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Comparison of Normal Saline and Metronidazole as Irrigating Solutions in Surgical Extraction of Third Molars

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Abstract

Objectives: The primary objective of the study is to compare the efficacy of normal saline and metronidazole when used as irrigating agents after third Molar disimpaction. Secondary objectives were to compare the parameters like pain, infection, wound healing,trismus and incidence of alveolar osteitis at the site of surgery. Materials and Methods: This study is a double blinded, randomised controlled trail.Study population was derived from the patient reported to the department of oral and maxillofacial surgery and diagnosed with impacted mandibular 3rd molar. A total of 40 participants were chosen without any existing infections and required surgical extraction of the impacted molars. The age limit was taken as 18-45 years. Participants were allocated randomly into group 1 (postoperative irrigation with normal saline) group 2 (postoperative irrigation with 1% metronidazole saline). Group 1 patients were irrigated using normal saline and group 2 patients were irrigated using metronidazole wash.Parameters like postoperative infection and wound healing and pain were measured immediately after the procedure, at intervals of 3days and 6days after the procedure respectively. Results: Total of three parameters were measured in this study. VAS scale shows no difference of Pain experienced on the first day but there is significant difference seen on third and sixth day. There is also significant difference seen in the Trismus recorded and the incidence of alveolar osteitis. Conclusion: This study proves that metronidazole can be a better irrigating agent compared to normal saline in reducing the postoperative pain and the chances of infections.

KEY WORDS: Metronidazole, Alveolar osteitis, Extraction socket.

Introduction

Third molar disimpaction is one the frequently performed procedures in dentistry[1]. Wisdom teeth, the third set of molars that typically emerge in late adolescence or early adulthood, often require extraction due to various reasons, including impaction, misalignment, or a lack of space in the jaw. The surgical removal of these teeth, while commonplace, can leave the patient vulnerable to post-operative complications such as infection and delayed healing, swelling, infection, trismus, wound dehiscence,lymphadenopathy, paraesthia.[8]

Dry socket, also known as alveolar osteitis, is a painful complication that can arise following third molar extractions when the blood clot that forms in the socket is prematurely released or destroyed. This syndrome can drastically prolong recovery time and cause major discomfort. It is typically observed one to three days after the operation.[4][8]

Metronidazole, is an antibiotic from nitroimidazole family which is bactericidal for anaerobic bacteria, which are often implicated in post-operative infections. Metronidazole is bactericidal in nature to the anaerobic bacteria, especially against Bacteroides, Fusibacterium which are the main bacteria causing Alveolar Osteitis. It has a broad spectrum of activity against various microorganisms, making it a valuable tool in preventing infections. When used as an irrigating agent,

metronidazole can target and eliminate harmful bacteria that might otherwise remain in the surgical site. By doing so, it can significantly reduce the risk of post-operative infections, a common concern after third molar disimpactions[3]

Metronidazole also possesses anti-inflammatory properties, which can be beneficial in the post-operative period. Inflammation is a common response to surgical trauma, and excessive inflammation can lead to pain and delayed healing. By using metronidazole as an irrigating agent, it may help to reduce inflammation, resulting in a more comfortable post-operative experience for the patient and faster healing times.The combined antibacterial and anti-inflammatory properties of metronidazole can contribute to enhanced healing. When the surgical site is kept clean and free from harmful bacteria, the body can focus its resources on repairing the tissues and closing the wound. Reduced inflammation also means less pain and discomfort for the patient, which can encourage better adherence to post-operative care instructions.[3-4]

MATERIALS AND METHODOLOGY:

This study was conducted at Saveetha Dental College and Hospital , Chennai. It is a double blinded randomised trail. A total of 40 patients were considered for this study. Procedure was performed in Department of Oral and Maxillofacial Surgery. Patients considered for this study have reported to the department with chief complaint of pain or surgical indication for the removal of third molars. Initial assessment was done with orthopantogram and classification was done according to the Winter's classification.

Inclusion criteria:

- Patients indicated for impacted third molar extraction.
- Patients agreeing for the treatment under local anesthesia.
- Patient without bleeding or clotting disorders.
- Patients free of acute systemic or local infections.
- Patients not allergic to any of the medication that will be used in the study.

Exclusion criteria:

- Patients with impacted tooth indicated for removal under general anesthesia.
- Patient not complying with the treatment plan.
- Patients presenting with acute local infection.

