



TO EVALUATE THE CHANGES IN BLOOD PRESSURE, OXYGEN SATURATION AND HEART RATE IN 1:80,000 VS 1:2,00,000 LOCAL ANAESTHESIA WITH ADRENALINE

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Abstract- Local anaesthesia (LA) is widely used for medical procedures including maxillofacial surgeries. In 1948, lidocaine was the first local amide anaesthetic to be marketed and since then has become the “gold standard” against which other LAs are measured.^{1,2,3}

Lidocaine in dentistry is used either as plain LA i.e. without vasoconstrictor or with vasoconstrictor. The commonly used vasoconstrictor is adrenaline. Its effects, systemic as well as local at the site of injection are well established.

Aims & Objectives- The aim of this study was to quantitatively assess different hemodynamic parameters (SpO₂, Heart Rate, Blood Pressure) during extraction under local anaesthesia at different concentrations of 1:80,000 and 1:2,00,000 with adrenaline.

Material & Methods- This is a prospective, randomised controlled study. Patients who reported for extractions were included in the study. Hundred patients who satisfied the required criteria formed the study sample.

Summary & Conclusion- The present study was conducted on a local population of sample size hundred evaluating their haemodynamic changes using pulse oximeter while administering lignocaine alone and lignocaine with adrenaline in different concentration of 1:80,000 and 1: 2,00,000 in otherwise healthy individuals.

The present study comprises of two groups. Group I shows effect of lignocaine 2% with adrenaline 1:80,000 on blood pressure. In this group both systolic and diastolic blood pressure increases 100%.

Keywords- Local anaesthesia, vasoconstrictor, vasodilator

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DOI: 10.48047/ecb/2023.12.si5a.0446

Introduction-

Local anaesthesia (LA) is widely used for medical procedures including maxillofacial surgeries. In 1948, lidocaine was the first local amide anaesthetic to be marketed and since then has become the “gold standard” against which other LAs are measured.^{1,2,3}

Lidocaine in dentistry is used either as plain LA i.e., without vasoconstrictor or with vasoconstrictor. The commonly used vasoconstrictor is adrenaline. Its effects, systemic as well as local at the site of injection are well established. Adrenaline aids in less bleeding at the site of injection.⁴ It diminishes systemic toxic effects of lidocaine by slowing its incorporation, thereby increasing depth and duration at the site of administration.^{5,6} However, also documented are side effects of adrenaline and potential dose-related cardio-vascular effects.⁷ Therefore, it is imperative that the effects of adrenaline with vasoconstrictor in comparison with plain LA be studied and interpreted to better understand its systemic and local effects.

Material & Methods

All patients were categorised into groups based on the choice of local anaesthetic agent used with their respective concentration of adrenaline. The total no. of groups being two group I received Lignocaine 2% with adrenaline 1:80,000 and group II received Lignocaine 2% with adrenaline 1:2,00,000.

Results

MEAN VALUES OF BLOOD PRESSURE IN 2% LIGNOCAINE 1:80,000

	5 MIN BEFORE LA		IMMEDIATELY after LA		5 MIN After LA	
	Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
Mean	120.6	79.88	128.68	88.56	133.88	93.6
Median	121	80	130	90	134	94
SD	7.14	5.90	5.49	4.31	4.65	4.44
Range						
Min	102	70	110	80	120	86
Max	134	90	140	100	144	108

MEAN VALUES OF BLOOD PRESSURE IN 2% LIGNOCAINE 1:2,00,000

	5 MIN BEFORE LA		IMMEDIATELY after LA		5 MIN After LA	
	Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
Mean	121.8	80.28	121.84	79	121.92	80.8
Median	122	80	120	80	120	80
SD	7.45	6.36	8.48	8.33	5.73	5.41
Range						
Min	102	70	100	60	110	70
Max	134	90	136	92	134	94

A standard nerve block was administered using a disposable aspirating type syringe and 26-gauge long needle. Aspiration was performed after needle insertion and before deposition of anaesthetic solution to avoid inadvertent intravascular injection. Injection was administered slowly at a rate of 1ml per minute. All patients received. 2-5 ml of local anaesthetic solutions during each appointment.

Under each group, the following parameters such as oxygen saturation, heart rate, systolic and diastolic blood pressure were recorded immediately after administration and at timely intervals of 5 min before LA administration, after LA & 5 minutes after LA.

Inclusion criteria-

- Age of patient between 20 and 30 years.
- In cases of multiple extractions.
- Subjects of both genders.

Exclusion criteria-

- Third molar removal during any other maxillofacial procedure.
- Patients that have any systemic disease.
- Patients with an implanted pacemaker or implantable cardioverter defibrillator (ICD)
- Cases of cyst, tumour.

