FEDERAL UNIVERSITY OF RIO GRANDE DO SUL

INTEGRATED RESIDENCY IN ORAL HEALTH

ORAL AND MAXILLOFACIAL SURGERY

COMPARATIVE EXPERIMENTAL STUDY BETWEEN BUPIVACAINE AND ROPIVACAINE REGARDING EFFICACY IN THIRD MOLAR REMOVAR SURGERY UNDER GENERAL ANESTHESIA

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ABSTRACT

The removal of third molars is one of the most frequently performed procedures in dentistry, and can be carried out in a hospital setting under general anesthesia. In such cases, local anesthetics are often administered at the surgical site in addition to general anesthesia, to promote better hemostasis and postoperative analgesia. Bupivacaine is a local anesthetic commonly used in these situations. However, its known cardiotoxic and neurotoxic effects, as reported in the literature, have led to increased interest in safer alternatives, such as ropivacaine. **Objective:** to evaluate whether there is a significant difference between bupivacaine and ropivacaine in terms of postoperative analgesic efficacy, intraoperative hemostasis, and patient vital signs during the intraoperative period. **Materials and Methods:** This was a randomized, controlled, split-mouth clinical trial. The sample size was based on a similar previously published study and included 15 participants (n = 30). As this study also follows a split-mouth design, each of the 15 patients underwent two tooth extractions. All patients had indications for the removal of both lower third molars under general anesthesia. Surgical extractions were performed in a single session, with bupivacaine (Group A) administered at one surgical site and ropivacaine (Group B) at the other. The procedures were carried out at the Hospital de Clínicas de Porto Alegre. Vital signs were continuously monitored by the same anesthesiology team, with data collected at the time of drug injection (before and immediately after), as well as one minute and five minutes post-injection. Intraoperative bleeding was measured by calculating the volume of blood aspirated into the collection vial, from the time of incision to the final suture, at each surgical site. To minimize systemic interference from the anesthetic agents, their administration was alternated between patients. Postoperative analgesia was self-reported by the patients using a Visual Analog Scale (VAS) for each side at various postoperative time points. A descriptive analysis will be conducted on the clinical data obtained through these measurements.

Key-words: Third Molar; Anesthetics, Local; Surgery, Oral

SUMÁRIO

1 INTRODUCTION

The search for painless surgical interventions was a highly controversial topic just a few centuries ago, often considered a utopia or the work of charlatans. This panorama began to change in the 18th century with the discovery of the anesthetic properties of nitrous oxide, known as "laughing gas," culminating in the first surgery performed under general anesthesia in October 1846.[1] Since then, new anesthetic agents have been developed and introduced into medical practice.[2]

General anesthesia is an anesthetic technique in which a combination of drugs is used to induce analgesia, unconsciousness, immobility, and skeletal muscle relaxation, allowing procedures to be performed with greater safety and comfort for both professionals and patients.[3] Currently, general anesthesia can be achieved using intravenous or inhaled agents, or a combination of both. Anesthetic agents widely used in Brazil include thiopental, propofol, etomidate, and midazolam (intravenous) and halothane, isoflurane, and sevoflurane (inhalation).[4]

In dentistry, general anesthesia has several indications and can be used in cases of extensive or highly complex surgical procedures, in patients with odontophobia or extreme anxiety, in patients with special needs or children who cannot be managed in the office, and in patients allergic to local anesthetics, among other situations. Despite this, the use of general anesthesia in dentistry is not routine for most Brazilian dentists. On the other hand, local anesthetics are the most widely used and prevalent substances in dentistry, and their use is essential for adequate clinical practice.[5] They are defined as substances capable of reversibly blocking nerve conduction by inhibiting the excitation and conduction processes of the nerve cell membrane, resulting in temporary impairment of thermal, pain, and tactile sensitivity without causing loss of consciousness.[6] Currently, the use of local anesthetics in dentistry is considered quite safe, with substances that have low systemic toxicity, are non-irritating to tissues, and do not cause permanent nerve damage, ideally offering a short onset of action and sufficient duration for surgical procedures.[7]

The most commonly used local anesthetics in dentistry are amide-type agents, including lidocaine, prilocaine, mepivacaine, articaine, bupivacaine, ropivacaine, and levobupivacaine.[5,7]

Lidocaine hydrochloride, the most widely used amide-type local anesthetic in dentistry, is considered very safe for pregnant women, children, and heart patients.

