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Research Article

Efficacy of Moderate Intravenous Sedation in Patients Undergoing Dentoalveolar Surgery Procedures

Peraza Arianny[1], Solano Nicolas[2], Rios Elvia[3], Montiel Alberto[4] and López Patricia[5]*

[1]*DDS Oral Surgeon, Oral and Maxillofacial Surgery Unit, Autonomous Hospital Service University of Maracaibo, Venezuela*

[2]*DDS Oral and Maxillofacial Surgeon, Oral and Maxillofacial Surgery Unit, Autonomous Hospital Service University of Maracaibo, Venezuela*

[3]*DDS Oral Surgeon, Oral and Maxillofacial Surgery Unit, Autonomous Hospital Service University of Maracaibo, Venezuela*

[4]*MD Anesthesiologist, Head of the operating room and coordinator of the anesthesiology service of the Madre Rafols health system. Venezuela-Zulia*

[5]*DDS, Postgraduate Residency Training Program in Oral Surgery, Zulia University, Venezuela*

***Corresponding author:** López Patricia, DDS, Postgraduate Residency Training Program in Oral Surgery, Zulia University, Venezuela.

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Abstract

Dental treatments are the fifth most common cause of anxiety in the general population. According to the patient's conditions, the complexity of the procedure and the surgeon's criteria, there are various alternatives for pain management, one of which is the use of moderate intravenous sedation. The aim of this study was to describe the effectiveness of the use of moderate intravenous sedation in terms of analgesia and amnesia in patients undergoing dentoalveolar surgery procedures.

Keywords: Intravenous sedation; Dentoalveolar surgery; Pain management; Dental extraction

Introduction

Dental treatments are the fifth most common cause of anxiety in the general population; Since the beginning of his practice, subjecting a patient to different types of procedures has been associated with high levels of stress, with painful experiences in the office being one of the main conditioning causes [1, 2].

Generally, it is the procedures in the area of Oral and Maxillofacial Surgery that are associated with higher levels of stress in patients, especially when it comes to extractions, mainly related to the mandatory need for local anesthetic infiltration and the different surgical times performed according to each particular case, so the ideal conditions sought are to block pain, not generate traumatic memories in the patient and control anxiety before dental treatments.

According to the patient's conditions, the complexity of the procedure and the surgeon's criteria, there are various alternatives for managing pain and anxiety in patients during surgical procedures; These comprise a wide range of options including the use of local anesthesia in conjunction with behavior management, the use of oral anxiolytics prior to surgery, the use of moderate inhalation, oral, or intravenous sedation in the office, as well as planning under general anesthesia. in some cases [4, 5].

According to the response to verbal or physical stimulation, the possible affectation of the airway, the adequacy or not of spontaneous ventilation and the affectation of cardiovascular function, the American Society of Anesthesiology (ASA) defined the depth levels of sedation, divided into: minimal sedation or anxiolysis, moderate sedation, deep sedation and general anesthesia [6]. Moderate intravenous sedation (MIS), also known as conscious sedation, is defined as a drug-induced depression of consciousness where the patient responds to verbal stimuli and tactile, with preservation of respiratory reflexes, adequate spontaneous ventilation, as well as cardiovascular function [7].

Various medications and protocols have been proposed for MIS, including the combined or individual use of sedative-hypnotic agents such as barbiturates and benzodiazepines; propofol, narcotics such as opioids and dissociative agents such as ketamine, without finding a specific protocol establishment in dentoalveolar surgery [7].

Among the procedures that are frequently performed in the office are: simple extractions, extractions of third molars or other retained teeth, pre-prosthetic surgeries, hard and/or soft tissue biopsies, implant placement, among others, for which pain management and anxiety levels. in these patients it constitutes an essential point. Pain plays a determining role in the development of anxiety, being directly related to dental phobia; therefore, the search for additional strategies to local anesthesia for pain management is essential in these patients.

