

# Blood Pressure and Pulse Changes after Injection of Local Anesthesia and Adrenaline in Oral Surgical Procedures

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## Abstract

*Introduction:* Lignocaine with adrenaline is used in oral surgical procedures widely. Catecholamines have a significant role in increasing haemodynamic parameters like blood pressure, blood glucose level and pulse rate. In this study we study the effect of lignocaine with adrenaline on blood pressure and pulse rate. *Material and Methods:* A comparative double blind study was designed on 40 healthy males and females who needed extraction of tooth. In 20 patients only lignocaine was used and in other 20 subjects lignocaine was added with adrenaline. The changes in blood pressure were recorded after injection in both the groups. *Results:* There was increase in variables like mean systolic and diastolic blood pressure and heart rate in patients where adrenaline was used with lignocaine where as there was decrease in the same variables in the patients in whom only lignocaine was used. However, the results weren't statistically significant. *Conclusion:* There is change in haemodynamic variables in patients in whom lignocaine with adrenaline was used, however the use of adrenaline doesn't bring any significant change in studied variables.

**Keywords:** Adrenaline; Blood Pressure; Pulse Rate.

## Introduction

The oral surgical procedures are pleasant if carried out painlessly. Most of the times these procedures are carried out under local anesthesia [1]. The vasoconstrictor properties of adrenaline not only reduces bleeding and prolong the duration of local anesthesia but also reduces the complications of the local anesthesia. Ever since the discovery of lignocaine in 1943, it has been used extensively in dentistry and other allied medical specialities [2]. The most apprehensions about its use are its systemic side effects like vasovagal shock, hyperventilation syndrome, tachycardia, shivering, and the loss of consciousness. Since lignocaine is vasodilator, adrenaline is added to prolong its effects as local anesthetic to produce desirable

anesthesia. However, the anxiety associated with the dental procedures leads to production of catecholamines and exogenous administration of adrenaline has synergistic effect and can have serious metabolic and haemodynamic effects [3].

The present study aims to study the effect of lignocaine with adrenaline and lignocaine only in patients undergoing minor oral surgical procedures like extraction of tooth

## Materials and Methods

The study was conducted on outpatient basis on 40 patients with the age group 25 to 40 years of age, 20 patients in experimental group (group A) in whom lignocaine with adrenaline was used were

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studied and in the control group (group B) 20 patients were given only lignocaine at Dental Impant and Faciomaxillary Clinic Bandipore Kashmir. The patients were allocated to the groups blindly and the operator also didn't knew which drug was used in which group of patient. The injections were covered with coloured cloth to eliminate the bias. Only healthy patients who were normotensive and had normal baseline and normal ECG were selected for the study. Proper consent was obtained for the procedure .

Sethoscope (Litman) and Diamond LED regular (mmHG) was used for blood pressure measurement before the procedure and 10 minutes after injection.

Pulse oximeter was used to measure heart rate before the procedure and 10 minutes after the injection.

A standard protocol was followed for the procedure. Patients who needed only extraction of one tooth were selected for the procedure. Only 2ml of solution containing lignocaine and 1:80000 of adrenaline was used in Group A and Group B only 2ml of lignocaine was used. Patients in whom block was repeated or with positive aspiration were excluded from the study. The results were entered

into master sheet and SPSS software was used for data compilation.

## Results

The study consisted of 20 patients with mean age of 33 years in group A with equal distribution of sexes. In the study group the mean systolic blood pressure increased from 124.55 to 126.43mmHg where as mean diastolic blood pressure increased from 79.70 to 81.58mm Hg where as mean pulse rate increased from 79.73to 80.57 per minute (Table 1), In the control group B (lignocaine without adrenaline) the mean age of studied subjects was 31with males and females distributed equally the mean systolic BP decreased from 123.83mmHg to 121.59 mmHg after injection,whereas the diastolic BP decreased from 80.73 to 79.79 with a slight decrease of mean heart rate from 79.73to 79.19 per minute after injection (Table 2). The mean increase in blood pressure in group A and decrease in blood pressure was significant, however all other variables studied changed after injection but were not stastically significant (p value >0.05) in both the groups

Table 1: Group A (lignocaine with adrenaline)

	No of subjects	Pre-Injection(Mean)	Post -Injection(Mean)
Systolic BP(mmHg)	20	124.55	126.43
Diastolic BP(mmHg)	20	79.70	81.58
Pulse Rate(per minute)	20	79.73	80.57

Table 2: (Lignocaine without adrenaline)

	No of Subjects	Pre-Injection	Post -injection
Systolic BP(mmHg)	20	123.83	121.59
Diastolic BP(mmHg)	20	80.73	79.79
Pulse Rate(per minute)	20	79.73	79.19

## Discussion

It is presumed that local anesthesia with adrenaline will increase blood pressure and heart rate. Since dental procedures release lot of catecholamines due to stress the effect could get compounded [4]. In our study in experimental group in which adrenaline with lignocaine was used ,there was significant increase in mean systoic blood pressure where diastolic blood pressure and heart rate didn't change much significantly,where as in control group in which only lignocaine was used the mean blood pressure dropped from pre injection

to post injection phase significantly, however there was not much change in other variables like mean diastolic blood pressure and mean pulse rate. Both the changes could be explained by the vasoconstrictor properties of adrenaline in the experimental group and vasodilator properties of lignocaine in case of control group [5]. Though some studies conclude that there is no change in haemodyanmices in both the groups [6], however other studies show there can be significant changes in blood pressure and heart rate after the injection of local anesthesia with adrenaline [6,7,8]. Kohler-Knoll concluded that local anesthesia containing catecholamines increased the blood pressure

significantly [9]. There is still a lot of controversy surrounding the use of adrenaline in local anesthetics [10], with the most of the studies showing there is no change in parameters like blood pressure and heart rate [11], and most of our results in the study almost show the same results. Though adrenaline has documented use in increasing the duration of action of local anesthesia and reducing the complications [12,13,14].

## Conclusion

Adrenaline with lignocaine doesn't bring any significant changes in parameters like blood pressure and heart rate and lignocaine alone doesn't bring any significant changes also. Adrenaline used with lignocaine isn't associated with significant changes in cardiac parameters like blood pressure and heart rate. However, significant changes in haemodynamics in increased doses need to be elucidated.

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