Original Article

# The Evaluation of the Changes in Blood Pressure of Patients During Tooth Extraction

Blood Pressure Variation During Tooth Extraction

**1. Muhammed Junaid Lakhani 2. Muhammad Mohsin Girach 3. Anjum Tariq 4. Michelle Griffin**

1. Prof. of Oral Maxillofacial Surgery, 2. Prof. of Oral Maxillofacial Surgery, 3. Asstt. Prof. of Operative Dentistry, 4. Demonstrator, Dept. of Oral Maxillofacial Surgery, Jinnah Medical and Dental College, Karachi

## ABSTRACT

**Objective:** This study was conducted to evaluate the changes in blood pressure of hypertensive patients having dental extraction under a local anesthetic containing epinephrine.

**Study Design:** Cross-sectional descriptive and analytical study

**Place and Duration of Study:** This study was carried out at Jinnah Medical & Dental College (JMDC) from January 2015 to April 2015.

**Materials and Methods:** The data was collected from the patients visiting the Oral Surgery OPD of Jinnah Medical & Dental Colleges, Karachi. The study was conducted at Jinnah Medical and Dental College to evaluate the changes in blood pressure of patient with a known history of hypertension controlled using medications. All the patients underwent uncomplicated dental extraction. The blood pressure was recorded at three times: before the local anesthesia, 3 minutes post local anesthesia, and 3 minutes post extraction.

2 % Lidocaine with adrenaline 1:180,000was used for local anesthesia. Careful administration of anesthesia was ensured to avoid direct injection into the bloodstream. In majority of cases only 2 anesthetic ampules were used (only two patient required 3 ampules). The data was stored in excel worksheet and was analyzed using SPSS.

**Results:** The total sample size was 122 patients seen in the Oral and maxillofacial surgery department of JMDC. There were 52 females and 70 males. Mean age was 46.17 ±13.26 years (range 25-78). The age was further divided into four groups;

Group 1: 25-34, Group 2: 35-44, Group 3: 45-54, Group 4: 55 and above. There was no significant change in diastolic and systolic blood pressure blood pressure at three time points. Paired sample T test was used, the only significant difference was in SBP before (SBP1) and after anesthesia (SBP2) (t= -2.28 p=0.045). No significant change noticed in the DBP values at DBP1, DBP2 and DBP3. Amongst the age group the significant variation in systolic blood pressure was seen in the age group 3 and 4.

**Conclusion:** This study was conducted to find out the changes in blood pressure of patients with a known history of hypertension controlled using medications. The study showed no significant changes in the observed parameters.

**Key Words:** Blood pressure changes, Hypertension, Local anesthesia with vasoconstrictor

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## INTRODUCTION

For successful dentistry achieving good-quality local anesthesia (LA) is a prerequisite. Local anesthesia acts by blocking the nerve conduction of both myelinated and unmyelinated nerve fibers. It is a reversible change and it slows down the depolarization phase, and decreases the influx of sodium ions.

Local anesthetic agents commonly used in dentistry is Lidocaine in combination with vasoconstrictors like Epinephrine.[1] Epinephrine is added in local anesthetic to reduce bleeding and increase its safety as lower anesthetic doses are required for effective anesthesia.[2,3,4] Physiological responses associated with local anesthetic solutions containing a vasoconstrictor include changes in heart rate and blood pressure.[5,6,7] Researchers observed a significant increase from 5 to 12 mmHg in the systolic blood pressure in patients submitted to root surface debridement without local anesthesia.[8,9] Use of epinephrine in patients with known history of CVS problems is controversial, although new research shows that using vasoconstrictor in local anesthesia appears to be safe and it also provide relief patient's pain and discomfort during dental treatment.[10,11]

This study was conducted to find out the changes in blood pressure of hypertensive patients having dental extraction under a local anesthetic containing epinephrine.

**Correspondence: Dr. Muhammed Junaid Lakhani**
Prof. of Oral Maxillofacial Surgery, Jinnah Medical and Dental College, Karachi
**Contact No.: 0300-8222287**
**E-mail: drmjunaid@hotmail.com**