Commercial preparations containing lidocaine are diverse and may or may not be combined with vasoconstrictors such as epinephrine, norepinephrine, and phenylephrine.[8]

Prilocaine hydrochloride has a structure very similar to lidocaine, but is less potent and less toxic. It is often found in commercial formulations combined with felypressin, exhibiting minimal cardiotoxicity. Its use is contraindicated in patients with methemoglobinemia, anemia, or hypoxic heart failure.[9] Felypressin is contraindicated in pregnant women due to its potential to cause uterine contractions.[10]

Mepivacaine hydrochloride is approximately twice as potent and toxic as lidocaine and is often used in combination with levonordefrin, norepinephrine, or epinephrine. However, unlike lidocaine, its use without an associated vasoconstrictor has clinical relevance, with an anesthetic effect lasting 20 to 40 minutes, significantly longer than the 5 minutes of lidocaine without a vasoconstrictor. It is an excellent choice for cases where the use of vasoconstrictors is contraindicated.[11]

Articaine hydrochloride, the most widely used local anesthetic in countries such as Germany and the United States, is often found in combination with epinephrine. It has greater potency and less toxicity than lidocaine. It is contraindicated in patients with methemoglobinemia, anemia, or hypoxic heart failure.[12] Despite reports of paresthesia associated with the use of articaine, there is no high-quality scientific evidence to support this relationship.[13]

Bupivacaine hydrochloride provides long-lasting anesthesia, significantly contributing to the reduction of postoperative pain, and is the most widely used anesthetic in dental procedures under general anesthesia in hospital settings. Its potency is considerably greater than that of the other anesthetic agents mentioned above. However, its onset of action is slower, taking about 6 to 10 minutes to initiate analgesia. It can be used without vasoconstrictors or in combination with epinephrine.[11,14] The cardiotoxicity of bupivacaine is well documented, with cardiovascular collapse being widely reported, especially when erroneously applied intravascularly, and it is difficult to reverse.[15]

As a result, there has been a search for a new anesthetic substance that combines the advantages of bupivacaine (high potency and long duration) while minimizing its disadvantages (lower cardiac toxicity and arrhythmogenic properties). Among the substances found, levobupivacaine and ropivacaine stand out.[16]

Levobupivacaine hydrochloride shares properties withracemic bupivacaine, but

with lower cardiac toxicity. Its use is more common in the medical field, often combined with epinephrine. However, its use is not widespread in dentistry.[17]

Ropivacaine hydrochloride also has properties similar to racemic bupivacaine, but with reduced cardiac toxicity. Furthermore, it has intrinsic vasoconstrictor properties, minimizing the need for additional vasoconstrictors during its administration. [16,18]

Among the main benefits of using local anesthetics are comfort, analgesia, vasoconstriction (when combined with vasoconstrictors) and reduce postoperative pain, what makes its use is recommended even during procedures under general anesthesia.[19] Even with the proven greater safety of anesthetic agents such as levobupivacaine and ropivacaine, bupivacaine still dominates hospital dental practice, despite so much evidence against its use.[20] Moreover, there is no protocol or commercial formulation for its use in anesthetic tubes, further hindering the use of these alternative anesthetic agents in dentistry. Therefore, this study aims to evaluate whether there is a significant difference between bupivacaine and ropivacaine in terms of postoperative analgesia, intraoperative hemostasis, and the patient's vital signs during the procedure.[16]

2 LITERATURE REVIEW

2.1 RACEMIC BUPIVACAINE

Bupivacaine is a potent local anesthetic from the amide group, widely used in regional anesthesia, epidural anesthesia, spinal anesthesia, and local anesthesia. It is available in three different concentrations: 0.25%, 0.5%, and 0.75%.[21] It is called racemic because it is an equimolar mixture of dextrorotatory and levorotatory isomers.[22] Bupivacaine has a slow onset of action (6 to 10 minutes), a half-life of 2.7 hours, and intrinsic vasodilatory potential. It is commonly used in more extensive procedures that require prolonged intraoperative and postoperative anesthesia.[11] To reduce intraoperative bleeding, toxicity, and the required dose for anesthesia, vasoconstrictors are frequently added to bupivacaine, with epinephrine being one of the most commonly used substances.[23]

