

EVALUATION OF ANXIETY AND BLOOD PRESSURE IN PATIENTS UNDERGOING MINOR ORAL SURGERY

Guilherme Kovalhuk

Universidade do Vale do Itajaí- UNIVALI -
Dentistry course
Itajaí -SC
<http://lattes.cnpq.br/1688744828599443>

Daniel Douglas Heckmann

Universidade do Vale do Itajaí- UNIVALI -
Dentistry course
Itajaí -SC
<http://lattes.cnpq.br/8839666805566167>

Fabiano Rodrigues Palma

Universidade do Vale do Itajaí- UNIVALI -
Dentistry course
Itajaí -SC
<http://lattes.cnpq.br/8419303621727005>

Silvana Marchiori de Araújo

Universidade do Vale do Itajaí- UNIVALI -
Dentistry course
Itajaí -SC
<http://lattes.cnpq.br/9975563669648580>

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Abstract: The dental environment generates fear and anxiety for many individuals. These feelings can be observed by behavioral and physiological changes, such as altered blood pressure, tachycardia, changes in temperature, pulse and respiratory rate. The objective of this study was to verify if there is variation in blood pressure (BP) of normoreactive patients submitted to surgical procedures in the Update on Minor Oral Surgery course at ``Universidade Vale do Itajaí`` - Univali, before and after the anesthetic act, and to relate the values blood pressure levels with patients' anxiety. Cross-sectional clinical study through primary data collection. Eighty-five patients participated, who answered a Corah Anxiety Scale questionnaire. Subsequently, blood pressure was measured before the anesthetic act and immediately after it. After the measurements, the data were tabulated and related to the Corah Anxiety Scale, in order to determine whether there was a relationship between anxiety levels and the variation in blood pressure values. It was observed that the mean BP was 122/84 before and 127/80 after the anesthetic act. As for anxiety, 57.6% were calm, 24.7% a little tense, 13% tense and 4.7% very anxious. It was concluded that there was no significant difference in blood pressure before and after the anesthetic procedure, nor was there any relationship between pressure values and patient anxiety.

Keywords: Dental Anesthesia; Blood pressure; Anxiety.

INTRODUCTION

The anesthetic act is still something that most people fear when they have their appointments scheduled with their dentists, either for fear of the needle or fear of the imminent sensation of pain that they may feel, which increases their degree of anxiety and apprehension.

This condition can trigger a physiological

reaction called stress, leading to significant changes in vital signs, especially blood pressure, and in this case, the risk of an in-office medical emergency becomes more present.

Studies demonstrate the important impact that psychological factors can have on the perception of pain, especially in anxious patients¹⁻³ (ANNIBELLI et al., 2014; ANDRADE, 2014; WANG et al., 2017). During stress, endogenous catecholamines (adrenaline, noradrenaline) are released from their storage sites into the cardiovascular system at a level approximately 40 times higher than the resting level, proving that there are changes that can occur silently in our body without even perceive (MALAMED, 2016).

The objective of the study was to verify if there is variation in the blood pressure of normoreactive patients submitted to surgical procedures in the Update on Minor Oral Surgery course at ``Universidade Vale do Itajaí`` - Univali, before and after the anesthetic act, and to relate the pressure values with the patient anxiety.

MATERIALS/METHODS

This is a clinical, cross-sectional study through primary data collection. The target population consisted of all patients treated at the Minor Oral Surgery Update course at ``Universidade Vale do Itajaí`` (Univali), in the year 2021. From the target population, a non-probabilistic convenience sample was obtained, that is that is, 85 patients were part of the sample who voluntarily agreed to participate in the study, signing the Informed Consent Form (TCLE). Inclusion criteria were: normoreactive patients, from 18 years of age and without gender selection, who did not use any medication and had no medical history of cardiovascular alterations. And the exclusion criteria were: patients with heart disease, diabetes, immunocompromised or

with some systemic compromise.