The determination of the effectiveness in the application of MIS for the management of pain and anxiety in patients undergoing dentoalveolar surgery would provide an enormous contribution to our profession, by allowing the establishment of clinical guidelines and priorities necessary for an adequate selection of cases. The aim of this study was to describe the effectiveness of the use of moderate intravenous sedation in terms of analgesia and amnesia in patients undergoing dentoalveolar surgery procedures.

Materials and Methods

Modalities of the study

This study was carried out from March 1, 2018 to March 1, 2021 at the Oral and Maxillofacial Surgery Service of the University Hospital of Maracaibo. A monocentric, descriptive and cross-sectional study was carried out.

Inclusion criteria

Patients who met the following criteria were included in this study: Patients older than 12 years, within the ASA I and II classification. Likewise, those patients who require surgical procedures of dentoalveolar surgery and manifest unsatisfactory past experiences or anxiety, which may be performed in the dental office under moderate sedation, such as extraction of retained third molars, extraction of supernumerary teeth, placement of dental implants, among others.

Exclusion criteria

The exclusion criteria were patients allergic to any of the drugs administered during the moderate sedation process. Surgical procedures that, due to their magnitude, required their performance under general anesthesia were also excluded. Likewise, those who did not agree with the inclusion in the study or who did not sign the informed consent.

Procedure

Technique and instrument for data collection

The patients selected to undergo the surgical procedure under moderate sedation required a pre-surgical evaluation by anesthesiology to consider them fit, where laboratory tests were evaluated (complete blood count, coagulation times, blood glucose, urea, creatinine, HIV and VDRL) as well as an electrocardiogram. , chest x-ray and cardiovascular evaluation; likewise, the assessment of the airway through the Mallampati classification. On the day of surgery, the patient had to come fasting, where the peripheral line was taken for the intravenous administration of drugs, likewise the patient was constantly monitored (blood pressure, heart rate, and SaO2) preoperatively, intraoperatively, and postoperatively.

Preoperatively, patients complied with the administration of a STAT steroid/analgesic protocol; Subsequently, prior to the start of the surgical act, the anesthesiologist was in charge of administering titrated doses of midazolam 0.05 mg/kg for the relaxation of the patient and ketamine 0.25 mg/kg for the dissociation of the patient, with the aim of reaching the sedation level 2 according to the Ramsey scale, which allows the patient to be awake, cooperative, and calm; followed by the surgeon's administration of 2% lidocaine + epinephrine 1:80,000.

The use of fentanyl at 0.5 mg/kg was reserved for older cases in which significant pain status was expected in the patient. If necessary, once the surgeon indicated that the procedure was nearing completion, the anesthesiologist used 0.2-1 mg of Flumazenil to reverse the effects of midazolam. Subsequently, 7 days after the surgical procedure, a post-surgical survey method described by Khader et al (Annex 1) was used to collect the data, which consisted of a series of questions about the perception of pressure and pain of the patients during the procedure. Procedure.

This instrument considered the age, sex and personal data of the patient, the surgical procedure performed, as well as in terms of analgesia, the perception of pressure and pain of the patient was evaluated intraoperatively according to the Visual Analog Scale.

Accordingly, pain was classified according to the following rating: No pain, with a score of 0, mild pain if the patient scores pain from 1 to 3, moderate pain if the rating is between 4 and 7, and severe pain if the rating is equal to or greater than 8. Regarding the assessment of amnesia terms, the patients responded if they remembered the moment of anesthetic infiltration, the procedure itself, as well as the postoperative instructions given by the surgeon. Regarding possible postoperative complications, patients had to report the presence of nausea or emesis, these being the most frequently described in the literature. On the other hand, in terms of satisfaction, the patient had to choose to classify the procedure under the SMEV modality as: unacceptable, poor, satisfactory, good

or excellent.

Statistical analysis

The data obtained were processed and presented in tables and graphs, proceeding to the analysis of the information by absolute and relative frequency distributions in IBM SPSS Statistics 27.0.