Bupivacaine was first synthesized in 1957 and introduced to the market in the mid-1960s. As its use increased, so did reports of adverse effects, including toxicity to the central nervous system and cardiovascular system.[24] Bupivacaine is closely associated with seizures, severe bradycardia, and cardiac arrest, which are often

resistant to conventional cardiopulmonary resuscitation techniques. [25] These side effects are frequently linked with overdose or accidental intravascular injection. [26]

Duo to these concerns, several studies have been conducted to better understand the cause of bupivacaine's toxicity, ultimately leading to the exploration of isomers and the development of new anesthetic agents.[27]

2.2 LEVOBUPIVACAÍNE

Levobupivacaine is a long-acting anesthetic agent developed in response to reports of toxicity associated with bupivacaine in the 1970s.[28] It is a pure enantiomer of bupivacaine, composed exclusively of levorotatory isomers, which explains its distinct physiological effects, despite the molecules being very similar.[27] This local anesthetic has several properties that distinguish it from racemic bupivacaine, including less associated vasodilation, longer duration of action, lower potency, and reduced toxicity to the central nervous system and cardiovascular system.[29]

2.3 ROPIVACAINE

Ropivacaine was also developed in response to reports of toxicity associated with bupivacaine, becoming commercially available only in the mid-1990s.[24] Although its name does not specifically mention levorotatory isomers, ropivacaine os, in fact, a pure levorotatory version, similar to levobupivacaine.[27]

It is a long-acting amide-type local anesthetic with slightly lower potency and duration of action compared to bupivacaine, exhibiting rapid dissociation from sodium channels, which contributes to its reduced cardiotoxicity.[30, 31, 32] Furthermore, animal studies show that resuscitation after local anesthetic-induced cardiovascular collapse was more easily achieved in the ropivacaine group compared with the bupivacaine group.[33]

Studies indicate that higher doses of ropivacaine are required to trigger symptoms and initial signs of toxicity in the cardiovascular and nervous systems when compared with racemic bupivacaine.[34] Unlike most local anesthetics, ropivacaine possesses intrinsic vasoconstrictor properties, which may be beneficial in surgical practice.[35, 36]

3 OBJECTIVES

3.1 GENERAL OBJECTIVE

This study aims to evaluate whether there is a significant difference between 0.5% bupivacaine with 0.2Ml of epinephrine and 0.75% ropivacaine with 0.2Ml of epinephrine in terms of postoperative analgesic capacity, intraoperative hemostasis and the patient's vital signs during the transoperative period.

3.2 SPECIFIC OBJECTIVES

- Measure the amount of intraoperative bleeding (in mL) during procedures performed with 0.5% bupivacaine with 0.2 mL of epinephrine and 0.75% ropivacaine with 0.2 mL of epinephrine.
- Assess potential changes in patients vital signs during and after the administration of local anesthetics.
- Compare the levels of postoperative discomfort associated with anesthetic agents using a visual analog scale (VAS).

JUSTIFICATION

Despite the well-known cardiotoxic and neurotoxic effects of bupivacaine, it continues to be widely used in oral and maxillofacial surgery. This study aims to compare and evaluate the feasibility of using a less toxic anesthetic agent in lower third molar removal surgeries under general anesthesia.

4 MATERIAILS AND METHODS

The study is designed as a randomized, controlled, split-mouth clinical trial. Patients receiving 0.5% bupivacaine with 0.2 mL of epinephrine are defined as group A (GA), while patients receiving 0.75% ropivacaine with 0.2 mL of epinephrine are classified as group B (GB).

4.1 SAMPLE CALCULATION

The sample size was determined for convenience, based on a similar study previously conducted[37], which established a significance level of 5% ($p < 0.05$), a power of 80%, and a 5% margin of error for its calculation ($n = 30$). In the baseline study, a comparison was made between ropivacaine and lidocaine during implant placement, with procedures performed on 15 patients, as it was a split-mouth design. In the present study, procedures will be performed on 15 patients, yielding a total sample size of 30.

4.1 ETHICAL ASPECTS

The study will be conducted in accordance with the Guidelines and Regulatory Standards of the National Health Council (Resolution No. 466/12), which establishes the ethical guidelines for research involving human subjects in Brazil.