At the time of admission of the patient in the waiting room of the Univali Minor Oral Surgery Clinic, the Anxiety Scale recommended by Corah (Corah et al., 1978) was applied. The scale is composed of 4 questions, each with five alternatives, scored from 1 (a) to 5 (e). The degree of anxiety was classified according to the score obtained from the sum of the scores of the four questions in: calm (score from 4 to 8); little tense (score from 8 to 10); tense (score 11 to 12); anxious (score 13 to 14) and very anxious (score equal to or greater than 15), according to Braga et al. (2010).

Then, as part of the conduct adopted by Univali's Minor Oral Surgery Update Course, patients were previously medicated with Diazepam 10 mg, one hour before the beginning of the surgeries. For anesthesia, Mepivacaine 2% was used as anesthetic salt, and Epinephrine 1:100,000 as vasoconstrictor, as they are routinely used in the Clinics of the Update Course in Minor Oral Surgery at Univali.

BP was measured by a single researcher, using an OMRON sphygmomanometer (model HEM-7122), always with new and properly calibrated batteries. BP measurement was performed in two moments: 5 minutes before the anesthetic act and soon after the end of the anesthetic act, in order to obtain the pre- and post-procedure pressure values, which were recorded in a separate form for later tabulation according to the degree of anxiety of each patient observed by the Corah anxiety scale.

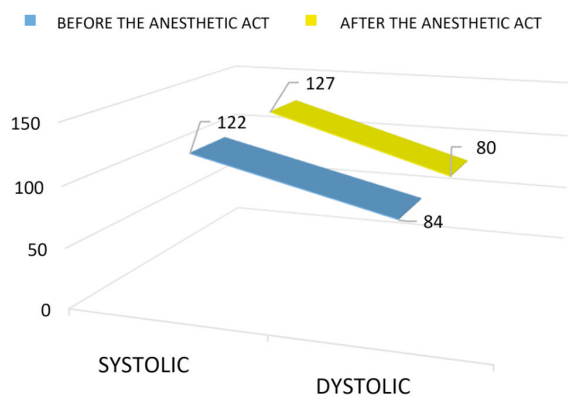
To verify whether there was a difference in BP, before and after and between degrees of anxiety, the analysis was performed by calculating the confidence interval, which was given through the mean +/- the standard error of the mean ($\bar{x} \pm s \bar{x}$).

This study was previously approved by

the Univali Research Ethics Committee under opinion No. 4,663,614, CAAE 44311220.0.0000.0120.

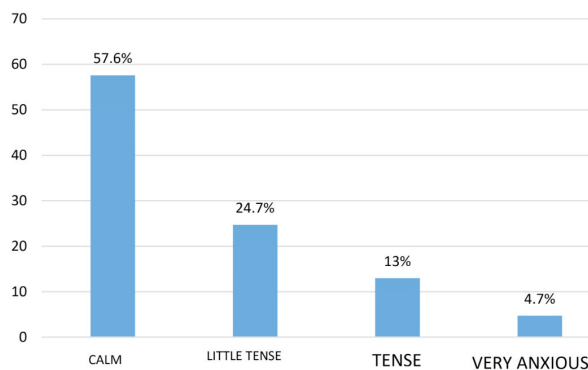
RESULTS

Graph 1 shows the BP averages before and after the anesthetic act of the total sample, regardless of the anxiety classification, and Graph 2 shows the distribution of the relative frequency of anxiety according to the classification used in the study. There were no participants classified as anxious.



Graph 1 - Behavior of BP averages before and after anesthesia regardless of anxiety classification

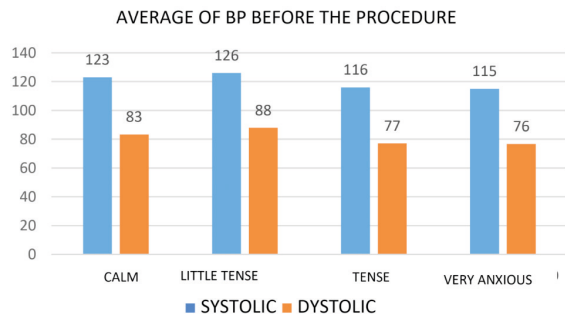
Source: The authors, 2021.



