

Efficacy of Warm Saline and Chlorhexidine Mouth Rinses in the Prevention of Alveolar Osteitis after Third Molar Surgery: A Comparative Study

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ABSTRACT

Introduction: For the prevention of alveolar osteitis (AO) after third molar surgery, chlorhexidine (CHX) mouth rinses have proved to be an effective measure. The present trial was done to compare the efficacy of warm saline rinse, which is a constituent of postextraction instructions, with that of CHX mouthwash in our institution over a period of 2 years.

Materials and methods: Apparently healthy patients reporting to the Department of Dentistry of our institution with an indication for surgical extraction of third molars were prospectively, consecutively, and uniformly randomized into warm saline and CHX groups. Instruction given to the experimental group (n = 110) was warm saline gargle twice daily, whereas the CHX group (n = 110) was instructed to gargle with 0.12% CHX. Information on demographic, types and level of impaction, indications for extraction, and development of AO was obtained and analyzed. Comparison of data was done using Pearson's Chi-square, Fisher's exact, or Mann-Whitney U-tests, as applicable. Statistical significance was set at $p < 0.05$.

Results: The study groups were analogous in terms of demographic profile, types and level of impaction as well as indications for extractions ($p > 0.05$). The overall prevalence of AO was 19.54%. There was no statistically significant difference between application of warm saline and 0.12% CHX rinse with respect to the development of AO ($p = 0.127$).

Conclusion: Warm saline mouth rinse is equally as effective as CHX mouth rinse, as prophylaxis against prevention of AO after third molar surgery.

Keywords: Complications, Osteitis, Prevention, Warm saline.

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INTRODUCTION

One of the most common oral surgical practice is tooth extraction.¹ Though dentists are very well versed with basic principles of tooth extraction,² still on many occasions complications do occur.³ Alveolar osteitis, also known as alveolitis sicca dolorosa (dry socket), alveolgia, osteomyelitis or fibrinolytic osteitis, postextraction osteomyelitis syndrome, fibrinolytic alveolitis, and localized AO⁴⁻⁷ and first defined by Crawford⁸ in 1896, is one of the most common postextraction complications. Incidence of AO after dental extractions ranges from 1 to 70%⁹⁻¹⁵ and is characterized by dislodgement of the intraalveolar blood clot from the socket along with bare bony walls and sensitive on mild probing. Halitosis and fever is intermittently present.^{16,17}

The etiology of AO is not determinedly recognized, though the risk factors that intensify the occurrence of this complication comprise smoking,¹⁸ oral contraceptives,¹⁹ understanding of the surgeon,^{18,20} and poor oral hygiene.²⁰ According to literature²¹⁻²⁴ incidence of AO can be reduced by decreasing the bacterial count in the oral cavity as these oral bacteria contribute to fibrinolysis and subsequent loss of the blood clot.⁹ Chlorhexidine mouthwash,²⁵ systemic and topical antibiotics,²⁶ fibrinolytic means,²⁷ local antiseptic packs,²⁸ and warm saline rinse²⁹ are the various methods used for prevention of AO. Of these, the present study deals with the use of warm saline rinse and CHX mouthwash, being the most readily available and easy-to-use regimen.

Warm saline oral rinse is one of the techniques of inhibiting the development of AO, and it is believed to augment smooth reclamation after dental extractions as evinced by reports throughout the world.²⁹⁻³¹ An unprejudiced assessment of the effectiveness of warm saline rinse, as a postextraction curative, was lately carried out in a randomized controlled study.³¹

Its capability to check the development of AO was decisively established by the study, and this has further reinforced its uninterrupted usage as a postextraction medicament.³¹ Chlorhexidine is effective against both aerobic and anaerobic, Gr (+) and Gr (-), organisms, and yeast. It has a high affinity for the cell wall of microorganisms and brings alterations in the superficial structures,

consequential loss of osmotic equilibrium, and precipitation of the cytoplasm.³²⁻³⁶ Oral rinsing with CHX has been publicized to diminish the quantity of oral microbial populations and, thus, may be effective in decreasing the occurrence of AO.^{32,37-39}

There are very few studies that compare efficacy of warm saline rinse with other modalities, such as CHX mouth rinse.^{29,40} With this as the background, the present study was done with an aim to compare the efficacy of warm saline rinse with 0.12% CHX gluconate rinse on the development of AO following dental extractions in a tertiary care hospital. A null hypothesis that warm saline mouth rinse was as efficacious as 0.12% CHX in the prevention of AO was formulated.

MATERIALS AND METHODS

The present study was a double-blind randomized controlled parallel-group clinical trial performed at the Department of Dentistry, VSS Institute of Medical Sciences and Research, Burla, India, from April 2015 to March 2017. Institutional Ethical clearance was taken prior to the commencement of the study. This study includes all the subjects (both males and females) reporting to the department for extraction of mandibular third molars during the specified period according to the inclusion and exclusion criteria set for the study. Patients with a history of uncontrolled diabetes mellitus, facial cellulitis, impacted third molars associated with tumors, liver diseases, kidney diseases, present steroid therapy, human immunodeficiency virus/acquired immunodeficiency syndrome, smokers, as well as previous radiotherapy to the head and neck region were excluded from the study. All the extractions were performed by the same surgeon under local anesthesia using 2% lignocaine hydrochloride with 1:80,000 adrenaline. All patients received the same oral medications (amoxicillin 500 mg 8 hourly for 5 days; metronidazole 400 mg 8 hourly for 5 days; and aceclofenac 100 mg 8 hourly for 5 days).

