

Comparison Between The Onset Duration Of Action And Recovery Rate Of Lignocaine And Bupivacaine In Patients Who Underwent Periodontal Surgical Procedures

Research Article

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Abstract

Background: Local anesthetics are essential for achieving proper and sufficient anesthesia and analgesia post operatively and intra operatively. Local anesthetics are widely used in periodontal surgical procedures like flap surgery, gingivectomy, gingivoplasty all these procedures are extensive, time consuming and are capable of producing severe pain post operatively and also during the procedure. It is essential to use an anesthetic which is long acting and effective in reducing pain intraoperatively and post operatively, earlier studies have been done to compare the effect of lignocaine and bupivacaine in dental surgical procedures like dental extractions and other surgical procedures like tracheostomy, the current study is done to compare the onset duration of action and recovery rate of lignocaine and bupivacaine in patients undergoing periodontal surgical procedures.

Aim And Objective: The aim of the current study is to compare the onset duration of action and recovery rate of local anesthetic agent 0.5% Bupivacaine and 2% Lignocaine in patients undergoing periodontal surgical procedures under visual analog scale and clinical assessment parameters and the objective of the current study is to compare the onset, duration of action and recovery rate of bupivacaine and lignocaine in patients undergoing periodontal surgical procedures.

Materials And Methods: Local anesthetic solutions used in the study are: 2% Lignocaine 1:80,000 and 0.5% bupivacaine plain. Patients were given the informed consent and the procedures to be done were explained to the patients. 40 patients were involved in this study. The samples were selected through simple random sampling

Local anesthetic agents were given to patients before starting the surgical procedure. Intra oral nerve blocks and field blocks were given to the patients. Time was calculated using stopwatch. Time taken for the initiation of anaesthesia was noted right after administering local anaesthesia till the point where complete anaesthesia is initiated which was identified by responses from multiple pricks. Post treatment the patients were asked about any discomforts during the procedure and was asked to respond to visual analog scale on presence of pain which has scale ranging from no pain to worst possible pain and faces pain rating scale ranging from no hurt to hurts the worst. The duration of action and recovery was recorded until complete recovery from local anaesthetic is obtained

Results: The results obtained clearly states that the time for onset of anaesthesia is shorter in lignocaine and bupivacaine is longer, and duration of action is more for bupivacaine and less for lignocaine, the visual analog scale shows pain experienced by the patients intra operatively and post operatively is less in bupivacaine group than the lignocaine group which implies that bupivacaine could be used as local anaesthetic in long periodontal surgical procedures like flap surgery.

Conclusion: Thus Lignocaine and Bupivacaine have their pros and constraints. When compared to lignocaine which is more commonly used in periodontal surgical procedures bupivacaine has longer duration of action and provided better analgesia and anaesthesia. Therefore bupivacaine can be considered as an alternative to lignocaine in long periodontal surgical procedures.

Keywords: Bupivacaine; Lignocaine; Comparison; Periodontal Procedures; Duration of Action.

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Introduction

Local anesthesia is the temporary loss of sensation or pain in part of body produced by applying or injecting local anaesthetic agent without affecting the consciousness. The anesthetic agents used in dentistry falls into two major groups Esters and Amides [1].

Pain management is of greater importance in dentistry and prolonged anaesthesia and analgesia is required [2]. Studies done in America, Brazil indicate that nearly 50% of the people avoid dental treatment due to fear of pain [3, 4]. Local anesthesia is commonly used to relieve pain and discomfort that rise during dental treatment. The most important goal in periodontal surgical procedures is to achieve a proper and sufficient anaesthesia and analgesia pre and post operatively.

Bupivacaine was first synthesised by Ekenstam in the year 1957 and was first introduced into clinical use in the year 1963' Bupivacaine is a commonly used local anesthetic drug in surgery and obstetrics is considered to be one of the major local anaesthetic agent used in dentistry is a water soluble amide [5]. This long acting local anaesthetic plays an important role in management of postoperative pain. Bupivacaine has a longer side chain with four methylene groups on the piperidine ring that is responsible for the different properties of bupivacaine that makes it different from lignocaine. The soluble form bupivacaine hydrochloride is used therapeutically.