Graph 2- Distribution of the relative frequency of the sample according to the classification of anxiety

Source: The authors, 2021.

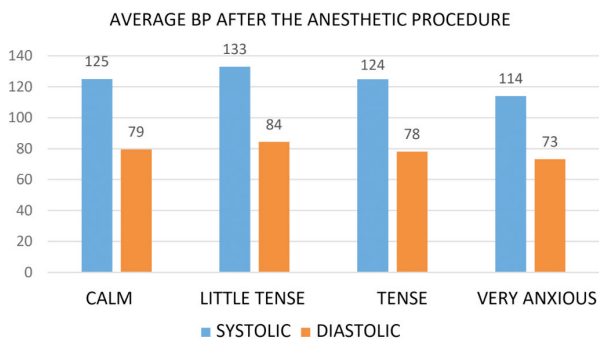
Graph 3 shows the average BP behavior before the anesthetic act between the groups, with the following values (systolic and diastolic pressure, respectively): calm group (123 – 83), slightly tense (126 – 88), tense (116 – 77) and very anxious (115 – 76).



Graph 3 - Mean BP before anesthesia according to anxiety classification

Source: The authors, 2021.

Graph 4 shows the average BP behavior after anesthesia between the groups, with the following values (systolic and diastolic pressure, respectively): calm group (125 – 79), mildly tense (133 – 84), tense (124 – 78) and very anxious (114 – 73).



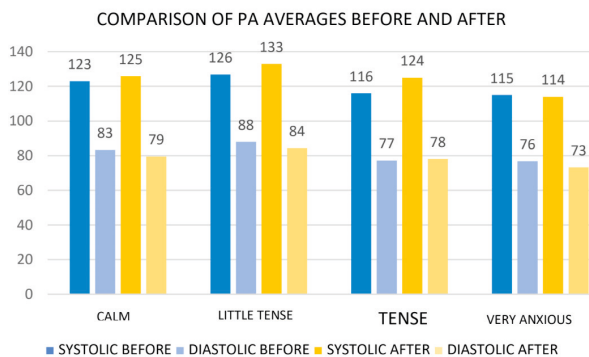
Graph 4- Mean BP after anesthesia according to anxiety classification

Source: The authors, 2021.

Graph 5 shows the average behavior of BP before and after anesthesia among the four groups. There is a small increase in BP in the “calm”, “little tense” and “tense” groups after the anesthetic act, whereas in the “very anxious” group, there is a slight decline in BP

after anesthesia, demonstrating that anxiety had no relationship or interference in the change in blood pressure values.

All groups tended to remain stable or with little relevant change in pressure values after anesthesia.



Graph 5- Comparison of BP Means before and after anesthesia according to the degree of anxiety

Source: The authors, 2021

There was no significant difference in BP between before and after the anesthetic procedure, nor between degrees of anxiety (95% CI).

DISCUSSION

It is important to initially contextualize that anxiety can be defined as a set of somatic manifestations - increased blood pressure, heart and respiratory rate, sweating, muscle tension, nausea, stomach emptiness, dizziness and psychological manifestations - apprehension, alertness, restlessness, hypervigilance, difficulty concentrating and sleeping, among others. (CHAVES; CADE, 2004)

Pathological stress, which can be triggered by anxiety, denotes the state generated by the perception of stimuli that provoke emotional excitement and, by disturbing homeostasis, trigger an adaptation process characterized, among other alterations, by the increase in adrenaline secretion, producing several

systemic manifestations, with physiological and psychological disturbances. The stress produced by the outpatient environment causes the release of large amounts of adrenaline and noradrenaline, which pass directly into the bloodstream, affecting the central nervous system (MARGIS et al., 2003; GANHOTO et al., 2006; MEDEIROS et al., 2013; DANTAS et al., 2017).