The patients were consecutively randomized into warm saline and 0.12% CHX groups. The warm saline group was instructed to gargle twice daily, whereas the CHX group was asked to gargle twice daily with 0.12% CHX gluconate rinse. The patients were not aware of any parallel group concerned with the study. The patients were evaluated postoperatively for the presence of AO by a blinded observer.

Criteria for diagnosing AO were based on persistent throbbing pain and exposure of bare alveolar bone, within 3 to 7 days postextraction.⁴¹ The data were analyzed using Statistical Package for the Social Sciences (version 20; SPSS Inc., Chicago, Illinois, USA). Analysis included means, standard deviation, and cross tabulation. Comparative

statistics was done using Pearson's chi-square test, Fisher's exact test, or nonparametric Mann-Whitney U-test as appropriate. Statistical significance was set at $p < 0.05$.

RESULTS

All the 220 subjects were uniformly divided into two groups of 110 each. Age range of patients was 18 to 58 years, with a mean of 31.12 ± 11.99 . Mean age of the saline group was 30.75 ± 11.86 and that of CHX group was 31.49 ± 12.17 and their difference in age was not statistically significant ($p > 0.05$) (Table 1). Overall number of female patients ($n = 122$) was more than that of male patients ($n = 98$). The most common type of impaction was mesio-angular impaction ($n = 67$), which was followed by vertical ($n = 56$), distoangular ($n = 53$), and horizontal ($n = 44$). Out of total 220 patients, 43 (19.54%) presented with AO, and Table 2 shows there was no significant difference for this complication in the saline (23.63%) and CHX (15.45%) mouthwash groups ($z = -1.527$, $p = 0.127$).

DISCUSSION

This study evaluated the efficacy of warm saline and 0.12% CHX mouth rinse regimens on the prevention of AO after routine third molar extractions. An overall prevalence of 19.54% was observed. This finding is very much similar to previous studies reporting 20 to 30% prevalence of AO^{18,32} and is much more than studies by Swanson⁵ and Osunde,⁴⁰ who have reported 5% prevalence. The reason behind such wide difference in the prevalence may be attributed to the diagnostic criteria, experience of the surgeons, postsurgical placement of local dressings, and patients' compliance with postoperative instructions.^{18,30,42}

According to the literature, there are many methods for minimizing the incidence of AO, including CHX mouth rinse,²⁵ systemic and topical antibiotics,⁷ fibrinolytic agents,²⁷ and local antiseptic packs.⁴² In the present study, comparison was being made between warm saline and 0.12% CHX gluconate mouthwash groups. No significant difference was found on comparing development of AO in both the groups (23.63 vs 15.45% respectively).

A hypertonic solution prepared on dissolution of one teaspoon salt in a glass of lukewarm water has potential effect on reduction of postoperative facial edema.¹⁸ Mechanism of action of this can be attributed to the hypertonicity of the warm water which can inhibit bacterial growth but at the same time can encourage the growth of oral commensal microorganisms. The bacteriostatic effect occurs when the bacterial intracellular fluid is drawn out through the bacterial cell wall, which acts as a semipermeable membrane, by the relatively more

Table 1: Demographic, clinical characteristics, and indications for surgical extraction (n = 220)

Variables	Total patients (n)	Warm saline	Chlorhexidine	df	χ^2	p-value
Gender						
Male	98	50	48	1	0.074	0.786
Female	122	60	62			
Side involved						
Left	126	61	65	1	0.463	0.496
Right	94	49	45			
Type of impaction						
Mesioangular	67	38	29	3	3.275	0.352
Distoangular	53	28	25			
Vertical	56	28	28			
Horizontal	44	19	25			
Level of impaction						
Partially bony	121	67	54	1	2.215	0.176
Fully bony	99	43	56			
Reason for indication of extraction						
Dental caries	82	41	41	3	2.667	0.446
Apical periodontitis	47	22	25			
Pericoronitis	53	31	22			
Neuralgic pain	38	16	22			
Alveolar osteitis						
Present	43	26	17	1	2.341	0.173
Absent	177	84	93			

Table 2: Comparative statistics for development of AO between warm saline and CHX groups

Treatment group	n	Mean rank	Sum of ranks	Mann–Whitney U-test	Z-value	p-value
Warm saline	110	106	11660.00	5555.00	-1.527	0.127
Chlorhexidine	110	115	12650.00			

concentrated hypertonic saline solution in a process called plasmolysis. The thermal effect of the warm saline rinse encourages smooth and uncomplicated healing by inducing vasodilatation of the vasculature of oral cavity, and thus enhances migration of phagocytes to the extraction site.^{11,18} Our result is much more than that of Delilbasi et al,²⁹ who also found comparable efficacy for warm saline rinse and 0.2% CHX with respect to prevention of AO.

Chlorhexidine is a broad-spectrum biocide effective against Gram-positive and Gram-negative bacteria as well as fungi. It has earned an eponym of gold standard as an oral rinse because of its ability to adhere to both hard and soft tissues and have prolonged effects due to sustained release.⁴³ However, warm saline rinse is cheaper, easy to prepare, and is devoid of the side effects associated with oral CHX rinse.⁴³

CONCLUSION

This study has shown that warm saline mouth rinse could be a useful substitute to CHX rinses after dental extractions. This is important because it is readily available, cheap, and easy to prepare, especially in resource-limited

areas, such as Western Odisha, India, where affordability of CHX is a problem.

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