The benefit of participating in the research is indirect, as the patient contributes to the discovery of scientific evidence that will serve as the foundation for safer and more effective treatment.

Patient personal data, collected through direct contact with the participant during the study, will not be disclosed, and confidentiality will be ensured for all participants. This data will be stored in a Google Drive spreadsheet linked to the researchers institutional email address.

Surgical procedures and the participant's participation in the project may present certain surgical and confidentiality risks inherent to participation, which are outlined in the Informed Consent Form (APPENDIX A).

4.2 TYPE OF STUDY

The study is a randomized, controlled, split-mouth clinical trial.

4.3 LOCATION

The surgeries will be performed at the Outpatient Surgery Center and Surgical

Block of the Hospital de Clínicas de Porto Alegre, located at the address: Rua Ramiro Barcelos, 2350, Santa Cecília, Porto Alegre - RS, 90035-903.

4.4 SAMPLE

The sample selection will consist of patients referred to the Oral and Maxillofacial Surgery Unit at the Hospital de Clínicas de Porto Alegre. The selected patients require bilateral extraction of lower third molars under general anesthesia, either due to the complexity of the surgery or due to systemic conditions that contraindicate local anesthesia. Patients who meet these criteria will follow the routine care protocol adopted by the team. During outpatient consultations, laboratory tests (including blood count, PT, aPTT, glucose, AST, ALT, and creatinine), imaging (CT scan of the skull and facial bones), and pre-anesthetic evaluation will be requested. If the tests are normal and cleared by the Anesthesiology team, patients will be placed on the waiting list and contacted when surgery is available. There will be no change to the routine care for patients volunteeing in the study. The surgical procedures will be performed by the research team responsible for this study. The inclusion criteria will include patients aged 18 to 60, classified as ASA I or ASA II, who have impacted or semi-impacted lower third molars with similar positioning on both sides, according to the Pell and Gregory classification.[38]

Patients who can undergo surgery under local anesthesia or who require additional procedures in the same surgical session, will be excluded from the sample. All patients, wheter participating in the study or not, will have the right to withdraw from the study at any time without penalty.

Postoperative consultations will be conducted for follow-up, suture removal, and the evaluation and treatment ofany potential postoperative complications.

Regarding general anesthesia, since this is a split-mouth study, both patients undergoing total intravenous anesthesia and general inhalational anesthesia will be included. Patients requiring additional intraoperative medications, which may interfere with the data, will be excluded. An example of this is patients receiving tranexamic acid during the procedure, as it could distort bleeding measurements between surgical sites.

The selection of the control group and experimental groups will be determined by a simple randomization in the immediate preoperative period. One surgical site will recieve 0.5% bupivacaine + 0.2mL of epinephrine (GA) while the other site will recieve 0.75% ropivacaine + 0.2mL epinephrine (GB).

4.5 PREOPERATIVE CONDUCTS

Each patient selected for the study will be required to complete an Informed Consent Form (APPENDIX A) prior to the clinical procedures. If any participant disagrees with the terms outlined in the form, they will not be included in the study.

The patient's medical history will be taken during an outpatient appointment automatically scheduled via the GERCON system. During this appointment, the team will investigate the patient's current medical condition, other comorbidities, medication use, and known allergies. In addition to the physical examination, imaging tests (panoramic X-rays and/or CT scans) and laboratory tests will be requested. This consultation will also collect sociodemographic data from the sample, assess their health status, and identify any factors that may contraindicate their participation in the study. After the imaging and laboratory tests are completed at the Hospital de Clínicas de Porto Alegre, patients will be placed on the waiting list for surgery. Following the surgical procedure, patients will receive a postoperative care and instructions form (APPENDIX B), standardized medications, and medical notes, if necessary. The VAS (APPENDIX C) and instructions on how to use it will also be provided after the surgery.

