ORIGINAL ARTICLE

A Comparasion of Povidon Iodine & 2% Chlore hexadine Gluconate Scrubs in preventing Post Operative Wound Infections

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ABSTRACT

Objective: Comparison of Povidone Iodine & Chlor hexadine Gluconate scrubs in preventing postoperative wound infections in clean and clean contaminated surgeries.

Methodology: A randomized control trial was conducted at Rawal Institute of Health Sciences (RIHS) Islamabad, a tertiary care hospital having a large catchment area in Islamabad. Two departments' i.e. General surgery and department of Gynae & Obs who shared the surgical work participated in this study. The duration of trial was from May 2016 to December 2016. A proforma was designed to be filled in by the treating doctor to record demographic data, surgical procedure and prophylactic antibiotics used. A total of 114 patients included in study were divided in two groups, and the disinfectant 10% povidone iodine for group 1 and 2% chlore hexadine gluconate for group II. The patients were selected randomly for both groups. The patients were observed and postoperatively followed on weekly basis for a month to observe any sign of surgical site infection(SSI).

Results: Out of total 114 patients from two departments,57 patients were in each group I&II. In group, I six (6) patients (10.5%) developed infection, while in group II only 1 patient (1.7%) got infected ($p<0.005$). The pathogens seen were Strep pyogenes, E coli, Pseudomonas and Steph aureus.

Conclusion: Chlorehexadin Gluconate was found to have a lower infection rate as compared to Povidone Iodine in prevention of surgical site infections(SSI).

Keywords: Surgical Scrubs, Chlorehexadine Gluconate,Povidone Iodine, prevention of surgical site infections.

Introduction

Surgical site infections (SSI) always remain a concern for the surgeons, so different skin antiseptics are in use to achieve better results. However, evidences are limited that which one is better for various common clean or clean contaminated surgical procedures. As asepsis is a basic requirement for any kind of surgery, various precautions and techniques has been adopted by the surgeons to avoid the surgical site infections(SSI). The

control of infection or to keep it at a minimal level has a benefit to the patients and reduces the burden on hospital resources [1, 2] All the precautions are essential for decontamination of skin surface to reduce the risk of surgical site infections (SSI). As the choice of disinfectants depends on the surgeon, so the knowledge of disinfectants and their mode of action is essential. The number of available solutions in the market are limited and the most commonly used agent in different institutions is iodophor containing solution (povidone iodine). The other recently used agent is chlor hexadine gluconate. The povidone iodine has both bacteriostatic and bactericidal activity. Iodine solution have broad spectrum antimicrobial action against bacteria, viruses and fungi. Chlore hexadine is cationic bigoanade which fuses to the negatively charged exterior of bacterial cell wall inducing a change in its permeability and outflow of cell constituents and ultimately cell death. Chlore hexadine has properties which makes it more effective as an antiseptic. It has greater affinity for binding to skin, better activity against gram positive and gram-negative bacteria. Efficacy of these agents has been studied in different trails reported in the literature, but the results are conflicting.

This study was planned to observe the efficacy of two disinfectants in preventing the SSIs in patients of departments of General surgery and Gynae & Obs at Rawal Institute of Health Sciences(RIHS) Islamabad.

Methodology

The current randomized control trail was conducted during May 2016 to December 2016 in departments of General Surgery and Gynae & Obs. at Rawal Institute of Health Sciences Islamabad(RIHS). This hospital is a tertiary care centre in private sector, located in periphery of Islamabad, having a thick population of multiple housing societies and villages in the surroundings. This hospital also provides care to the patients referred from AJK (Azad Jammu &Kashmir), Gilgit Bultistan and province of KPK (Khyber Pakhtunkhwa). Exclusion criteria for this study was that, patients having co- morbid conditions like diabetes, infection near the site of surgery and unwilling patients were excluded from the trail. Permission of study was obtained from the ethical review committee of RIHS and written consent obtained from all the participants.

Sample size was calculated by using WHO recommended formula. Total number of 114 patients were included from both the departments. The number of patients from Gynae department was 90 and that of surgery department was 24. A pre-designed proforma was filled to record the demographic data of patients, diagnosis, surgical procedure, Prophylactic antibiotic, antiseptic used, outcome and follow up of the patients.

The patients were assigned randomly, by lottery method to one of the groups i.e., group I patients whose skin was scrubbed with povidon iodine (10%) and the group II where skin was disinfected by using 2% chlorehexadine gluconate. The skin preparation was performed by the operation theater assistant and manufacturer's instructions were followed strictly. A wait time of 3 minutes was allowed between the application of antiseptic agent and the skin incision.

After surgery, all patients were observed daily for any sign of SSI until discharge from the hospital. All the patients were advised to follow up in surgical and gynae outpatient department(OPD), on weekly basis. Centre for Disease Control (CDC, USA) definition for SSIs was applied to identify the infected patients which states that '' Infection would be regarded as surgical site infection if it occurs within 30 days of procedure and has at least one of the following symptoms, purulent discharge from the wound, pain or tenderness, localized swelling, redness malodour, or fever.[5] patients showing any sign of pus or discharge, wound swab was collected using transport media. The sample was sent to microbiology laboratory of the hospital for culture and sensitivity reports. In case of no signs of infection observed until four weeks, the patient was declared as infection free.

