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COMPARITIVE EVALUATION OF CHANGES IN PAIN SCORE AND PULSE RATE DURING EXTRACTION- A PROSPECTIVE RANDOMIZED STUDY

Clinical Research

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ABSTRACT

AIM: The objective of this study is to compare the subjective and objective changes during extraction by correlating the pain score and pulse rate
TYPE OF STUDY: A prospective study carried out on a University affiliated hospital in Chennai.
MATERIAL AND METHOD: This study involved ninety six patients aged between 20 to 70 years who were willing to take part in the study and who presented to the department of oral and maxillofacial surgery with a complaint of pain and for whom extraction was planned. Patients having underlying systemic disorders were excluded from the study.
OUTCOME MEASURE: Pain was assessed using visual analog scale and correlated with measurement of pulse rate using pulse oximeter during extraction.

KEYWORDS:

1. INTRODUCTION

In this modern era, for many people the fear of pain and anxiety prevent the patients seeking dental care. Anxiety owes to pain response stimuli during dental treatment. Fear and anxiety towards dental extraction leads to changes in physiological response which is characterized by rise in pulse rate and blood pressure [1]. Anxiety and psychological stress are interlinked with hemodynamic changes during extraction and other dental treatment procedures. Increase in chronotropoic and ionotroic response and rise in total peripheral resistance in a stressful condition causes cardiac- vagal withdrawal. Activation of adrenergic receptors differs among individuals. [1]

Epinephrine is added in local anesthetics has an effect on cardiovascular system and responsible to produce hemodynamic changes.[2] Partly release of endogenous epinephrine during the injection of local anesthetics results in increase in pulse rate and changes in blood pressure.

Pain is the utmost important factor in patients undergoing tooth extraction. Fear is caused by painful conditions which thereby increase the amount of pain experienced by the patients. Local anesthetic forms the effective drug for management of pain in dentistry. Painful stimuli are detected by the Nociceptors. The signal is carried from the Nociceptors in the form of action potential. Pain is perceived once the signal reaches the cerebral cortex. [3, 4] Depolarization occurs when local anesthesia is administered near the Nociceptors which eventually prevent the signal from central nervous system. [5] The aim of this study is to compare the subjective and objective changes during extraction.

2. MATERIAL AND METHOD

This study was done after getting the informed consent and protocol approval from the institutional ethics committee. Ninety six patients aged 20 to 70 who presented to the department of oral and maxillofacial surgery with a complaint of pain and for whom extraction was planned. Pulse rate was noted using pulse oximeter. Approximately 1.8 ml 2% Lignocaine with 1:200000 adrenaline was administered. The latency time period was found to be 5 to 10 minutes. During extraction pain score was noted using visual analog scale and pulse rate was measured using pulse oximeter.

3. RESULT

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. Out of the ninety six patients who participated in this study 61% were female and 39% were male. (Fig 3.1)

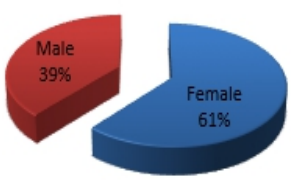

Fig 3.1 Gender distribution

During extraction, based on visual analog scale (VAS) pain score was assessed. The value obtained ranged from 0 to 10 as mild moderate and severe. 51 patients had moderate pain during extraction. 40 patients experienced severe pain whereas 5 patients experienced mild pain. Fig 3.2 shows increase in pain during extraction

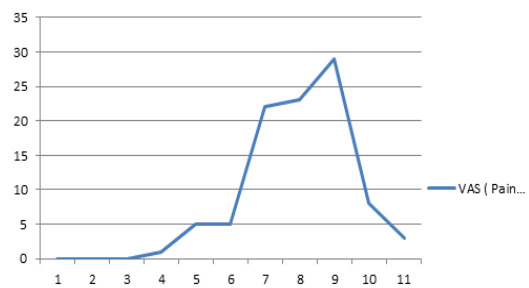

Fig 3.2 VISUAL ANALOG SCALE

Pulse rate was measured using pulse oximeter. It was found that patients who experienced moderate and severe pain had their pulse rate which was considerably high compared to patients who experienced mild pain Fig 3.3 illustrates the increase in pulse rate during extraction.