4.6 SURGICAL TECHNIQUE

The procedure will be performed in a hospital setting, where patients undergo a single surgery for the extraction of the lower right and lower left third molars. Throughout the perioperative period, patients will be closely monitored, with their vital signs observed by both the surgical team and anesthesiology teams. As prophylaxis, patients will receive 900mg of clindamycin intravenously at the start of the procedure. The patient will be positioned supine on a hospital stretcher and placed under general anesthesia. Extra and intraoral antisepsis will be performed using a 0.12% chlorhexidine digluconate aqueous solution, and sterile surgical drapes will be used. Following these initial steps, one of the surgical sites (as selected) will be infiltrated with either 6 mL of 0.5% racemic bupivacaine + 0.2 mL of epinephrine or 4 mL of 0.75% ropivacaine with 0.2 mL of epinephrine, with approximately 25 mg of anesthetic injected. The surgical procedure will then begin. A Neumann incision with diverticulum will be made on the distal side of the adjacent mandibular second molar, followed by mucoperiosteal detachment, osteotomy, and odontosection (if necessary). The tooth will then be luxated and extracted using levers. The surgical wound will be cleaned and sutured with single or X-shaped stitches using 4-0 polyglactin sutures. Suture removal will take place between 7 and 10 days postoperatively. Before discharge, while

still in the hospital, patients will receive intravenous administration of 2g of dipyrone every 6 hours, 40mg of tenoxicam once daily, 100mg of tramadol every 8 hours, 600mg of clindamycin every 6 hours, and 4mg of ondansetron every 8 hours.

Postoperative instructions and necessary medications will be provided to patients both verbally and in writing, according to the protocol recommended by the hospital (APPENDIX B). Suture removal will be performed in an outpatient setting at the Hospital de Clínicas de Porto Alegre between 7 and 10 days postoperatively.

4.7 ASSESSMENT OF VITAL SIGNS DURING THE OPERATIVE PERIOD

Intraoperative vital signs will be assessed by the Anesthesiology and Perioperative Medicine Service of the Hospital de Clínicas de Porto Alegre, always led by the same care team. Heart rate, blood pressure, and oxygen saturation will be measured and recorded before, immediately after, 1 minute after, and 5 minutes after the injection of each anesthetic. Significant changes, such as hypo or hypertension, bradycardia or tachycardia, and hypoxia, will be recorded and presented in the results.

4.8 EVALUATION OF TRANSOPERATIVE BLEEDING

The intraoperative bleeding assessment will be quantitative, based on the blood collected in the collection bottle. The amount of distilled water used will be subtracted from the total aspirated volume. This value will be recorded at the time the suture is completed.

To assess bleeding from the second surgical site, the measurement will be taken at the time the suture is completed. The amount of distilled water used, along with the volume present in the collection bottle prior to the incision at the second site, will be subtracted. These values will be recorded, compared, and presented in the results.

4.9 EVALUATION OF POSTOPERATIVE ANALGESIA

To assess postoperative analgesia, a VAS will be used, in which patients will rate their pain from zero (no pain) to ten (worst pain ever felt) at different postoperative time points: T0 (immediate postoperative period, as soon as the patient is lucid), T1 (1 hour after T0), T2 (12 hours after T0), T3 (18 hours after T0), and T4 (24 hours after T0). Two scales will be used for each postoperative time point: one for the left side and one for the right side. These values will be recorded, compared, and presented in the results.

4.10 DATA ANALYSIS

A descriptive analysis will be performed on the changes in vital signs observed during the operation (if any). A direct comparison and calculation of the averages will be made beween the values observed in both the postoperative analgesia evaluation and the transoperative bleeding assessment.

5 TIMELINE

The mandibular third molar removal surgeries under general anesthesia will be performed based on availability at the Oral and Maxillofacial Surgery Unit of the Hospital de Clínicas de Porto Alegre. Currently, two surgeries per week are available, and these will be conducted until the sample size is reached.

ACTIVITY/MONTH	01	02	03	04	05	06	07	08	09	10	11	12
BIBLIOGRAPHY REVIEW	x	x										
SURGICAL PROCEDURES			x	x	x	x						
DATA ANALYSIS							x	x				
COMPLEMENTARY LITERATURE REVIEW									x	x		
PRESENTATION OF THE FINAL PAPER											x	x
WRITING AND SUBMISSION OF THE SCIENTIFIC ARTICLE												x

6 RESOURCES AND BUDGET

The transportation costs for research participants to attend their appointments will be covered by the researchers (including the cost of a municipal bus ticket for each appointment), as well as any other expenses incurred as a result o their participation in the study.

All costs related to the surgical procedure will be covered by the Hospital de Clínicas de Porto Alegre, through the Unified Health System (SUS). Postoperative medications will be reimbursed through the Unified Health System (SUS).