Results

During the study period, a total of 97 patients, who met the proposed criteria, underwent dentoalveolar surgery procedures under moderate intravenous sedation. The female gender represented 70% of the cases (68 patients) and the male gender 30% (29 patients), showing a predominance of the former. The age ranged from 12 to 68 years with a mean age of 30.3 years and a standard deviation of 13.5 years, being the age between 20-29 years the most frequent with 37.3% of the cases attended (36 patients), followed by the age group 30-39 years with 24.7% (24 patients), 12-19 years with 19.5% (19 patients) and, finally, ≥40 years with 18 .5% (18 patients). Regarding the dentoalveolar surgery procedures performed under the modality of moderate intravenous sedation, the most frequent was the extraction of impacted third molars, representing 87% of the cases (84 patients), followed by implant placement procedures. dental and extraction of impacted teeth in 4% each, excisional soft tissue biopsies in 2% and bichectomy, corticotomy and guided bone regeneration procedures in 1% respectively.

6.1. Perception of pressure

During the postoperative control at 7 days, 83% of the patients reported absence of perception of pressure during the surgical act (80 patients), 15% reported slight perception of pressure sensation (15 patients) and 2% reported pressure moderate (2 patients).

6.2. Pain perception

Regarding the perception of pain during the surgical procedure, according to the VAS scale, 81.4% of the patients reported absence of pain perception with a score of 0 (80 patients), 14.4% gave a score of 1 (14 patients), 2.1% a rating of 2 (2 patients) and, finally, 2.1% a rating of 3 (2 patients), no patient rated pain perception with a number greater than 3. According to the EVA, a scale of 0-3 is established. considered mild pain, moderate pain is 4-7 and severe pain is 8-10; thus 97.9% (95 patients)

Amnesia

Regarding amnesia, 78.4% (76 patients) reported not remembering the moment of infiltration of the local anesthetic, while 21.6% (21 patients) reported remembering the infiltration of the anesthetic; however, this group reported remembering only a few episodes of the surgical procedure after infiltration of the anesthetic. On the other hand, 93.8% (91 patients) reported remembering the postoperative instructions given by the surgeon, and 6.2% reported not remembering them (6 patients).

Postoperative nausea and vomiting

Immediately after surgery, 81.4% (79 patients) reported not having nausea, while 18.6% (18 patients) reported having nausea, without emetic episodes (Graph 8).

Patient experience and satisfaction

Regarding the experience and satisfaction of the patients, 82% (80 patients) rated their experience as excellent, while 18% (17 patients) rated it as good. There were no fair, poor, or unacceptable ratings within the survey population. Likewise, 100% of the population (97 patients) reported that they would undergo surgical procedures again.

Discussion

Oral and maxillofacial surgery procedures are frequently associated with high levels of anxiety immediately before performing them, where fear and pain significantly affect oral health care in general, specifically, with a decrease in the search for timely and dental care. a higher incidence of oral diseases [8]. In the present study it was possible to observe low pressure indices with the sedation protocol administered, the vast majority being perceived as absent. This contrasts with what was found by Khader et al. [9] who under a midazolam and fentanyl protocol, 24 hours postoperatively, found a greater perception of pressure in their population; Specifically, 13 patients did not report feeling any kind of pressure, 25 patients reported mild but tolerable pressure, 17 patients reported moderate but tolerable pressure, and 9 patients reported severe but tolerable pressure.

Regarding the perception of pain, in the population studied, 81.4% of the patients reported an absence of pain perception with a score of 0 according to the VAS, presenting a mean score of 0.2. Unlike what was found in the present study, in the study conducted by Khader et al. [9] the mean VAS score was higher, where the group that received midazolam first reported a mean of 1.5 according to the VAS, while the group that received fentanyl first reported an average of 2.

