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Original Research

Evaluation of effect of adrenaline containing local anaesthesia solution in patients undergoing dental extraction

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ABSTRACT:

Background: Local anaesthetics are frequently used by the dental surgeon to control intra-operative pain. When lignocaine and adrenaline are used in combination, they prevent pain transmission passing from the area of injection to the brain and so it numbs the surgical area. Hence; the present study was conducted for evaluating the effect of adrenaline containing local anaesthesia solution in patients undergoing dental extraction. **Materials & methods:** A total of 50 subjects scheduled to undergo dental extraction procedure under the effect of local anaesthetic solution were enrolled. For each patient, a complete case history was compiled, including completion of a basic health questionnaire, to evaluate the patient's general condition. All the subjects were divided broadly into two study groups as follows: Group A: 25 patients receiving 2% lignocaine local anesthetic with adrenaline (1:80,000), and Group B: 25 patients receiving 2% lignocaine local anesthetic without adrenaline (1:80,000). All the dental procedures were carried out under the hands of skilled and experienced oral surgeons. Regular monitoring of hemodynamic response was done. All the results were recorded and analysed by SPSS software. **Results:** While comparing the pulse rate, systolic blood pressure and diastolic blood pressure in between group A and group B at baseline, after administration of local anesthesia and during dental extraction procedure, non-significant results were obtained. **Conclusion:** Adrenaline does not have any significant effect on the hemodynamic responses among patients undergoing dental extraction procedures under local anesthesia.

Key words: Adrenaline, Dental, Extraction

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INTRODUCTION

Pain is a nearly ubiquitous phenomenon—a fact of everyday life. Pain is the chief symptom that brings patients to dental or medical attention. Local anaesthetics are frequently used by the dental surgeon to control intra-operative pain. An oral surgeon has to use local anaesthetics for most minor surgical procedures. Increase in stress, decrease in physical activity, irregular food habits, consumption of nutritionally poor food have a detrimental effect on a person's health. All these factors and many more have increased the incidence of juvenile and maturity onset diabetes on one hand and the use of hypoglycemics on the other. Since lignocaine with or without adrenaline is one of the most commonly used local anaesthetics in our country, we decided to undertake a study to observe its effects on blood glucose concentration in patients undergoing tooth extraction.[1-3]

When lignocaine and adrenaline are used in combination, they prevent pain transmission passing from the area of injection to the brain and so it numbs the surgical area. This study signifies that painful procedures in oral and maxillofacial surgeries, such as minor surgical procedures or major surgeries, can be performed easily without causing pain and discomfort to patients. The numbness will constantly wear off following the surgical procedure under local anesthesia.[4, 5]

Extraction is the most common minor oral surgical procedure in oral and maxillofacial surgery. Painless tooth extraction using the local anesthetic agent is the requirement for the comfort of the patient. Lignocaine (xylocaine) is a commonly used drug to produce local anesthetic effect. Xylocaine, a local

anesthetic agent, can be used as plain or with epinephrine (adrenaline) and is administered topically or by injection. It is used as the backbone ingredients for minor and major surgical procedures as local and regional anesthesia or analgesia for the oral surgical procedures. Dental extractions are associated with pain and require potent local anesthetics that can keep the patient comfortable during the procedure. Lignocaine is available for more than half a century and is still being widely used in clinical as well as the academic practice even with the advent of newer local anesthetic agent.[6- 9]Hence; the present study was conducted for evaluating the effect of adrenaline containing local anaesthesia solution in patients undergoing dental extraction.

MATERIALS & METHODS

The present study was conducted for evaluating the effect of adrenaline containing local anaesthesia solution in patients undergoing dental extraction. A total of 50 subjects scheduled to undergo dental extraction procedure under the effect of local anaesthetic solution were enrolled. For each patient, a complete case history was compiled, including completion of a basic health questionnaire, to evaluate the patient's general condition. Patients with decompensated systemic diseases contraindicating or impeding dental treatment were excluded from the study, as were those who had arterial hypertension or were receiving medication capable of interacting with the drugs contained in the anesthetic solutions used. All the subjects were divided broadly into two study groups as follows:

Group A: 25 patients receiving 2% lignocaine local anesthetic with adrenaline (1:80,000),

Group B: 25 patients receiving 2% lignocaine local anesthetic without adrenaline (1:80,000)

All the dental procedures were carried out under the hands of skilled and experienced oral surgeons. Regular monitoring of hemodynamic response was done. All the results were recorded and analysed by SPSS software.