TYPE OF MATERIAL	MATERIAL	QUANTITY	PRICE	
			UNITARY	TOTAL
	Bus ticket	90	R$ 4,80	432
	Total			**R$ 432,00**

6.2 HUMAN RESOURCES

The bibliographic review and construction of the project will be carried out by the research team, as well as the surgical procedures and data analysis.

6.3 FINANCING SOURCES

The expenses necessary for the execution of the research project will be paid with the responsible researcher’s own resources.

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APPENDIX A – FREE AND INFORMED CONSENT FORM

CPPG OR CAAE PROJECT NUMBER: 89726325.2.0000.5327

PROJECT TITLE: "COMPARIMENTAL STUDY BETWEEN BUPIVACAINE AND ROPIVACAINE REGARDING EFFICACY IN THIRD MOLAR REMOVAL SURGERY UNDER GENERAL ANESTHESIA"

You are invited to participate in the research project "COMPARIMENTAL STUDY BETWEEN BUPIVACAINE AND ROPIVACAINE REGARDING EFFICACY IN THIRD MOLAR REMOVAL SURGERY UNDER GENERAL ANESTHESIA," which will be conducted at the Hospital de Clínicas de Porto Alegre. The main objective of this research is to compare the postoperative analgesic capacity, bleeding, and intraoperative signs of two anesthetic salts. The study is designed as a randomized, controlled, split-mouth clinical trial, with group A receiving 0.5% bupivacaine and 0.2 mL of epinephrine, and group B receiving 0.5% ropivacaine and 0.2 mL of epinephrine.

You may participate in this study if you have two lower third molars that require surgical removal under general anesthesia, either due to the complexity of the surgical technique or clinical management. If other procedures are required at the same time as the surgery, or if the procedure can be performed under local anesthesia, your participation will not be included in the study. If you agree to participate in the research, the procedure involved will be surgery to remove your lower third molars under general anesthesia. A local anesthetic (0.5% bupivacaine with 0.2mL of epinephrine) will be administered to one side and a local anesthetic (0.5% ropivacaine with 0.2mL of epinephrine) to the other side, selected randomly. The surgery will be performed under general anesthesia in a single session.

Your participation in the research involves the collection of personal and health data during preoperative consultations, the surgical procedure, and postoperative appointments. This information is guaranteed confidentiality between the researchers and the patient. Furthermore, you, as a research participant, have the right not to answer any questions in the questionnaire that cause you embarrassment or discomfort, without needing to provide an explanation or justification. You may withdraw from the research at any time without any harm to yourself.

By participating in this research, you consent to undergo a tooth extraction procedure using two different anesthetic salts, both already established on the market.

Furthermore, you agree to attend postoperative consultations. These consultations will take place 7 or 10 days after surgery, during which a physical and clinical examination will be performed, as well as suture removal and other postoperative measures, if necessary. The benefit you will receive from participating in this research is indirect, as you will contribute to the discovery of scientific knowledge that will serve as the basis for larger studies on this topic, which may create safer and more effective treatments for patients requiring third molar removal under general anesthesia.

Surgical procedures and your participation in this research may present certain risks inherent to participation, such as:

Regarding the surgical procedure, these risks are inherent to your participation in the research: risks of paresthesia (an abnormal and unpleasant sensation on the skin that takes various forms, including burning and numbness), mouth injuries, risk of infection of the fascial spaces, bleeding, and jaw fracture. These possible complications will be treated, if they occur, as follows: prescription of neuroregenerative medications, clinical management of mouth lesions, antibiotic prescription and immediate clinical management by the team, local hemostasis maneuvers, and immediate rigid internal fixation, all during the same surgical procedure. Furthermore, this document includes the cell phone number of the researcher in charge in case of complications beyond pre-scheduled postoperative appointments and the availability of the researchers for care at the Hospital de Clínicas de Porto Alegre and the UFRGS School of Dentistry.

Regarding research participation: You will provide personal and health information that may cause embarrassment and/or discomfort. In this case, you may refuse to answer the questions without any need for justification. You should be aware that confidentiality may be breached in the following situations: when it is the last resort available, or in the event of an adverse event requiring care from other professionals. Therefore, to minimize this situation, only information relevant to the procedure to be performed will be disclosed after due consent.

