

## Research

# Effect on Blood Glucose Level After Injection of Lignocaine with Adrenaline (Original Research)

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### Abstract:

**Introduction:** The injection of local anesthesia with adrenaline in oral surgical procedures is associated with the metabolic changes in blood glucose level. The present paper aims to study the changes in blood glucose level after injection of lignocaine with adrenaline

**Materials and Methods:** The study was carried out on 30 healthy subjects who needed minor oral surgical procedure under local anesthesia. The patients were excluded for any blood sugar or other metabolic and endocrine disorders. The procedure was carried out with 2ml of lignocaine with adrenaline and the blood glucose was measured pre and post operatively after 10 minutes.

**Results:** The study showed that there is no significant ( $p$  value  $< 0.05$ ) increase in blood glucose levels after injection of lignocaine with adrenaline on healthy studied subjects with mean age of 27.66 years.

**Conclusion:** Injection of adrenaline with the lignocaine doesn't increase blood glucose significantly in healthy subjects. **Key words:** Blood glucose, adrenaline, local anesthesia

Date of Submission: 22 -09-2017

Date of acceptance: 05-10-2017

## I. Introduction

Most of the oral surgical procedures are carried out under local anesthesia all over globe. Painless dentistry is an important innovation of the modern times. In painless procedures patients behave and co-operate more effectively and procedure turns out to be a pleasant experience for lifetime. The most commonly used local anesthetic is lignocaine. The addition of adrenaline to lignocaine not only reduces bleeding and other complications but also increases the duration of local anesthetic which increases the flexibility of the operator in performing the variety of procedures<sup>1</sup>. Vasovagal shock, hyperventilation syndrome, tachycardia, shivering, and the loss of consciousness are one of the common complications reported after injection of lignocaine. The stress of dentistry and injection procedures cause pain and activate sympathetic activity which induce secretion of endogenous catecholamines, which could have a synergistic effect with the vasoconstrictors used in the local anesthetic material, leading to undesirable side effects<sup>(2,3)</sup>. The increased endogenous secretion of catecholamines and adrenaline have a role in increasing the blood glucose level<sup>4</sup>. The blood sugar level changes following administration of adrenaline containing local anesthesia have been observed as a subject of controversy in some studies<sup>(5,6,7)</sup>. No conclusive evidence is yet confirmed even though a lot of research has been done in this regard. The hemodynamic and blood glucose fluctuations after local anesthetic injection are of importance to know to manage some emergent conditions that may occur immediately after injection. The objective of this study is to compare the blood glucose level among patients before and after administration of local anesthesia containing adrenaline 1:80,000 among healthy patients who needed dental procedure like extraction.

## II. Material And Methods

The medically fit 30 patients with age ranging from 20 to 45 years were enrolled for the study after thorough medical examination. A proper consent was obtained for the procedure. The study was carried at Dental implant and Faciomaxillary centre Bandipore Kashmir from July to August 2017. This clinical study was carried out with 2ml of local lignocaine with 1:80,000 concentration of adrenaline which was used to as a nerve block intra orally for the removal of the posterior mandibular teeth. Patients who needed only extraction of one tooth were included in the study.

Patients with diabetes or other underlying medical problems were excluded from the study. Blood glucose level was checked before the injection and 10 minutes after the procedure. Accu Check Active, model

GC, Germany was used for the estimation of blood glucose level from finger samples. The data was entered into master sheet and subjected to statistical analysis. SPSS software was used for the data compilation.

**Table 1:**

Patient	Age /sex	Pre operative Glucose level	Post injection glucose level after 10 minutes
1	22/M	97	105
2	27/M	103	109
3	29/F	83	88
4	34 /F	97	101
5	39/M	117	112
6	21/F	95	87
7	21/F	83	81
8	28/M	96	87
9	33/F	122	131
10	37/M	89	89
11	35/M	83	84
12	32/F	96	83
13	30/F	107	106
14	31/M	101	105
15	27/M	108	104
16	26/M	109	112
17	22/F	123	124
18	21/M	90	93
19	22/F	89	92
20	27/M	104	106
21	24/F	81	89
22	29/F	102	105
23	34/F	89	92
24	40/M	118	107
25	23/M	106	105
26	26/M	94	98
27	29/M	90	94
28	34/M	113	124
29	37/F	106	102
30	33/F	80	82
Mean	27.66 Years	99.03	102.86 (p value >0.05) not significant

### III. Results

The study consisted of 16 males and 14 females with age ranging from 20 to 40 years with overall mean age of 27.66 years. The pre-operative mean blood glucose level ranged from 80 to 123mg/dl with mean of 99.03mg/dl. The post injection blood glucose level varied from 81 to 131mg/dl with a mean of 102.86mg/dl with a mean increase of 3.83 with a p value of >0.05 which is not significant. (Table 1)

### IV. Discussion

Majority of the oral surgical procedures are performed under local anesthesia. The addition of adrenaline not only prolongs then duration of anesthesia but minimizes certain complications of lignocaine as adrenaline is a vasoconstrictor. Local anesthetic with adrenaline may cause rapid rise in heart rate, blood pressure, and random blood sugar level<sup>8</sup>. Adrenaline is known to cause elevation of blood glucose level by increase in glycogenolysis in liver and muscle. It increase the amount of glucose released in to the circulation by liver and decreases the utilization of glucose by muscle<sup>9</sup>. In this study we studied blood glucose level before and after the injection of lignocaine with adrenaline in healthy subjects. In our study the mean increase in blood glucose level was 3.83 which is insignificant which is in conformity with the most of the studies. Tily and Thomas, in 2007 emphasized that dental local anesthesia containing adrenaline can be safely used in healthy and diabetic patients as no significant result (p > 0.05) was seen pre and post-extraction of the tooth<sup>10</sup>. In our study non-significant results may be attributed to smaller volumes of the local anaesthetic agent used as we used only 2ml of the solution only. Some studies suggested a statistical increase in blood glucose level associated with adrenaline in local anaesthesia, which is in contrast to the present study<sup>11</sup>. Meechan JG. states that "four dental local anaesthetic cartridges of 1:100,000 epinephrine must be administered to elicit increase blood glucose level"<sup>5</sup>. Christensen in 1979 observed that an increase in blood glucose levels due to vasoconstrictors used with local anesthetics may be insignificant in normal patients, but can be relevant in diabetic patients<sup>12</sup>. Epinephrine is important in managing the dental procedure, the absence of epinephrine in the local anesthesia reduces the anesthetic effect and diminished effect of local anesthetic makes the procedure stressful, that leads to secretion

of endogenous epinephrine which will cause blood glucose level to increase. To overcome use of adrenaline containing local anesthesia is recommended to reduce the secretion of endogenous adrenaline (Ad et al., 1984)<sup>13</sup>. Akinmoladun et al suggested that patients treated with both local anesthetic with adrenaline and local anesthetic without adrenaline show similar responses in both the groups<sup>14</sup>.

#### V. Conclusion

The study concludes that the use of adrenaline containing local anesthetic solution is not associated with any significant changes in blood glucose levels.

**Source of funding :Nil**

**Conflict of interest :None**

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\*Shabnum Majeed. "Effect on Blood Glucose Level After Injection of Lignocaine with Adrenaline (Original Research)." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* 16.10 (2017): 46-48