Dental treatment, which is mainly carried out in an outpatient environment, can induce anxiety and anguish in patients, reaching the point of sometimes leading to real panic in the dentist's chair without an apparent cause. In this sense, according to Palma et al. (2005), the procedure that probably causes more stress to the patient is tooth extraction.

These findings are also seen in the study by Salmeron et al. (2018), who show that dental procedures are commonly related to pain and discomfort. In addition, patients have different degrees of anxiety and fear, which can make treatment difficult, especially when it comes to surgical procedures.

Authors such as Palma et al. (2005) and Medeiros et al. (2013) describe in their studies that one of the procedures that causes the most anxiety, after minor oral surgeries, such as tooth extraction, is the anesthetic procedure.

With the intention of evaluating whether these autonomic alterations were capable of jeopardizing the health of patients, Dantas et al. (2017) evaluated possible changes in vital signs (systolic and diastolic blood pressure, heart rate and oxygen saturation) during the third molar extraction procedure under local anesthesia and found that the presence of anxiety and fear positively influenced the increase blood pressure, and the anesthetic salt, Mepivacaine 2% with epinephrine 1:100,000, promoted greater resistance for vital signs to return to normal, especially blood pressure levels.

In addition to dental procedures that

can cause systemic changes, the emotional state of patients facing these procedures can also generate this imbalance. The study by Andrade (2014) points out that a conduct that can be used in patients to control anxiety and stress and thus avoid an increase in BP due to emotional reasons in a dental office is the use of a previous benzodiazepine. Facaro et al. (2003), state that in normotensive patients there were no statistically significant clinical changes in cardiovascular parameters when using 10 mg of a benzodiazepine compared to a placebo, which contradicts the study by Andrade (2014).

According to Facaro et al. (2003) the degree of anxiety or expectation of pain does not significantly influence the values of Blood Pressure.

As can be seen, there is great controversy in the literature regarding what can cause an increase in BP in patients who will undergo dental care.

Thus, this study intends to contribute to this line of research and, as a methodology, follows the indication of the use of benzodiazepines to control anxiety and stress, therefore, all patients evaluated were premedicated with Diazepam 10 mg in order to avoid uncontrolled BP due to emotional reasons.

Through the results presented, it was possible to verify that there was no change in blood pressure values in any of the groups in the most diverse degrees of anxiety, determined by the application of the Corah Dental Scale.

We can suggest that the use of benzodiazepines can reduce the risk of lack of control of this vital sign, due to emotional reasons, which is supported by the works of Andrade (2014),

Regarding the type of anesthetic solution, amides, among them Mepivacaine 2% with epinephrine 1:100,000, are among the most used in Dentistry and are considered safe and

adequate, however authors such as Marcos; Valley; Cenador (2006), relate the existence of a risk of BP increase due to the presence of epinephrine in the anesthetic solution.

In the present study, the anesthetic solution used in all extraction procedures was Mepivacaine 2% with epinephrine 1:100,000, within safe volumes according to Malamed et al. (2016).

In this sense, the general objective of the study was to evaluate whether the application of anesthetic solution for extractions would significantly change BP, it is important to remember that all patients were premedicated with 10 mg of Diazepam to control it for emotional reasons.

By analyzing, in general, the results shown in Graph 3, we can see that all patients, regardless of the degree of anxiety, had pressure levels within the standards considered normal, before the anesthetic procedure was performed.

This analysis can also be performed with the results of graph 4, where we have the post-anesthetic blood pressure values, showing small changes, but still within normal limits.

This result is in line with those of Neves et al. (2007) who evaluated the electrocardiographic and blood pressure parameters during the restorative dental procedure under local anesthesia with and without vasoconstrictor in patients with coronary artery disease. The authors did not find differences regarding the behavior of blood pressure, heart rate, evidence of ischemia and arrhythmias between the groups. The use of vasoconstrictor proved to be safe within the limits of the study.