The researchers undertake to suspend the study in the event of any adverse reaction suspected to be related to the research procedure. If any, the treatment of these adverse reactions will be the sole responsibility of the lead researcher, without restriction.

Participation in the study does not involve any financial gain for the participant, nor does it generate any costs to be paid by them. Transportation costs (the cost of a round-trip municipal bus ticket for each appointment) will be reimbursed, as well as any expenses incurred due to their participation in the study, with reimbursement being the responsibility of the lead researcher.

The participant has the right to seek compensation for any damages arising from the study. Likewise, the participant may withdraw from the study at any time without needing to justify their decision, and without compromising the care provided at the Hospital de Clínicas de Porto Alegre.

All patients will receive intravenous antibiotics (Clindamycin 900mg) from the researchers in the first 30 minutes of the surgical procedure, as a form of prophylaxis, reducing the risk of infection. During hospitalization, patients receive intravenous doses of 2g of dipyrone every 6 hours, 40mg of tenoxicam once daily, 100mg of tramadol every 8 hours, 600mg of clindamycin every 6 hours, and 4mg of ondansetron every 8 hours.

After the surgical procedure, patients will be prescribed 1g of paracetamol (take two 500mg tablets every 6 hours for 3 days), ketorolac tromethamine 10mg (place one 10mg tablet under the tongue every 6 hours for 3 days), and 600mg of clindamycin (take two 300mg tablets every 6 hours for 7 days). In addition, an aqueous solution of chlorhexidine digluconate (150ml at 0.12%) will be prescribed for rinsing 10ml for 1 minute, every 12 hours, for 7 days, to be started only 24 hours after the procedure. These medications should be used at home. The researchers undertake to disseminate the results to the research participants in an accessible format once the research is completed.

Finally, it is important to emphasize that your data will be stored for at least 5 years, and this Informed Consent Form must be signed and initialed on every page by the principal investigator and the participant in two copies.

It is important to emphasize that the project was evaluated by the CEP-UFRGS, a collegiate body with an advisory, deliberative, and educational nature, whose purpose is to evaluate, issue opinions, and monitor research projects involving human beings, in their ethical and methodological aspects, carried out within the institution. The CEP-UFRGS is located at Av. Paulo Gama, 110, Room 311, Annex Building I of the Rector's Office – Centro Campus, Porto Alegre, RS – Zip Code: 90040-060. Phone: +55 51 3308 3787. Email: etica@propesq.ufrgs.br. Opening hours: Monday to Friday, from 8:00 to 12:00 and from 13:30 to 17:30.

Contacts:

Researcher in Charge: Henrique Tedesco - (51) 99960-1939

The participant declares having read and received information about the research, thus agreeing to participate in the study.

Signatures:

_____ _____

Reseacher Volunteer

Date: / / .

Heading:_____

APPENDIX B – POSTOPERATIVE CARE PROTOCOL

- Bite firmly on a gauze pad for 20 minutes in case of delayed bleeding.
- Eat a soft, cold, or ice-cold liquid diet for 48 hours. Avoid grainy or bran-based foods until the suture is removed.
- Apply ice to the face over the surgical site for 20 minutes for the first 24 hours, followed by a 20-minute rest.
- Rest, keeping your head elevated above the rest of your body.
- Avoid strenuous physical activity and sun exposure for 7 days.
- Brush your teeth normally 24 hours after surgery.
- Gently brush the surgical site until the suture is removed.
- Do not rinse your mouth for 48 hours.
- Avoid spitting.
- Do not smoke until discharge from surgery.
- Medication:
- Paracetamol 1g, 2 tablets every 6 hours for three days.
- Ketorolac tromethamine 10mg, 1 tablet every 6 hours for three days.
- Clindamycin 300mg, 2 tablets every 6 hours for seven days.
- Rinse with 10mL of 0.12% chlorhexidine digluconate aqueous solution for 1 minute every 12 hours for seven days, starting 24 hours after surgery. – see medications.
- In case of persistent bleeding, severe pain, or fever (temperature greater than or equal to 37.8°C), contact your doctor.

APPENDIX C – VAS FOR ASSESSING POSTOPERATIVE

No pain **Unbearable pain**

A 10-cm visual analog scale is used to measure the patient's pain during the stipulated periods. It is used postoperatively for each operated side.