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ORIGINAL ARTICLE

Evaluation of anxiety and hemodynamic changes in surgical removal of lower third molar under local anesthesia.

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ABSTARCT… Objective: To determine the anxiety and hemodynamic changes in surgical removal of lower third molar under local anesthesia. **Study Design:** Comparative Cross-sectional study. **Setting:** Department of Oral and Maxillofacial Surgery, Institute of Dentistry of Liaquat University of Medical Health Sciences, Jamshoro. **Period:** January 2021 to December 2021. **Material & Methods:** Three hundred and fourteen patients were selected by non-probability convenience sampling technique. Patient having age between 18 to 50 years with either gender presented with third molar surgical extraction, first experience of tooth extraction and partial bony impaction were included in study. The demographic and clinical parameters like age, gender, level of anxiety and hemodynamic changes were identified. Hemodynamic parameters were recorded on before starting the surgical procedure (T1), after 5 minutes of injecting local anesthesia (T2) and after completion of surgery (T3). **Results:** Out of 314 patients, male patients were 156 (49.7%) and female patients were 158 (50.3%) with mean age of 31.0 ± 9.2 (18-50). In third molar extraction significant difference was observed for hemodynamic parameters at T1, T2 and T3 intervals. **Conclusion:** Surgical removal of lower third molar under local anesthesia significantly increases the anxiety, blood pressure and heart rate after injecting local anesthesia.

Key words: Anxiety, Hemodynamic, Local Anesthesia, Surgical Extraction, Third Molar.

INTRODUCTION

It is common knowledge that dental anxiety exists, and wisdom teeth extraction is the dental treatment that causes the most dental anxiety out of all others.[1] According to the American Heritage Science Dictionary, anxiety is a feeling of fear brought on by the expectation of a dangerous circumstance or occurrence. While severe dental anxiety (DA), commonly referred to as dental phobia, is a significant and persistent worry that is inordinate or unjustified and is triggered by the thought of a certain item or circumstance. Many individuals of all ages and socioeconomic backgrounds have dental anxiety, which continues to be a substantial issue for both the dentist and the patient while obtaining dental treatment.[2]

The reason of dental anxiety and fear varies depending on the age at which it first manifests; in children, a bad dental encounter is often to blame, but in adults, general anxiety moods are more likely to be to blame. Hemodynamic changes during the procedure may be brought on by such anxiety as well as the use of vasoconstrictor medications and local anesthetics. During the surgical removal of a lower third molar, fluctuations in hemodynamic measures, including systolic and diastolic blood pressure and heart rate, are examined for their relationships to patient gender and anxiety.[3]

It is acknowledged that controlling dental anxiety is a crucial problem in dental practice. Dental treatment is hampered by a patient's fear, which negatively impacts a dentist's performance.[4] Dentists have additional work stress as a consequence of the longer treatment times and often unsatisfactory outcomes of treating worried

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patients. The dentist may take steps to reduce the patient's anxiety during the surgical operation if he is aware of the patient's degree of dental anxiety in advance.[5]

The therapy of third molars often depends on determining the existence of symptoms or a condition that may be directly linked to the third molar. A strong contraindication to keeping an impacted third molar in place should go hand in hand with a strong reason to remove it. Indications of tooth removal are Pericoronitis, Caries, Root resorption, Formation of follicular cyst, Tumors arising in the follicular (Dentigerous cysts) and Temporomandibular joint symptoms, while the contraindications are acute infections with pericoronitis, medically compromised state– uncontrolled diabetes, Extremes of age – Old age.[6-10]

One of the most frequent operations carried out in offices of oral and maxillofacial surgery is third molar surgery. However, this operation needs precise preparation and surgical expertise. Complications may always happen during surgical operations, which may also increase patient worry and panic. Permanent nerve damage, mandibular fracture, atypical inflammatory processes and abscess development, displacement of third molars and tools, along with other unexpected issues, are common intra- and postoperative difficulties and adverse effects related to third molar removal. In order to lessen patient concern and provide the best possible care, it is important to be aware of any potential risks connected with this surgery.[9-11]

Individuals' quality of life, looks, and self-esteem are significantly influenced by their oral and dental health; hence dentists are required to continually monitor their patients during any dental surgical operation to prevent any potentially dangerous responses. Such type of data is limited, and no such kind of study has been carried out in our population. In order to ascertain if these fluctuations are caused by the patient's worry, this research will examine the hemodynamic changes that occur in healthy individuals after the surgical removal of the lower third molar.