In the same sense, Caldas et al. (2015) compared cardiovascular parameters, anesthetic efficacy and the degree of discomfort during the injection of 2 anesthetic solutions of 2% lidocaine associated with different concentrations of epinephrine, and concluded that considering the anesthetic volume used,

the reduction in epinephrine concentration in the lidocaine solution did not affect its clinical efficacy and demonstrated clinical safety in the assessed cardiovascular parameters.

In contrast, the studies by Ganhoto et al. (2006), report that stress levels can influence trans-surgical complications in a much more incisive way, being responsible, for example, for hypertensive episodes during dental interventions. This statement is supported by the clinical study by Ferraz et al. (2007), in which, during a dental surgical procedure, a significant variation in BP was observed, with peaks in the preoperative period, that is, before anesthesia, and again soon after tooth dislocation. These results were not observed in our work.

Besides, in the study by Andrade et al. (2021) there was a variation in BP throughout the dental surgical procedure, with a greater change in anesthesia. According to the author, these variations can be attributed to the anxiety and stress caused by the surgical procedure.

According to the results observed in Graph 5, the "Little Tense" and "Tense" groups showed an increase in BP in the post-anesthesia period, but this increase was discreet and still within the average standards of normality according to the American Heart Association (AHA) (2020). Still analyzing the results of graph 5, a small increase in BP is observed (within normality standards) in the "calm", "little tense" and "tense" groups after the anesthetic act, while the "very anxious" group notes There was a slight decline in BP after anesthesia, demonstrating that anxiety was not related to or interfered with the change in blood pressure values.

In the study by Rodrigues et al. (2013), the BP variation measured 15 minutes before anesthesia and at the time of its injection proved to be very close in terms of percentage both in hypertensive and non-hypertensive

patients. When comparing the BP measured 15 minutes before anesthesia with the pressure measured 15 minutes after anesthesia, there was a greater increase, in percentage terms, in hypertensive patients than in non-hypertensive ones, and this increase could have been generated by the BP itself. stress of the dental procedure itself. The author's method was very similar to the one used in the present study, in which the pressure was measured before anesthesia, with the patient in the chair, and right after the anesthetic act. In this study, there was no significant difference in pressure variation at these two moments, similar to the study by Rodrigues et al. (2013).

Thus, in the present study, as well as in the studies by Facaro et al. (2003); Chaves et al. (2004); Palma et al. (2005); Neves et al. (2007) and Goulart et al. (2012), no significant difference was found in the values of systolic and diastolic blood pressure with the use of anesthetics with vasoconstrictor. It must also be noted that, in this study, there was no relationship between the variation in blood pressure and the patients' anxiety, considering that the patients in the "calm" group had higher mean blood pressure than the "very anxious" group. What differs from the studies by Margis et al. (2003); Ganhoto et al. (2006); Medeiros et al. (2013) and Dantas et al. (2017), in which blood pressure variation was observed in patients, related to anxiety.

Another point to be discussed is the one raised by Kanegane et al. (2003) who claim that care for anxious patients, especially women, is frequent in dental emergencies and that a

previous traumatic experience proved to be important for the development of anxiety in relation to care.

In some studies, females are still more likely to have dental fear and anxiety (CARVALHO et al., 2012; GOULART et al., 2012; WANG et al., 2017; ALSHORAIM et al., 2018; FRANCISCO et al., 2017; FRANCISCO et al. al., 2019), while others say there is no correlation between gender and the development of these emotional responses (MEDEIROS et al., 2013).

The findings by Kanegane et al. (2003) also found support in the studies by Francisco et al. (2019), who point to a prevalence of anxiety in female individuals with previous unpleasant or suffering dental experiences, and this factor can be configured as an important generator of dental anxiety. The study by Yakar et al. (2019), also shows greater dental anxiety in women, housewives, young patients, with a history of painful and difficult dental examinations.

This point raised by the authors above was not the object of this study, however, it brings us to the reflection that a previous negative experience with dental treatment may have a greater influence on vital signs than the procedure or anesthetic drug itself.

CONCLUSION

It was concluded that there was no significant difference in blood pressure before and after the anesthetic procedure, nor was there any relationship between pressure values and patient anxiety.

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