Despite the difference between the mentioned studies, it was found that the use of the moderate intravenous sedation protocol greatly reduces the perception of pain in patients, remaining within a range classified as mild according to the Visual Analogue Scale. The latter coincides with what was stated by Tomorrow et al. [10] who, under the scheme of midazolam and fentanyl, concluded that compared to procedures performed only under local anesthesia, those performed in conjunction with moderate intravenous sedation had the desired effect of reducing memory pain and anxiety associated with the course of the surgical procedure by the patient.

Regarding amnesia, 78.3% of the patients in this study reported not remembering the time of infiltration of the local anesthetic, differing from the 45% reported by Khader, et al [9]. The difference in pain perception levels and amnesia states between the two studies could be largely associated with the pharmacological protocols used for moderate intravenous sedation, and although multiple schemes have been described in the literature, the use of titrated doses of midazolam along with ketamine would be the answer. Ketamine produces symptoms such as perceptual changes, altered body perception, derealization, depersonalization, and memory deficits that resemble those seen in dissociative states. According to Hetem et al [11, 12], ketamine in subanesthetic doses reduces

memory performance and recognition by affecting the encoding of new memories.

Despite its wide confidence intervals, ketamine has several side effects, including nausea, vomiting, hallucinogenic effects, among 12 others. To reduce these side effects, ketamine is often used in combination with benzodiazepines, specifically, it has been administered midazolam to prevent such events and provide a synergistic effect. Midazolam is a benzodiazepine with a rapid onset of action and short recovery period, with anxiolytic, anticonvulsant, hypnotic, and amnestic properties [13].

Ketamine at subanesthetic doses also has potent analgesic properties through the inhibition of NDMA receptors and amnesic properties through dissociation [14] that would be potentiated by the amnestic properties of midazolam. A clinical trial demonstrated the benefits of the combination of ketamine and midazolam, where their doses were higher when they were used separately and could be reduced when they were used together [15], which allowed the safety margins of each drug to be increased and, at the same time , maintain sedation. levels on an optimal Ramsay scale with a calm and cooperative patient.

Specifically in dentoalveolar surgery, the combination of midazolam plus ketamine, like the one used in this study, was administered by Garip et al. [13] where they evaluated its clinical efficacy at low doses to alleviate or prevent postoperative pain, inflammation, and postoperative trismus. third molar. removal surgery. Similar to this study, they found better VAS scores in those subjected to the ketamine protocol, likewise, the consumption of analgesics was significantly lower in this group, indicating a longer pain-free time after surgery, as well as such as less postoperative swelling and trismus.

Regarding the presence of nausea or emesis in this study, 18.5% reported nausea after the sedation protocol, however, none of these patients presented an emetic event; On the contrary, Inverso et al.16 described a complication rate of 0.5% in a study of 3094 patients, the most frequent being, unlike this study, vomiting without aspiration during recovery with 0.2%.

The results obtained also showed high levels of satisfaction associated with the procedures performed under the modality of intravenous sedation, allowing us to provide an alternative for the management of fear in our patients; this coincides with what was indicated by Lapere et al. 17 who found that 93% of patients expressed a good general experience with sedation and 92.6% indicated that they would recommend it to others. Specifically in dentoalveolar surgery, the patients under sedation studied by Bedeloğlu18 reported that, if it warranted it, they would perform the same procedure again, while those who received only local anesthesia mostly reported a negative response to the surgical procedure. Likewise, in another consulted study, ranging from Excellent to Unacceptable, 58% of patients rated their experience under sedation as 'Excellent'.

This study has several limitations. To approve their results, it is necessary to carry out a prospective study, with a larger sample of patients.

Conclusion

The levels of satisfaction achieved in the patients in this study show that the use of this anesthetic modality should be within our arsenal of options offered to our patients, especially in apprehensive or anxious patients, in order to reduce possible complications. leading to delayed care seeking. The use of sedation not only allows a safe and comfortable method for patients, it also constitutes an excellent alternative for the surgeon, since the patient is more relaxed and cooperative, which allows greater concentration and reduction of surgical times.

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Conflict of Interest

No conflict of interest.

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