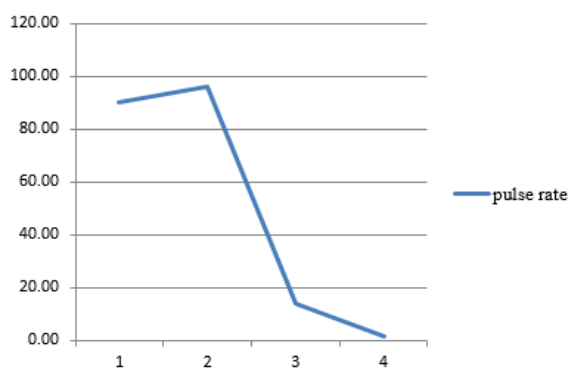

Fig 3.3 PULSE RATE

Tab 3.1 COMPARISON OF PULSE RATE

Pulse rate	mean	N	Std deviation	Std error mean
Baseline	84.8	96	15.4	1.5
During extraction	90	96	13.7	1.4

From table 3.1 and 3.2 it was found that during extraction there is

increase in pulse rate compared to baseline pulse rate. T test was used to compare the increase in pulse rate which states that it is statistically significant

Tab 3.2 T TEST

Paired sample								
	Mean	Std deviation	Std error mean	95% confidence interval		t	df	sig
				lower	upper			
Baseline-extraction	-5.2	16.0	1.6	-8.5	-2.0	-3.2	95	0.002

Tab 3.3 COMPARES PULSE RATE AND PAIN SCORE

	Mean	N	Std deviation	Std error
Pulse rate	90.17	96	13.7	1.4
Pain score	7	96	1.4	0.14

Based on the mean and standard deviation, both the paramters are correlated. (tab 3.3 and fig 3.4)

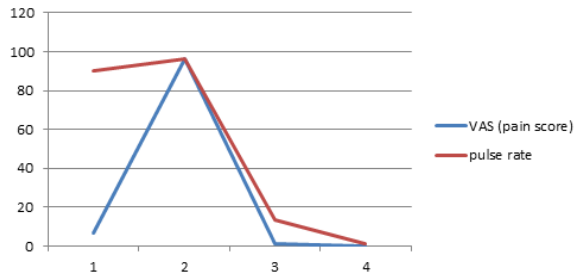

Fig 3.4 COMPARING PAIN SCORE AND PULSE RATE

4. DISCUSSION

Dental extraction induces hemodynamic changes in patients who do not have underlying systemic disease. Anxiety or fear of anticipation of pain may be one of the reasons for increase in pulse rate during extraction. Emotional stress and anxiety has been related to increase in pulse rate and blood pressure changes in hypertensive patients. [1] The role of vasoconstrictors in local anesthetics also cause increase in pulse rate during extraction by releasing the catecholamine. The other reason may be pain during extraction in case of improper or failure to achieve local anesthesia.

Niwa et al [6] and Meral et al [7] in their study reported, rise in pulse rate during extraction. It was stated that this increase in pulse rate may be due to anxiety or anticipation of pain. According to Alexander et al [8], previous uneventful extraction was the reason for the increase in pulse rate. Brand [9], Jowett [10] and Cabot [10] also reported the same.

Liau et al [11], in his study stated that there was increase in pulse rate and blood pressure after injecting local anesthesia. This was due to endogenous release of adrenaline as a result of emotional stress and anxiety.

According to Takuya et al [12], reported significant increase in pulse rate and blood pressure during extraction. He stated that pain related stress was the factor for the hemodynamic changes in the patients. Nathiya et al, [1] stated rise in pulse rate and blood pressure during extraction. It was reported that this objective changes had a close relation to anxiety.

Bispo et al, [13] evaluated the hemodynamic changes at every stage during root canal treatment. As a result of the study, changes were observed in heart rate and blood pressure. It was reported that anxiety to be the reason for the hemodynamic changes.

On the contradictory paramesvaran [14] kingdon and Yokobayashi [15] reported decreased heart rate following the administration of local anesthetics.

Although many studies have been highlighted the relation between increase in blood pressure and anxiety of the patients towards dental treatment, very few studies reported on the correlation between pain and pulse rate. This study aims to compare the pulse rate and pain experienced by the patient during extraction. To measure the pain visual analog scale was used and pulse oximeter was used to measure the pulse rate. Pain score and pulse rate was assessed during extraction and Pulse rate was correlated with pain. It was seen that pain experienced by the patient during extraction corresponds to increase in pulse rate.

5. CONCLUSION

We find that pain have a role on hemodynamic changes during extraction. Results of this study stated that during extraction under local anesthetics there exists a correlation between pulse rate values and pain score.

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