Lignocaine was first synthesised by Lofgen in the year 1943 and was used clinically from 1948 It is most soluble in water and the commonly used injectable solution as local anesthetic agent. Lignocaine is used to perform nerve blocks, infiltration, surface anaesthesia. Addition of Epinephrine/adrenaline causes vasoconstriction of arteries causing reduction in bleeding and increases the duration of action of lignocaine. It is metabolised in the liver and excreted by the renal system.[6]

The rate of systemic absorption of local anesthetics depends upon the total dose and concentration of the drug, its route of administration, vascularity of the administration site and the presence or absence of epinephrine in the anaesthetic solution [7]. Local anesthetics are widely used in periodontal surgical procedures like flap surgery, gingivectomy, gingivoplasty all these procedures are extensive ,time consuming and are capable of producing severe pain post operatively and also during the procedure .It is essential to use an anaesthetic which is long acting and effective in reducing pain intraoperatively and postoperatively.

Materials and Methods

Local anesthetic solutions used in the study are: Lignocaine 2% and bupivacaine 0.5%. Patients were given the informed consent and the procedures to be done were explained to the patients. This study was designed as a randomised, prospective, double blinded study. Patients involved in the study were those who came to the outpatient ward of the department of periodontics for periodontal surgical procedures. 40 patients were included in the study who were over 20 years of age and the exclusion criteria required patients without any systemic disorders, drug abuse, liver disease, cardiac disease, mental illness ,pregnancy and allergic to drugs and anaesthetics. The patients were enrolled only during the day time from 8 AM to 3PM. Local anaesthetic agents were given to patients before starting the surgical procedure. The patients were randomly allocated into two groups. Intraoral nerve blocks and field blocks were given to the patients. Time was calculated using stopwatch and the time taken for the initiation of anaesthesia was noted right after administering local anaesthesia till the point where complete anaesthesia was achieved which was identified by responses from multiple pricks. Post treatment the patient were asked about any discomforts during the procedure and was asked to respond to visual analog scale and faces pain rating scale on presence of pain which has scale ranging from no pain to worst possible pain and faces pain rating scale ranging from no hurt to hurts the worst. The duration of action and recovery was recorded until complete recovery from local anaesthetic is obtained.

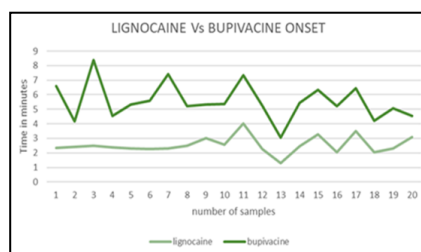
Results

A total of 40 patients were involved in the study over a four month period, of which 20 received 2% lignocaine and 20 received 0.5% bupivacaine. The mean time taken for the onset of anaesthetic for lignocaine group is 2.5 min and 5.5 for bupivacaine group.

Discussion

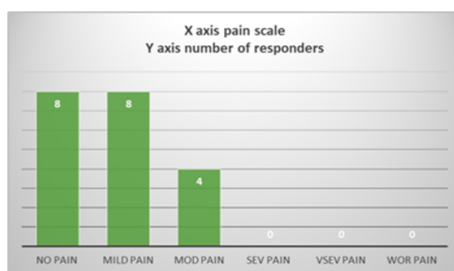
Local anaesthetic blocks the generation and the conduction of nerve impulses by increasing the threshold of excitation of a nerve by slowing the progression of nerve impulses . clinically the events in loss of function of nerve after local anaesthetic administration is as follows, there is loss of pain, loss of sensation of temperature and touch followed by loss of muscle tone. If the drug is absorbed systemically it produces systemic and vascular effects. Concentration in normal therapeutic doses has minimum changes in cardiac conduction and excitability. In toxic blood concentrations the outcome is fatal. The study aims in finding out which local anaesthetic is more suitable for long periodontal

Onset Of Anesthesia By Lignocaine And Bupivacaine.



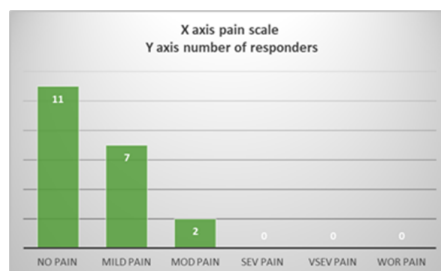
VAS Scale(Visual analog scale)

Lignocaine



On estimating pain using a visual analog scale 40 percentage of the patients who received lignocaine gave a response of no pain and 40 percent of patients responded to have mild pain and 20 percent of patients responded to have moderate pain.

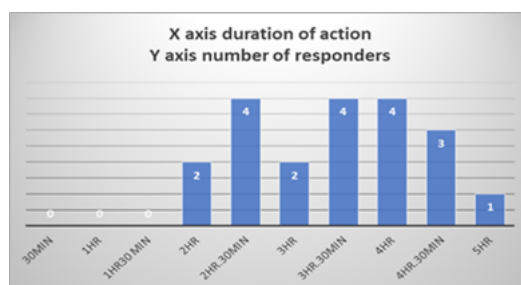
Bupivacaine.