MATERIAL & METHODS

This study was conducted after approval (LUMHS/REC/-65) of Ethics Review Committee (ERC) of University followed by informed consent of patients fulfilling inclusion criteria. Diagnosis depends on history, clinical examination, and radiographs (whenever suitable for every case). Total sample size was calculated as 314 by using Rao Soft sample size formula. The demographic and clinical parameters like age, gender, level of anxiety and hemodynamic changes were identified and recorded on proforma. The standard protocol of preparation and sterilization was done, and all surgeries were performed by the principal investigator, under the local anesthesia.

Inclusion Criteria

- Patients between the age group of 18 to 50 years of irrespective of gender.
- Third molar surgical extraction.
- First experience of tooth extraction.
- Partial bony impaction

Exclusion Criteria

- Patients with comorbidities. (diabetes, heart disease, hypertension, psychiatric disorders, or substance abuse).
- Pregnant patients.
- Closed Extraction.
- Patients with skeletal deformities.

PROCEDURE

During the procedure, patient position was reclined at an angle of 120° following standard protocol of draping and aseptic technique, under local anesthesia (Medicaine Made in Korea). After the incision with blade no. 15 (Feather blade) and reflection of soft tissues with molt no.9 periosteal elevator, bone was drilled using a round bur no. 6 (rose head) with irrigation using normal saline (0.9% Searle Made in Pakistan). After exposing the tooth sufficiently, luxation was achieved with the help of straight elevator followed by tooth removal. The sharp edges of the socket bone were smoothened by bone files. Closure was done with vicryl 4-0. In postoperative care, standard antibiotic therapy and analgesic was prescribed along with home remedies (i.e., cold and hot sponges).

The Modified Dental Anxiety Scale (MDAS), which consists of 5 items with a 5-category rating scale ranging from "not anxious" to "extremely anxious," was used to quantify dental anxiety. The OMRON M7 BP Monitor was used to monitor the patients' systolic and diastolic blood pressure and the Certeza PO 907 - Finger Pulse Oximeter was used to measure the patients' heart rate and oxygen saturation.

Data Analysis Procedure

The data was analyzed in Statistical Package for Social sciences (SPSS) version-22 (registered). Frequencies and percentages were calculated for the categorical variables. The continuous variables like age, hemodynamic parameter e.g., SBP, DBP, SPO2 and HR, and anxiety scale were presented as mean and standard deviation. The mean difference was calculated in hemodynamic variables between the three sets of scores by one way repeated measure ANOVA test. Categorical variables were compared by Chi-square test. P value ≤ 0.05 was considered as significant.

RESULTS

Distribution of gender in patients underwent for third molar surgical extraction was done. In this study 156 (49.7%) patients were male, and 158 (50.3%) patients were female. Table-I

Descriptive statistics of continuous variable of age (years) inpatients underwent for third molar surgical extraction was done and that showed mean and standard deviation of age as 31.0 ± 9.2 (18-50) years. Table-II

In Table-III distribution of patients as per anxiety classification, blood pressure classification, oxygen saturation classification and heart rate classification have been mentioned in patients who underwent for third molar surgical extraction.

In this study mean and standard deviation of anxiety score was 7.2 ± 2.4 (5-16), 9.3 ± 4.2 (5-18) and 8.6 ± 7.8 (5-66) at T1, T2 and T3 respectively. Mean and standard deviation of anxiety systolic blood pressure was 114.0 ± 10.8 (98-180) mmHg, 127.3 ± 14.2 (110-180) mmHg and 121.9 ± 11.0 (110-155) mmHg, while diastolic blood pressure was 72.8 ± 4.6 (62-90) mmHg, 78.3 ± 5.8 (70-100) mmHg and 75.5 ± 6.3 (70-107) mmHg at T1, T2 and T3 respectively. Oxygen saturation was 98.6 ± 0.6 (97-99)%, 98.6 ± 0.6 (97-99)% and 98.7 ± 0.5 (97-99)% at T1, T2 and T3 respectively. Mean and standard deviation of heart rate was 75.9 ± 4.2 (66-87) beats per minute, 81.3 ± 6.0 (69-92) beats per minute and 78.9 ± 4.7 (72-93) beats per minute at T1, T2 and T3 respectively. Table-IV

