE, Massoni C, Bruelle P, Fenies V, Groslier D, Schoeffler P. The addition of opioids to local anaesthetic in brachial plexus block: the comparative effects of morphine, buprenorphine and sulfentanil. Anaesthesia, 1997; 52(9): 858–862.
4. Likara R, Sittlb R, Graggerc K, Pipama W, Blatnigc H, Breschana C, Schalka HV, Steind C, Schäfer M. Peripheral morphine analgesia in dental surgery. Pain, 1998; 76(1–2): 145–150.
5. Likar R, Koppert W, Blatnig H, Chiari F, Sittl R, Stein C, Schafer M. Efficacy of peripheral morphine analgesia in inflamed, non inflamed and perineural tissue of dental surgery patients. J Pain Symptom Manage, 2001; 21(4): 330–337.
6. Kaczmarzyk T, Stypulkowska J. Assessment the effectiveness of peripheral administration of morphine with local articaine anesthesia for surgery in inflamed oral and maxillo facial tissues. Pain, 2005; 115: 348–354.
7. Gormley WP, Murray JM, Fee JPH, Bower S. Effect of the addition of alfentanil to lignocaine during axillary brachial plexus anaesthesia. Br J Anaesth, 1996; 76: 802–805.
8. Candido KD, Franco CD, Khan MA, Winnie AP, Raja DS. Buprenorphine added to the local anesthetic for brachial plexus block to provide postoperative analgesia in outpatients. Reg Anesth Pain Med., 2001; 26(4): 352–356.
9. Candido KD, Winnie AP, Ghaleb AH, Fattouh MW, Franco CD. Buprenorphine added to the local anesthetic for axillary brachial plexus block prolongs postoperative analgesia. Reg Anesth Pain Med., 2002; 27(2): 162–167.
10. Robaux S, Blunt C, Viel E, Cuvillon P, Nouguier P, Dautel G, Boileau S, Girard F, Bouaziz H. Tramadol added to 1.5 % mepivacaine for axillary brachial plexus block improves postoperative analgesia dose-dependently. Anesth Analg, 2004; 98: 1172–1177.
11. Vadivelu N, Hines RL. Buprenorphine: a unique opioid with broad clinical applications. J Opioid Manag, 2007; 3(1): 49–58.
12. Dobkin AB. Buprenorphine hydrochloride: determination of analgesic potency. Can Anaesth Soc J., 1977; 24: 186–188.
13. Dobkin AB, Esposito B, Philbin C. Double blind evaluation of buprenorphine hydrochloride for post operative pain. Can Anaesth Soc J., 1977; 24: 195–202.
14. Nishikawa K, Kanaya N, Nakayama M, Igaarashi M, Tsunoda K, Namiki A. Fentanyl improves analgesia but prolongs the onset of axillary brachial plexus block by peripheral mechanism. Anesth Analg. 2000; 91: 384–387.
15. Mays KS, Lipman JL, Schnapp M. Local analgesia without anesthesia using peripheral perineural morphine injections. Anesth Analg, 1987; 66: 417–420.
16. Tverskoy M, Braslavsky A, Mazor A, Ferman R, Kissin I. The peripheral effect of fentanyl on postoperative pain. Anesth Analg, 1998; 87(5): 1121–1124.