Surgical Protocol

Patients who were considered for this study were randomly placed into two groups with 20 patients in each group,Group A(irrigation done with normal saline) and Group B (irrigation done with 1% metronidazole saline). Patients were explained about the procedure and the expected complications during and after the procedure. 2% lignocaine with 1:80000 dilution of adrenaline used as local anaesthetic agent for the nerve blocks. Standard mucoperisoteal flap was raised and bone guttering was done with copious saline irrigation. After the third molar disimpaction the extraction sockets were irrigated with the respective irrigation solutions for each group. After the procedure, all the patients were given standard post operative instructions. All the patients were given Amoxicillin 500mg twice daily for three days.

Assessment protocol

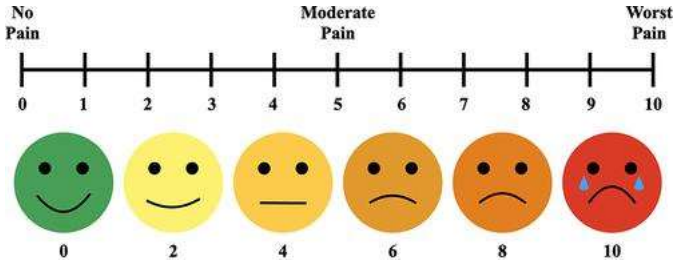
Patients were recalled after 3days and 6 days after the procedure. Pain was assessed using visual analog scale(VAS). Patients were asked to mark on the scale according to the pain perceived over a scale of 0 to 10. Alveolar osteitis was assessed after three days by examining the site for the pain, bare bone, infection and halitosis. Trismus was assessed using measuring the interincisal distance.

Statistical Analysis

Mann-Whitney test was used to compare the VAS scores and Trismus in between the groups. *P* value less than 0.05 is considered significant.

RESULTS

A total of 40 patients were considered for this research. They were divided into 20 each into 2 groups by using



randomisation. VAS scores were recorded on the day of procedure, third day and the sixth day. *P* value for the day of procedure was not significant as it was 0.36. *P* value for the third day and the sixth day was 0.00 which shows significant difference. *P* value of 0.04 was seen for the Trismus in between the group which was definitely significant.

TABLE 1 comparing pain on the day of procedure, third day and sixth day using VAS scale

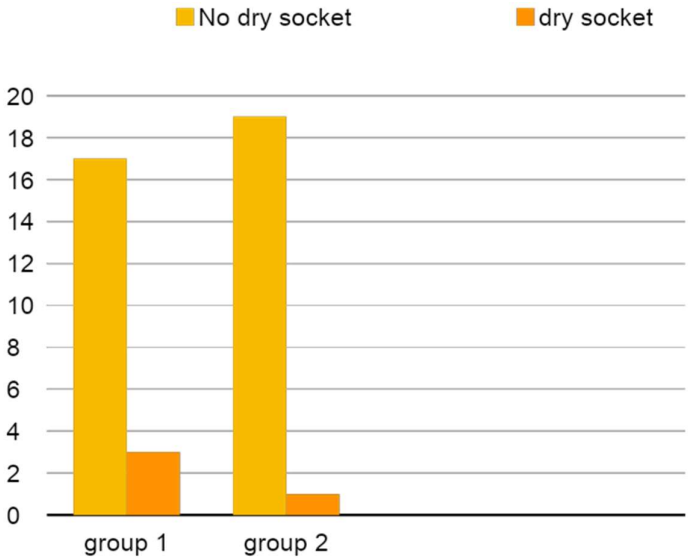
VAS	GROUP A	GROUP B	P VALUE
VAS 1	18.33	22.18	0.369
VAS 3	27.73	13.28	0.000
VAS 6	30.35	10.65	0.000

Group	Mouth opening
I	>35mm
II	25-35mm
III	15-25mm
IV	2-15mm

TABLE 2 comparing trismus between the groups

TRISMUS	GROUP A	GROUP B	P VALUE
TRISMUS (mm)	24.18	16.83	0.046

GRAPH 1 showing the incidence of Alveolar osteitis



Discussion

The use of metronidazole as an irrigating agent after third molar disimpactions presents compelling arguments due to its potential benefits, which surpass those of the conventional option of normal saline. The statistics and rationale underlying this transition in post-operative care warrant a comprehensive examination. The objective of our study was to investigate whether metronidazole is a more effective irrigating solution than normal saline in reducing postoperative problems such as wound healing issues, infections such dry socket, discomfort, and trismus. These characteristics were specifically chosen as the focus of our investigation.[15,16]

