

EFFICACY OF CHLORHEXIDINE VERSUS BETADINE AS AN IRRIGATING AGENT DURING REMOVAL OF BILATERAL IMPACTED LOWER THIRD MOLARS

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ABSTRACT

A prospective double blind study was carried out to compare the efficacy of 0.02% chlorhexidine and 0.5% povidone iodine as an irrigating agent on control of pain and swelling following removal of bilaterally impacted lower third molars. Twenty patients with bilaterally impacted lower third molars, in similar positions were included in the present study. All the patients underwent surgical removal of the bilaterally impacted third molars in the same appointment. 0.02% chlorhexidine was used as an irrigating agent during the surgical procedure on a randomly selected one side (Group I) and 1% povidone iodine (Group II) was used on the other side (Group II). Postoperative pain intensity was more pronounced in the Group II than in Group I ($P < 0.05$). There were no significant differences in swelling between the two groups ($P > 0.05$). Alveolar osteitis was noted in one case (5%) in Group II whereas it was nil in Group I. In conclusion, chlorhexidine was found more effective in control of postoperative pain and alveolar osteitis than povidone iodine when used for irrigation during the surgical removal of lower third molars. The control of swelling is similar in both the agents.

Key Words: Irrigating agents; 0.02% chlorhexidine; 0.5% povidone iodine.

INTRODUCTION

Mandibular third molar removal surgery is one of the commonest surgeries carried out in dental operatory and it can lead to immediate and postoperative discomfort. In the postoperative phase the swelling and pain are the main complaints.^{1,2}

The surgical wound lavage following wound debridement is an important factor affecting the healing process.^{2,3} In essence, the irrigating agent should be non toxic, non irritant, non allergic, cost effective, easily available and prevent the bacterial contamination of the wound.

In different surgical fields, various studies have been conducted to compare the efficacy of varied irrigating solutions for surgical wound debridement.²⁻⁶ This study deals with the use of 0.02% chlorhexidine and 0.5% povidone iodine as irrigating agents during the surgical removal of third molars and to compare their effects on postoperative healing of the surgical wound.

METHODOLOGY

Approval was obtained from the local ethical committee for the double blind prospective randomized study. Subject selection was done from the patients admitted for regular dental treatment between January 2011 and June 2012. An informed consent form for the study was signed by all participants or their legal guardians. Study protocol involved an initial screening, surgical therapy and postsurgical examination. 20 healthy nonsmoker patients (12 males and 8 females) of age 18 to 31 years with a mean age of 24.9 years who fulfilled the following inclusion criteria were selected for the study. Orthopantomograph were taken to ensure similarity of tooth inclinations according to Winter's classification (vertical, horizontal, mesioangular and distoangular positions). Inclusion criteria were: patients with similarly placed bilateral impacted lower third

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molars; patients without any systemic problems and not taking any medication; non-smokers; patients not allergic to the drugs or anesthetic agent to be used in the surgical protocol; patients without acute infection or pain at the operating site in the 7 days before surgery; patients who did not use any antibiotic or an anti-inflammatory agent in the 7 days prior to surgery.

A written consent for the procedure was taken from each patient and a randomized clinical trial using a split mouth design was carried out; thus the subjects served as their own control. The patients selected for the study were randomly assigned into Group I: chlorhexidine group or Group II: povidone iodine group. The surgical procedures were performed by a single surgeon. 0.02% chlorhexidine solution was prepared by diluting 0.2% chlorhexidine (Hexidine, Abott Healthcare Pvt Ltd.) and 0.5% of povidone iodine solution was prepared by diluting 1% povidone iodine (Bectodine, Ranbaxy, India) in a nearby pharmaceutical laboratory.

Extraoral antiseptis was performed with 5% povidone iodine followed by spirit and intraoral antiseptis with chlorhexidine rinse. The nerve block of inferior alveolar, lingual and long buccal nerves was given using 2% lignocaine with 1:100000 adrenaline. The surgery to remove lower third molar followed the standardized technique. An L shaped incision was made, a mucoperiosteal flap was raised, bone removal was done with S.S bur under copious irrigation of 0.02% chlorhexidine or 0.5% povidoneiodine as per the assigned group. When osteotomy and tooth sectioning was performed on one side, the other side received the same treatment in order to standardize the surgical procedure. Following tooth removal, wound debridement was done under the copious irrigation of chlorhexidine or povidone iodine solution. The irrigation was carried out with a 5ml disposable syringe and a 24-gauge needle. Interrupted sutures with 3-0 silk were placed. The same procedure was repeated on the opposite side. Post operatively patients were instructed for extraoral ice application for 3 hours bilaterally, avoid gargles during first 24 hours, to eat soft liquid diet, not to bite tongue/lips and defer from brushing and flossing around the surgical site until suture removal. Postoperative medication included diclofenac sodium 50 mg, 3 times daily for 3 days. Suture removal was done on the seventh postoperative day. All the patients were reviewed on second and seventh day post operatively. All the patients were provided with a visual analog scale (VAS) data sheet with a score of 1 to 5 (1, no pain to 5, severe pain) for pain evaluation on each side of the socket and asked to record the score on 7 consecutive days.⁷ To evaluate the swelling a single examiner performed all clinical measurements prior to surgery (baseline) and on second and seventh day postoperatively.⁸