MEAN VALUES OF HEART RATE IN 2% LIGNOCAINE 1:80,000 WITH ADRENALINE

	5 min before LA	immediately after LA	5 min after LA
Mean	82.92	84.72	84.58
Median	82	84	85
SD	14.757689	17.210628	14.7608
Range			
Min	51	55	54
Max	139	144	124

MEAN VALUES OF HEART RATE IN 2% LIGNOCAINE 1:2,00,000 WITH ADRENALINE

	5 MINUTES BEFORE LA	IMMEDIATELY AFTER LA	5 MIN AFTER LA
Mean	94.94	86.4	88
Median	97	87	88.5
SD	15.22	14.8	13.6
Range			
Min	50	55	54
Max	154	124	125

MEAN VALUES OF SPO2 IN 2% LIGNOCAINE 1:80,000 WITH ADRENALINE

	5 min before LA	immediately after LA	5 min after LA
Mean	97.76	97.84	98.12
Median	98	98	98
SD	1.72	1.63	1.18
Range			
Min	90	92	94
Max	100	100	100

MEAN VALUES OF SPO2 IN 2% LIGNOCAINE 1:2,00,000 WITH ADRENALINE

	5 min before LA	immediately after LA	5 min after LA
Mean	97.88	97.78	98.12
Median	98	98	98
SD	1.64	1.56	1.11
Range			
Min	90	92	94
Max	99	99	99

BLOOD PRESSURE CHANGES WITH ADRENALINE IN 1:80,000 CONCENTRATION-

Immediately after LA- The present study shows 100% increase in systolic and diastolic blood pressure immediately after LA administration. The present study shows that changes immediately after LA (systolic) number of cases which shows increase in systolic blood pressure after LA administration is 100% and Changes immediately after LA (diastolic) number of cases which shows increase in diastolic blood pressure after LA administration is 100%.

Changes 5 minutes after LA (DIASTOLIC)-

Changes 5 minutes after LA (systolic) number of cases which shows increase in systolic blood pressure after LA administration is 100% Changes 5 minutes after LA (diastolic) number of cases

which shows increase in diastolic blood pressure after LA administration is 100%

BLOOD PRESSURE IN 1:80,000 LA WITH ADRENALINE

The mean value of the changes after LA (Systolic) is 8.08 and the median is 8. The value of Standard deviation is 3.26. Minimum range is 2 while the maximum range is 18. The mean value of changes after LA (Diastolic) is 8.68 and the median value is 8. The value of Standard deviation is 3.32. The value of minimum and maximum range is same as that of LA (systolic) i.e. 2 and 18 respectively. Changes 5 min after LA (Systolic)- The mean value is 13.28 and the median value is 14. The value of Standard deviation is 3.97. The range of minimum is 6 and maximum range is 22. Changes 5 min. after LA (Diastolic)- The mean value is 13.72 and the median value is 14. The value of Standard deviation

is 3.68. The range of minimum value is 6 and maximum is 24.

BLOOD PRESSURE IN 1:20,000 LA WITH ADRENALINE

Changes after LA (Systolic)- The mean value is 0.04 and the median value is 0. The value of standard deviation is 8.48.

Changes after LA (Diastolic)- The mean value is 1.28 and the median value is same as that of systolic LA is 0. The value of standard deviation is 8.35.

Changes 5 min. after LA (Systolic)- The mean value is 0.12 and the value of median is 1. The value of standard deviation is 8.29.

Changes 5 min. after LA (Diastolic)- The mean value is 0.52 and the median is 0. The value of standard deviation is 7.36.

HEART RATE AND 1:80,000 LA CONCENTRATION-

Immediately after LA- The mean value of Heart Rate immediately after LA is 1.8 and the median value is 1.5 The value of Standard Deviation is 10.72.

Changes in Heart Rate 5 minutes after LA- The mean value is 1.66 and the median is 2.5 the value of standard deviation is 10.83.

HEART RATE AND 1:20,000 LA CONCENTRATION-

Immediately after LA- The mean value is 8.54 and the median is 4. The value of standard deviation is 15.35

Changes 5 min. after LA- The mean value is 6.94 and the median value is 4.5 , the value of standard deviation is 15.62.

SPO2 IN 1:80,000 LA CONCENTRATION-

Changes Immediately after LA-The mean value is 0.08 and the median value is 0. The value of Standard Deviation is 1.94.

Changes 5 min. after LA- The mean value is 0.36 and the median value is 0. The value of Standard deviation is 1.66.

SpO₂ in 1:20,000 LA Concentration-

Changes immediately after LA- The mean value is 0.06 and the median value is 0. The value of standard deviation is 1.99

Changes 5 min. after LA- The mean value is 0.22 and the median value is 0. The value of Standard deviation is 1.61

Discussion

Haemodynamic changes are well proved which occurs in our day-to-day life in circulatory system of the body. Certain enzymes and chemicals are produced which are beneficial for our physical mechanism. These chemicals have effect on most of the systems like circulatory, respiratory and neurosensory etc. The nervous regulation is rapid among all the mechanism involved in the regulation of the arterial blood pressure. When the blood pressure alters, the nervous system brings the pressure back to normal within few minutes although nervous mechanism is quick in action, it operates only for a short period and then it adapts to the new pressure. Hence, it is called short-term regulation. The nervous mechanism regulating the arterial blood operates through the vasomotor system.

Summary & Conclusion

The present study comprises of two groups. Group I show effect of lignocaine 2% with adrenaline 1:80,000 on blood pressure. In this group both systolic and diastolic blood pressure increases 100%

Group II shows effect of lignocaine 2% with adrenaline 1:200000 on blood pressure, heart rate and Spo₂ This analysis showed variation in heart rate, systolic blood pressure and diastolic blood pressure in patients who received lignocaine with adrenaline concentrations of 1:80,000 and 1:2,00,000. These variations were more in adrenaline concentrations of 1:80,000 than 1:2,00,000, but was not marked.

In this study we found minor variations in HR and Spo₂ with adrenaline concentrations of 1:80,000 and 1:2,00,000 dilutions when compared to plain lignocaine. All these variations were found to be more in lignocaine with adrenaline 1:80,000 group (Group II), even though it was not prominent.

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