Gender	Frequency (%)
Male	156 (49.7%)
Female	158 (50.3%)
Total	314 (100.0%)

Table-I Patients distribution according to gender (n=314)

Variable	Age
N	314
Minimum	18
Maximum	50
Mean	31.0
SD	9.2

Table-II. Descriptive statistics of age (Years) (n=314)

Variable	Pain	T1	T2	T3	P-Value
Anxiety Classification	Not Anxious	109 (34.7%)	85 (27.1%)	99 (32.0%)	<0.001
	Mildly Anxious	152 (48.4%)	111 (35.4%)	146 (47.2%)	
	Moderate Anxious	48 (15.3%)	78 (24.8%)	64 (20.7%)	
	High Anxiety	5 (1.6%)	40 (12.7%)	0 (0.0%)	
Blood Pressure Classification	Normal	235 (74.8%)	100 (31.8%)	114 (36.3%)	<0.001
	Elevated	69 (22.0%)	68 (21.7%)	118 (37.6%)	
	Stage 1	5 (1.6%)	93 (29.6%)	55 (17.5%)	
	Stage 2	5 (1.6%)	53 (16.9%)	27 (8.6%)	
Oxygen Saturation Classification	Normal	314 (100.0%)	314 (100.0%)	314 (100.0%)	------
	Hypoxemia	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Heart Rate Classification	Normal	314 (100.0%)	314 (100.0%)	314 (100.0%)	------
	Tachycardia	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Bradycardia	0 (0.0%)	0 (0.0%)	0 (0.0%)	

Table-III. Patients distribution according to anxiety, blood pressure, oxygen saturation and heart rate classification in different stages

Variable	Statistics	T1	T2	T3	P-Value
Anxiety Score	N	314	314	314	<0.001
	Minimum	5	5	5	
	Maximum	16	18	66	
	Mean	7.2	9.3	8.6	
	SD	2.4	4.2	7.8	
Blood Pressure	N	314	314	314	<0.001/<0.001
	Minimum	98/62	110/70	110/70	
	Maximum	180/90	180/100	155/107	
	Mean	114.0/72.8	127.3/78.3	121.9/75.7	
	SD	10.8/4.6	14.2/5.8	11.0/6.3	
Oxygen Saturation	N	314	314	314	<0.001
	Minimum	97	97	97	
	Maximum	99	99	99	
	Mean	98.6	98.6	98.7	
	SD	0.6	0.6	0.5	
Heart Rate	N	314	314	314	<0.001
	Minimum	66	69	72	
	Maximum	87	92	93	
	Mean	75.9	81.3	78.9	
	SD	4.2	6.0	4.7	

Table-IV. Descriptive statistics of anxiety score, blood pressure, oxygen saturation (SPO2) and heart rate in different stages

DISCUSSION

Most people have some degree of dental anxiety, particularly those who have had bad dental experiences in the past.[12] The local anesthetic injection is a typical practice that makes people afraid of receiving dental care. The majority of patients are afraid of getting local anesthetic injections since they hurt, even though its primary goal is to reduce discomfort during dental treatment procedures. The main source of the fear is that after a third molar extraction, pain is the most common postoperative consequence. Furthermore, anxiety and hemodynamic changes in people are linked to dental dread and discomfort.[13,14,15,16]

In this study both male (49.7%) and female (50.3%) patients were equally affecting from third molar impaction and underwent for third molar surgical extraction. A similar study by Alemany-Martínez A et al[17] reported the 50.0%female patients and 50.0%male patients underwent for surgical removal of lower third molar under local anesthesia. Another similar study by Gadve VR[1] reported the 56.7% female patients and 43.3% male patients underwent for surgical removal of lower third molar under local anesthesia. Another study by Raocharernporn S[18] reported the 63.0%female patients and 37.0%male patients underwent for surgical removal of lower third molar under local anesthesia. All similar studies are reporting that both male and female patients are affected with impacted mandibular third molar.