A 2-0 nylon thread and a millimeter ruler was used to take the facial measurements. Markings with a permanent marker were made prior to the surgery on

the following facial regions: the angle of the mandible, the tragus, the soft pogonion and outer corner of the mouth. A single value was produced for each patient which is the sum of following measurements: distance (mm) between lateral corner of the eye and angle of the mandible; distance (mm) between tragus and outer corner of the mouth; and distance (mm) between tragus and soft facial pogonion. Difference between the measurement taken on the postoperative day and the baseline value was regarded as the swelling of that day. Alveolar osteitis was recorded during the postoperative week and was classified as yes or no.

RESULTS

A total of 20 patients requiring surgical removal of bilaterally impacted mandibular third molars were included in the present study of whom 12 were males and 8 females with a mean age of 24.9 years (range 18-31 years). The results of the study were evaluated statistically using SPSS Software. Wilcoxon Signed Ranks test was carried out for evaluation of pain. Statistically significant difference was found between the two groups, pain being worse in Group II as compared to Group I ($P < 0.05$). Swelling was evaluated using the student's t test. There were no statistical significant differences between the two groups on day 2 and day 7 postoperatively ($P > 0.05$). Alveolar osteitis developed in one case of Group II. No infection, nerve injury, allergic reactions or tissue toxicity occurred in either of the group.

DISCUSSION

Surgical removal of impacted third molars is one of the most common procedures in oral and maxillo-facial surgery.¹ The procedure fits in the category of clean- contaminated surgery leading to postoperative morbidity that includes pain, swelling, trismus and dry socket.⁹⁻¹¹

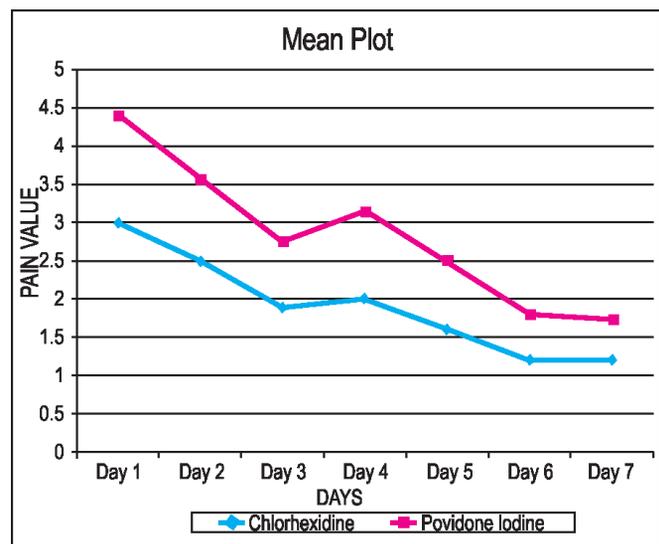


Fig 1: Postoperative evaluation of pain following removal of lower third molar

TABLE 1: EVALUATION OF POSTOPERATIVE SWELLING ON DAY 2 AND 7 H0: BOTH THE TREATMENT DO NOT SIGNIFICANTLY DIFFER FROM EACH OTHER H1: CHLORHEXIDINE IS BETTER THAN POVIDONE IODINE H2: POVIDONE IODINE IS BETTER THAN CHOHEXIDINE STUDENT'S T-TEST FOR DIFFERENCE OF MEANS WILL BE APPLIED TO TEST THE ABOVE SAID HYPOTHESIS. T-TEST: TWO-SAMPLE ASSUMING UNEQUAL VARIANCES

Mean	(Day 2)		(Day 7)	
	Variable 1	Variable 2	Variable 1	Variable 2
Observations	33.34	33.53	32.84	32.865
Hypothesized Mean Difference	3.704631579	3.684315789	3.748842105	3.72239474
df	20	20	20	20
t Stat	0		0	
P(T<=t) one-tail	38		38	
t Critical one-tail	-0.312591606		-0.040903338	
P(T<=t) two-tail	0.378150008		0.483793558	
t Critical two-tail	1.685954461		1.685954461	
	2.024394147		2.024394147	
*Variable 2: 0.5% Povidone iodine				
* Variable 1:0.02%Chlorhexidine				

Result: As the p-value for the t-test for Day 2 is >0.05 therefore null hypothesis is accepted. There is no significant difference in Chlorhexidine and Povidone Iodine.