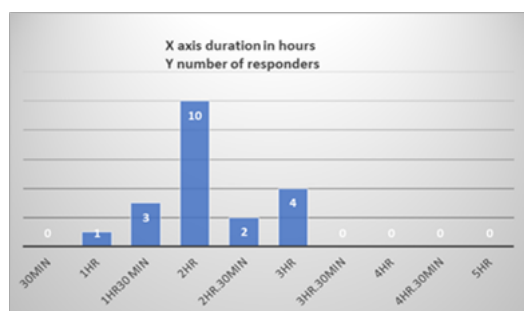
In the bupivacaine group 55 percent of the participants responded to having no pain and 35 percent of the patients responded having mild pain and 10 percent of the patients responded having moderate pain.

Duration Of Action Of Lignocaine And Bupivacaine

Duration Of Action Of Bupivacaine



Duration Of Action Of Lignocaine



The duration of action of lignocaine lasted about two to three hours for the participants of the lignocaine group. The duration of action of bupivacaine lasted about three to four and half hours of the participants of the bupivacaine group. No patients reported any adverse side effects.

surgical procedures.

Initiation of local anaesthetic action

In the current study the mean time for initiation of anaesthetic action of lignocaine is 2.5 minutes and mean time for the initiation of anaesthetic action of bupivacaine is 5.5 minutes. The time taken for initiation of anaesthetic action was recorded using a stop watch.

Most pain studies are performed on healthy individuals with little emotional impact on the pain score [8]. The pain scale used in this study was faces pain scale. The pain scale was used because it has high reproducibility and performance. On a descriptive scale the patients asked to pick out a picture or word that well describes the pain experienced. In this study the pain scale was ranging from no pain ,mild to moderate. In this study 8 patients who received lignocaine gave a response of no pain and another 8 patients responded having mild pain and 4 patients had moderate pain. Whereas in the bupivacaine group 11 patients responded to have

no pain and 7 patients responded to have mild pain and 2 patients responded to have moderate pain. The results of this study shows change or difference in degree of pain perceived by the patients in both lignocaine and bupivacaine group. There is advantage in using long acting local anaesthetic since there is significant reduction in pain perceived by the patients.

Duration of analgesia is as follows: The duration of action of lignocaine is nearly two to three hours for 80 percent of the participants of the lignocaine group and three to four and half hours for 70 percent of the participants of the bupivacaine group. The onset of action of bupivacaine was longer when compared to that of lignocaine the mean time taken for the onset of anaesthesia for lignocaine group is 2.5 min and 5.5 for bupivacaine group and bupivacaine group presented with less discomfort than lignocaine group intra and post operatively, According to Spivey et al in a clinical comparison of lidocaine and bupivacaine the relative potency of bupivacaine to lidocaine is four is to one [9, 10]. The studies done by other authors who compared lignocaine and bupivacaine also has a similar result Bouloux et al in their study comparing bupivacaine vs lignocaine found that bupivacaine significantly reduced the postoperative pain, Su et al in their study found that bupivacaine group had longer onset time than the lidocaine group and onset of anesthesia took 2-3 minutes for lignocaine and 5-8 minutes for bupivacaine [11, 12]. From the former studies based on comparing lignocaine and bupivacaine it is evident that bupivacaine provides longer anaesthesia when compared to that of lignocaine thus it highly suggestive in long periodontal surgical procedures even though the onset of anesthesia is delayed when compared to lignocaine.[13, 14]

Local anesthetics are commonly used to relieve pain and discomfort caused by dental treatment [15, 16] and it is the most commonly used technique in controlling pain in dentistry procedures like dental extraction, root canal treatment, periodontal procedures need the use of local anesthetics [17] Most studies has been focused on the efficacy of anesthetic agents in endodontic procedures and extraction of teeth [18-20]. Local anaesthetics are widely used in periodontal surgical procedures like flap surgery, gingivectomy, gingivoplasty all these procedures are extensive, time consuming and are capable of producing severe pain post operatively and also during the procedure. It is essential to use an anaesthetic which is long acting and effective in reducing pain intraoperatively and postoperatively in these procedures.

Conclusion

Thus Lignocaine and Bupivacaine have their pros and constraints. When compared to lignocaine which is more commonly used in periodontal surgical procedures bupivacaine has longer duration of action and provided better analgesia and anaesthesia. Therefore bupivacaine can be considered as an alternative to lignocaine in long periodontal surgical procedures.

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