In this study, mean age of impacted mandibular third molar patients was 31.0 ± 9.2 (18-50) years, whereas majority of the patients were in age group of 20-30years having 18-30years having 191 (60.8%) patients followed by age group of 31-40years having 78 (24.8%) patients and 41-50years having 45 (14.3%) patients. A study by Alemany-Martínez A[17] reported the mean age of 27 years, while Gadve VR[1] reported the mean age of 37 years and Raocharernporn S[18] reported the reported the mean age of 24 years. All similar studies are reporting that young adults are suffering from impacted mandibular third molar.

In this study, significant (p-value < 0.001) increase in anxiety score was observed after injecting local anesthesia that decreased after the completion of surgery. Mean anxiety score was 7.2 ± 2.4 before

surgery that increased to 9.3 ± 4.2 after injecting local anesthesia and then decreased to 8.6 ± 7.8 after the completion of surgery. Different studies reported the similar high mean of anxiety score such as Gadve VR, et al. [1]10.3 ± 2.95, Liau FL[16] 9.3 ± 2.5 and Kunzelmann KH[19] 8.6 ± 3.7. All similar studies are reporting the higher anxiety score during third molar surgical extraction.

In this study, significant (p-value < 0.001) increase in blood pressure (systolic blood pressure and diastolic blood pressure) was observed after injecting local anesthesia that decreased after the completion of surgery. Systolic blood pressure was 114.0 ± 10.8 mmHg before surgery that increased to127.3 ± 14.2 mmHg after injecting local anesthesia and then decreased to 121.9 ± 11.0 mmHg after the completion of surgery. Similarly, diastolic blood pressure was 72.8 ± 4.6 mmHg before surgery that increased to78.3 ± 5.8 mmHg after injecting local anesthesia and then decreased to75.5 ± 6.3 mmHg after the completion of surgery. A study by Alemany-Martínez A[17] reported the lowest BP values in most anxious patients. The greatest mean SBP and DBP values were noted during the time of ostectomy and/or tooth sectioning. The fluctuations in BP during surgical extraction of the molars were within normal limits and no noteworthy changes were reported. A study by Gadve VR[1] reported the significant changes in SBP and DBP and highest value was recorded at the time of ostectomy/tooth sectioning. A study by Raocharernporn S[18] also reported the significant differences in the blood pressure.

In this study, non-significant (p-value 0.726) change in oxygen saturation was observed before surgery 98.6 ± 0.6%, after injecting local anesthesia 98.6 ± 0.6% and after the completion of surgery 98.7 ± 0.5%. Alemany-Martínez A[17] noticed that SPO2 values showed no significant changes and were lower at the start of the surgical procedure.

In this study, significant (p-value < 0.001) increase in heart rate was observed after injecting local anesthesia that decreased after the completion of surgery. Mean heart rate was 75.9 ± 4.2 beats per minute before surgery that increased to 81.3 ± 6.0 beats per minute after injecting local anesthesia and then decreased to 78.9 ± 4.7 beats per minute after the completion of surgery. A study by Alemany-Martínez A[17] reported the highest heart rate in most anxious patients. The variations in heart rate during surgical extraction of the molars were within normal limits. The lowest heart rate values were recorded at baseline, before the start of the surgical procedure, whereas the highest values were obtained during incision and flap raising. A study by Raocharernporn S[18] also reported the significant differences in the heart rate. All similar studies are reporting the significant changes in anxiety score, blood pressure and heart rate. So, it is very much important for oral surgeons that they should continuously monitor the anxiety score and vital signs during surgical removal of lower third molar under local anesthesia.

CONCLUSION

The results of the study led the researchers to the conclusion that surgical removal of a lower third molar under local anesthetic results in a considerable rise in anxiety, blood pressure, and heart rate immediately after the injection of local anesthesia, but that these variables return to normal once the procedure is over.

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2	Asna Khalid	Literature search.	
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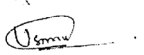
5	Usman Manzoor	Results.	
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