RESULTS

Mean age of the patients of group A and group B was 32.8 years and 35.1 years respectively. There were 15 males and 10 females in group A while there were 13 males and 12 females in group B. While comparing the pulse rate, systolic blood pressure and diastolic blood pressure in between group A and group B at baseline, after administration of local anesthesia and during dental extraction procedure, non-significant results were obtained.

Table 1: Comparison of in hemodynamic response

Variable		Group A	Group B	p- value
Pulse rate	Baseline	80.3	81.2	0.25
	After local anesthesia	82.8	83.1	0.13
	During dental extraction	84.6	85.4	0.65
Systolic blood pressure (SBP)	Baseline	122.8	124.5	0.35
	After local anesthesia	120.3	122.4	0.19
	During dental extraction	126.5	124.7	0.27
Diastolic blood pressure (DBP)	Baseline	80.3	82.4	0.81
	After local anesthesia	84.6	84.2	0.93
	During dental extraction	83.6	85.4	0.92

DISCUSSION

Local anesthetic agents are chemicals that reversibly block the transmission1 of action potential of nerve membrane. An essential pre-requisite to success in dentistry is to achieve good quality local anesthesia (LA). Local anesthetic agents are normally associated with absence of pain during surgical intervention in bone and soft tissue. There are many local anesthetic agents, lignocaine being the gold standard available with the wide selection of vaso-constrictive agents that improve the clinical efficacy and the duration LA. Lignocaine diffuses readily through interstitial tissues and lipid rich nerves, giving rapid onset of action. Its vasodilating effect is more than that of prilocaine and mepivacaine. Adrenaline prolongs the duration as well as the depth of anesthesia. It is effective in preventing or minimizing blood loss during surgical procedures. Due to vaso-constrictive effects of adrenaline, absorption of LA and systemic toxicity are reduced.[6- 9]Hence; the present study was conducted for evaluating the effect of adrenaline containing local anaesthesia solution in patients undergoing dental extraction.

Mean age of the patients of group A and group B was 32.8 years and 35.1 years respectively. There were 15 males and 10 females in group A while there were 13 males and 12 females in group B. In a previous study conducted by Saxena A et al, authorscompared the adequacy of analgesia achieved and the effects of xylocaine hydrochloride 2% without adrenaline and xylocaine hydrochloride 2% with adrenaline (1:200,000), used as local anesthetics in dentistry for extraction of tooth. Two hundred and fifty patients of varying age and sex, requiring at least extraction of two teeth, were picked from the outpatient department of oral and maxillofacial surgery. In each patient, two teeth were extracted under local anesthesia, one under xylocaine plain and other under xylocaine with adrenaline. Time of onset, depth, and duration of analgesia were recorded. Lidocaine with

epinephrine (1:200,000) local anesthesia efficacy in dental extractions is more effective than lidocaine without adrenaline in extraction of tooth, and the onset, duration, and depth of analgesia of xylocaine hydrochloride with adrenaline were good as compared to plain xylocaine (xylocaine without adrenaline). Thus, lignocaine as a local anesthetic may be an effective drug in dental extractions with the higher safety margin.[10]

While comparing the pulse rate, systolic blood pressure and diastolic blood pressure in between group A and group B at baseline, after administration of local anesthesia and during dental extraction procedure, non-significant results were obtained. Managutti A et al compared the efficacy and cardiovascular effects with the use of 2% lignocaine with two different concentrations.Forty patients underwent extractions of mandibular bilateral teeth using 2% lignocaine with two different concentrations - one with 1:80000 and the other with 1:200000. There was no significant difference in the efficacy and duration with the 2% lignocaine with 2 different concentrations. 2% lignocaine with 1:80000 adrenaline concentration has significantly increased the heart rate and blood pressure especially systolic compared with the lignocaine with 1:200000. Though 2% lignocaine with 1:80000 is widely used in India, 1:200000 adrenaline concentrations do not much affect the cardiovascular parameters.[11]

CONCLUSION

Adrenaline does not have any significant effect on the hemodynamic responses among patients undergoing dental extraction procedures under local anesthesia.

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