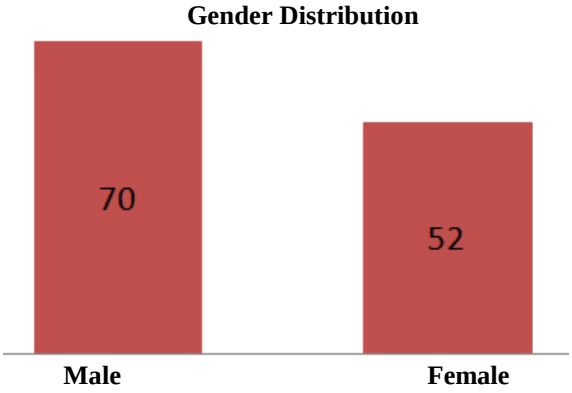
## MATERIALS AND METHODS

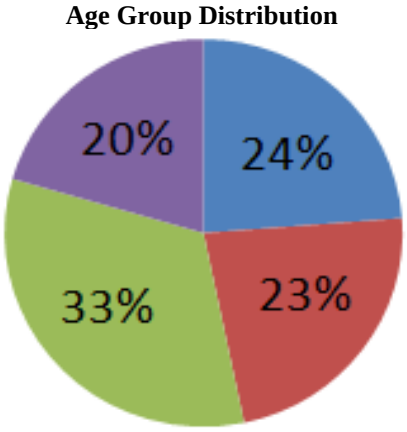
The study was conducted at Jinnah Medical and Dental College (JMDC) from January 2015 to April 2015.The study was conducted to evaluate the changes in blood pressure of patient with a known history of hypertension controlled using medications. A comprehensive history and clinical examination was performed to assess the health status . All patients had OPG done to evaluate the dental health status. All the patients underwent uncomplicated dental extraction. The blood pressure was recorded at three times: before the local anesthesia, 3 minutes post local anesthesia, and 3 minutes post extraction.2 % Lidocaine with adrenaline 1:180,000 was used for local anesthesia. Careful administration of anesthesia was ensured to avoid direct injection into the bloodstream. In majority of cases only 2 anesthetic ampules were used (only two patient required 3 ampules).The patients having controlled hypertension using medications, maximum systolic blood pressure of 140 mmHg, and maximum diastolic blood pressure of90 mmHg were included in the study. Consent was taken from all patients and the purpose of the study was explained. Patients underwent uncomplicated dental extraction. No premedication like anxiolytic was given to relax the patients. Patients were asked to take their routine medicine after breakfast on the day of extraction. Patients were instructed to avoid alcohol and smoking from the night prior to extraction. Mercury sphygmomanometer was used to record the blood pressure (BP). The blood pressure was recorded in sitting position on the right hand. For local anesthesia 2 % Lidocaine with adrenaline 1:180,000 was used. Infiltration along with inferior alveolar nerve block was used for lower molar extractions. Auto-aspirating syringe was used to deliver anesthesia to avoid directly injecting the anesthesia into the bloodstream. In majority of cases only 2 anesthetic ampules were used (only two patient required 3 ampules).The data was stored in excel worksheet and was analyzed using SPSS.

## RESULTS

The total sample size was 122 patients seen in the Oral and maxillofacial surgery department of JMDC. There were 52 females and 70 males. Mean age was 46.17 ±13.26 years (range 25-78). The age was further divided into four groups;

Group 1: 25-34, Group 2: 35-44, Group 3: 45-54, Group 4: 55 and above.




36% of the total patients were using antihypertensive drugs along with other drugs for other comorbidities. The most commonly used antihypertensive drug was Atenolol which accounted for 55% followed by angiotensin II receptor antagonists 35%, and about 10% were using calcium antagonists.

**Table No.1: Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Pair 1 | SBP1 SBP2 | -1.680 | 9.150 | .828 | -3.320 | -.040 | -2.028 | 121 | .045 |

**Table No.2: Paired Samples Test**

| | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pair 1 | SBP1<br>SBP3 | -.779 | 13.996 | 1.267 | -3.287 | 1.730 | -.615 | 121 | .540 |

Comorbidities were present in 76.3% of the patients; the remaining 23 % had only hypertension. Type 2 diabetes mellitus and Ischemic heart disease were the most common comorbidities. 45/122patients were smokers. Regarding number of ampules in majority of cases only 2 anesthetic ampules were used (only two patient required 3 ampules). The reasons for extraction included; dental caries in 90 cases, periodontal problems in 14 cases, and combination in 18 cases.

Data showed no significant changes in diastolic and systolic blood pressure blood pressure at three time points. Paired sample T test was used, the only significant difference was in SBP before (SBP1) and after anesthesia (SBP2) (t=-2.28 p=0.045). No significant change noticed in the DBP values at DBP1, DBP2 and DBP3.Table1.

Those patients who required less than two anesthetic ampules showed a non-significant change in SBP between the first and third time points (i.e.,SBP1 and SBP3) (t= -0.615 p=0.0540). Table 2.

Amongst the age group the significant variation in systolic blood pressure was seen in the age group 3 and 4. Table 3.

**Table No.3: Age-wise Mean BP**

| Age Group | SBP1 | SBP2 | SBP3 |
|---|---|---|---|
| 1 | 117.24 | 120.34 | 117.76 |
| 2 | 121.79 | 121.25 | 119.29 |
| 3 | 123.00 | 125.38 | 128.00 |
| 4 | 131.80 | 133.20 | 129.80 |

# DISCUSSION

In literature many studies have investigated the blood pressure changes in the patients undergoing tooth extraction in local anesthetic injection with vasoconstrictor[12,13,14]. In our study there was no significant difference in diastolic and systolic blood pressures at three time points. The only significant difference noticed was in SBP before the procedure (SBP1) and after anesthesia (SBP2). There was no difference in diastolic blood pressure (DBP) at any point that is (DBP1, DBP2 and DBP3). In our study we used vasoconstrictor with the local anesthesia and it did not significantly affect the blood pressure similar findings were reported in the study conducted by Silvestre et al.[15]

The only significant finding was a slight increase in mean SBP before and after the anesthesia. This could be because of anxiety or discomfort.

# CONCLUSION

This study was conducted to find out the changes in blood pressure of patients with a known history of hypertension controlled using medications. The study showed no significant changes in the observed parameters.

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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