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HEMODYNAMIC CHANGES FOLLOWING INTRAORAL INJECTION OF LIDOCAINE IN COMBINATION WITH ADRENALINE DURING TOOTH EXTRACTION

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Abstract

Local anesthetic drugs are used in combination with vasoconstrictors, commonly adrenaline which increases their efficacy and duration of action and reduces bleeding at the operative site. However, adrenaline might have adverse hemodynamic effects, especially in patients with cardiovascular diseases. Hypertensive patients represent a risk group in dental practice. One major apprehension of the dentist is the sudden and dramatic increase in blood pressure that could lead to life-threatening complications including sudden death during a dental procedure. The aim of this study is to measure hemodynamic parameters, blood glucose, oxygen saturation and pain score in normotensive and hypertensive patients following intraoral injection of lidocaine with adrenaline and correlate these changes to the level of pain intensity and plasma metanephrine concentration.

This prospective study was conducted at Basrah College of Dentistry from October 2016 to June 2017. One hundred patients were included in the study for teeth extraction under local anesthesia. Sixty normotensives, 30 had stage one hypertension (BP=140-159/90-99) and ten healthy volunteers for metanephrine assay. All patients were injected with two cartridges of 2% Lidocaine with 1:80,000 adrenaline. Systolic and diastolic blood pressure, heart rate, oxygen saturation, visual analogue scale, blood glucose and plasma metanephrine concentration were measured at different intervals; before anesthetic injection, 5 minutes after injection, during extraction and 10 minutes following the end of tooth extraction.

Administration of local anesthesia with adrenaline in addition to the surgical procedure resulted in a significant increase in systolic blood pressure during tooth extraction (+8.7% and +16.6% mmHg for normotensive and hypertensive patients respectively, $p<0.05$), also heart rate similarly affected in both groups (10.6% and 13.4% respectively), this effect was significantly higher in the hypertensive group. The blood glucose showed a significant increase ($P=0.00$) 30 minutes after injection as compared to baseline. Generally, the peak changes in parameters were observed during tooth extraction procedure in both groups. Metanephrine peak plasma level occurs at 10 minutes following injection and it was significantly correlated with the systolic and diastolic blood pressure.

In conclusions, the injection of lidocaine with adrenaline in addition to the surgical procedure produces significant increase in blood pressure and heart rate in both normal and hypertensive patients which were larger in the latter group. Similarly, plasma metanephrine concentration was increased during the dental procedure and linked to the increase in the systolic blood pressure.

Introduction

Control of dental pain during dental procedures by local anesthesia is considered as one of the most important factors for successful treatment[1]. Lidocaine is particularly safe and ideal anesthetics agent since it has a rapid onset, sufficient duration and can be injected with negligible tissue irritation[2]. Adrenaline by constriction of submucosal blood vessels will also reduce bleeding, shorten onset, increase duration of anesthetics' action and decrease risk of systemic toxicity[3,4]. With all these advantages, adrenaline when absorbed systemically can have undesirable cardiac effects especially in patients with cardiovascular diseases[5]. Hypertension is one of the most common systemic disease