Result: As the p-value for the t-test for Day 7 is >0.05 therefore null hypothesis is accepted. There is no significant difference in Chlorhexidine and Povidone Iodine.

Any clinical strategy aimed at reducing the incidence and severity of these parameters is greatly appreciated. Devitalised tissue and foreign body in a healing wound act as haven for bacteria and shield them from the body's defences. Necrotic burden allowed to persist in wound can prolong the inflammatory response, mechanically obstruct the process of wound healing and impede reepithelialisation. It is important to decrease the bacterial counts during and at the end of the intra oral surgical procedures while the mucosal incisions have not been sutured.¹²

The role of preoperative prophylactic systemic antibiotics in surgical removal of third molars is limited due to lack of adequate spectrum to cover potential intraoral pathogens and inability to reach to an effective level in saliva.¹⁴ The use of topical antibiotics for preoperative prophylaxis is also not encouraged due to possibility of allergic reactions, the potential of inducing bacterial resistance and cost.^{16,17} These negative effects can be overcome by using antiseptic solutions preoperatively as well as intraoperatively for the lavage of the surgical wound. Copious irrigation of the wound following wound debridement reduces bacterial contamination of socket and hence very essential for the healing process.¹ In different surgical fields, various studies have been conducted to compare the efficacy of varied irrigating solutions for surgical wound debridement.²⁻⁶ A comparative study of povidone iodine and saline in the irrigation of tooth socket on the complications after surgical removal of impacted wisdom teeth was carried

out by EI M Heidari et al. It revealed no significant difference on the postoperative wound healing between the two groups.⁵

In this pilot study an attempt has been made to compare the efficacy of 0.02% chlorhexidine and 0.5% povidoneiodine as irrigating agents during the surgical removal of impacted lower third molars. Povidone iodine and chlorhexidine in various concentrations are the most frequently used antiseptic agents in oral and maxillofacial surgery.¹⁸⁻²² Iodine is a rapidly acting, broad spectrum microbial agent effective against bacteria, fungi and viruses. Povidoneiodine is a soluble complex of iodine which releases free iodine slowly. It acts by iodinating and oxidizing the microbial protoplasm. 1% povidone iodine when used for mechanical washing of the oral cavity preoperatively is effective in reducing the oral cavity bacterial counts upto one hour of the surgical procedures without any local postoperative complications.¹⁹ In lower concentrations, it inhibits leucocyte chemotaxis resulting in reduced postoperative oedema while retaining its antiseptic properties upto dilution of 0.1%.²³

Chlorhexidine has proved to be effective in various intraoral procedures in stomatology.²⁴⁻²⁶ It is a potent, nonirritating, cationic antiseptic agent which binds strongly to bacterial cell membranes. It is bacteriostatic with the effect lasting upto 12 hours as it is adsorbed to the proteins, bacteria and extracellular polysaccharides of the oral cavity mucosa well as there is a gradual release from the retention site. In vivo and in

vitro studies have suggested that 0.02% chlorhexidine retains its antibacterial effects with improved wound healing.⁴ In contrast with povidone iodine its antimicrobial activity is not affected by presence of body fluids such as blood.²⁶ In the present study it was found that there were no signs of toxicity or any other local or systemic side effects after lavaging with 0.5% povidone iodine or 0.02% chlorhexidine other than unpleasant taste in the patients undergoing third molar removal surgery. Pain was worse in Group II than in Group I with a statistically significant difference. The control of swelling was similar in both the groups. The incidence of alveolar osteitis occurred in one patient of Group II (5%) whereas it was nil in Group I.

In this study 0.02% chlorhexidine was found more effective than 0.5% povidone iodine in control of postoperative pain and alveolar osteitis following the removal of impacted lower third molars. Swelling control did not differ between the two agents. Though normal saline is regarded as the gold standard as an irrigating agent during the surgical procedures yet, more such studies with larger groups may be carried out to evaluate the efficacy of other irrigating agents to reduce the postoperative morbidity.

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