In the context of bone guttering, a healthcare professional would opt for an irrigating solution that serves the dual purpose of lubrication and temperature reduction in order to mitigate the risk of bone necrosis. Furthermore, it is imperative that the device have the capability to effectively debride the adjacent area, since the presence of debris might serve as a conducive environment for microbial growth if not thoroughly removed. The primary characteristics of an irrigating agent are its non-toxicity, isotonicity, and non-irritating properties. The user's text does not provide enough information to be rewritten in an academic manner. [9,10]

In a research done by Rood and Danford, the significant function of metronidazole as a topical medicine in the prevention and treatment of Alveolar osteitis was demonstrated. This can be attributed to its significant ability to penetrate tissues. According to the study conducted by Moore et al., the use of metronidazole as an irrigating agent had positive effects in cases such as acute pericoronitis. This is attributed to the fact that a significant proportion of the microorganisms present in the purulent discharge were anaerobic bacteria. Utilising this approach can serve as an appropriate method for the management of acute pericoronitis. [4,5]

According to a study conducted by May and Barker, it was observed that the systemic administration of metronidazole resulted in the occurrence of incorrect urine flow and a dark crimson coloration. In addition to gastrointestinal issues, the presence of nausea and rashes was also seen. After prolonged administration of the medications, several individuals displayed minor neuropathies, neutropenia, and leukopenia. Taking into account all of the aforementioned elements in our investigation, we have used metronidazole as a topical agent for the purpose of irrigating the surgical site.[17]

In this study, the pain experienced by the patients at various intervals was assessed using the visual analogue scale (VAS). The utilization of VAS is advantageous due to its high level of comprehensibility for patients and its ease of reproducibility. Trismus was assessed and categorized into four grades based on the measurement of interincisal distance in millimeters.

One of the primary benefits of using metronidazole as an irrigating chemical lies in its considerable antimicrobial efficacy. The efficacy of this treatment against anaerobic bacteria, which are frequently associated with post-operative infections in the oral cavity, has been well acknowledged. Metronidazole exhibits a distinct ability to selectively target anaerobic bacteria, hence giving a superior degree of bacterial control compared to normal saline. The capacity to successfully decrease the bacterial burden can exert a substantial influence on incidence of post-operative infections. The efficacy of metronidazole in infection prevention not only facilitates a more seamless recuperation for the individual but also has cost ramifications by diminishing the necessity for later medical consultations and interventions aimed at managing complications.[3-4]

The dual functionality of metronidazole as an irrigating agent extends beyond its antibacterial characteristics. The intrinsic anti-inflammatory properties of this substance can significantly contribute to the management of patients after surgical procedures. In the context of surgical trauma, inflammation is an inherent physiological reaction. However, an excessive inflammatory response can give rise to heightened pain perception, delayed wound healing, and a less satisfactory recovery process for the individual undergoing surgery. Metronidazole's anti-inflammatory effects have the potential to mitigate these problems. Metronidazole has the potential to expedite the healing process, alleviate pain, and enhance the overall patient experience by mitigating inflammation at the surgery site. In addition, the reduction in discomfort may result in enhanced patient adherence to post-operative care guidelines, so facilitating a more seamless recuperation.[3-4][12-16]

Dry socket, also known as alveolar osteitis, is a commonly expected outcome following the extraction of third molars. Alveolar osteitis, also known as dry socket, occurs when the formation of a blood clot within the extraction socket is disrupted or prematurely dissolved, resulting in the exposure of the underlying bone and nerves. This particular medical problem has the potential to induce excruciating pain and significantly extend the duration of the recovery process. The potential efficacy of metronidazole in reducing the incidence of dry socket appears to be encouraging.Metronidazole has the potential to facilitate the development and maintenance of blood clot formation by promoting a sterile surgical environment, free from bacterial contamination. Consequently, the incidence of dry socket and its associated discomfort and effects is diminished. While more study is required to establish a definitive association, the potential advantages of using metronidazole to mitigate the incidence of dry socket appear to be noteworthy.[3-4]

CONCLUSION:

While normal saline has long been the standard irrigating agent after third molar disimpactions due to its gentle and isotonic properties, metronidazole is emerging as a superior alternative. Its broad-spectrum antibacterial properties, anti-inflammatory effects, and potential to reduce the risk of dry socket make it an attractive choice for post-operative irrigation. As always, the choice of irrigating agent should be made in consultation with a dental or oral surgery professional who can consider the individual patient's needs and circumstances. However, the evidence suggests that metronidazole holds promise as a more effective and beneficial irrigating agent in the context of post-third molar disimpactions.

Conflict of interest

The authors state no conflict of interest.

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