Results

A total 114 patients participated in the study from both departments of Surgery and Gynae & Obs. The age of the patients included in this study was between 17 – 71 years. The mean age was 40 yrs.

The patients were divided in two groups, Group I Povidone Iodine (Control) and Group II Chlore hexadine Gluconate (Test). Antiseptic agent was allocated randomly, and patients were strictly followed for one month on weekly basis. Overall 7(6.1%) patients developed SSI. Out of 90 patients from Gynae department, 5 (5.5%) patients were infected. Group I Povidone Iodine (control) were 4(8.8%) patients, while Group II Chlore hexadine Gluconate(test) was 1 (2.2%). Patients from surgery department (24), only 2 patients from group I (Povidone Iodine) were infected (8.3%), none of the patients from group II (Chlore hexadine Gluconate) was infected. (Table-1). Culture and sensitivity was done for all the infected cases i.e. 7 cases. No bacterial growth was seen in 2 cases. Pseudomona

aeruginosa, Streptococcus pyogen Staphylococcus aureus and Escherchia Coli were the pathogens detected from the other 5 cases. The culture and sensitivity pattren shown in (Table-1). No adverse effect like itching and rashes at the site of surgery noted in any patient with the antiseptic agents used. Antibiotic prophylaxis and surgical wound class is shown in (Tab1e-1). In this study, patients treated with chlore hexadine gluconate were having lower risk of surgical site infection (P value<0.005) than the patients treated with povidone iodine group.

Table I: Antibiotic Prophylexis		
Antibiotic	**Povidone Iodine (Group 1)**	**Chlore hexadine (Group II)**
None	0	0
Cefotaxim	9	10
Velosef	3	2
Cefotaxim	2	1
Ceftriaxxone+Flagyle	45	45
Surgical Wound Class		
Clean cases	5 (55.5%)	4 (44.4%)
Clean contaminated cases	52 (49.5%)	53 (50.4%)

Discussion

Povidone Iodine is being used universally as pre-operative skin preparation, for surgical procedures since 1955. But it failed to control surgical site infections completely. The other agent in use in recent years is Chlore hexadine Gluconate with its increased efficacy as an antiseptic and disinfectant.[6] To evaluate the efficacy of this comparatively new product (Chlorehexadine Gluconate) the control

trail was conducted on clean and clean contaminated surgeries for prevention of surgical site infections. Different trials has tested the effect of these agents.[3,4] Literature review has different reports on the efficacy of these agents. In some studies Chlore hexadine was found superior to Povidone Iodine as skin surface antisepsis.[6,7,8], Several other studies claim that both agents are equally good.[9], or, having no difference.[10] A prospective study observed the impact of Povidone Iodine on residual bacteria and surgical site infections.[12] It was reported that the patients having hernia surgery, both povedone Iodine and Chlore hexadine has similar reduction in skin bacterial colony counts and infection rate (9.5% vs. 7.0% P= .364),[11] which is compatible with the results of our study. In a systemic review and meta-analysis of pre-operative antisepsis with Chlore hexadine versus Povidone Iodine in clean contaminated surgery has shown superiority of chlore hexadine.[12] Similar results were shown in a prospective randomized clinical trial on 813 patients with significantly lower SSI rate in Chlore hexadine group compared to Povidone Iodine (9.5% vs16.1 p= 0.004) [11], Subsequent meta-analysis of other trails showed a significantly lower risk of infection with Chlorehexadine based antiseptics than with Iodine based antiseptics.[14,15]

In our study. povidone iodine group of 57 patients total, 6 (10.5%) patients got infected. No significant relationship with increasing age of the patients was found. In Chlore hexadine group of 57 patients total only 1 (1.7%) got infected. These results are comparable to some other studies which proved chlore hexadine gluconate better then povidone iodine.[17] as a surface disinfectant. Pathogens detected in our infected cases were Ps. aeruginosa, E. coli, Strepto Pyogens and Staph.aureus. The diversity in organisms is due to different types of surgical procedures facing different floras.[18] Culture and sensitivity pattern is shown in (Table - II).

Table II: Culture and Sensitivity Pattern of Infected Cases	
No of Infected cases: No Growth seen in: Pathogens seen in:	7 patients 2 patients 5 patients
Pathogens Seen	**Sensitivity Pattern**
a. Pseudomonas aeruginosa	Meropenem, Amikacin, Ofloxacin Polymexine B
b .Staphlococus aureus	Vancomycin, Fucidic acid and Chloramphenicol
c. E. Coli	Polymexin B, Amikacin
d. Streptococus pyoens	Clindamycin, Doxycycline and clotrimazole

The old age and obesity has some relation with infection, but in our study, we did not find any difference in both the groups.[13] We may need more detailed study to find out the effect of these factors. Cost should be considered while choosing any drug, however, this is not so much burden on the patient, so we did not study the cost-effective analysis for both groups. The strength of our study was its design, because there are limited studies which are randomized control trails for comparing the efficacy of povidone iodine and chlorehexadine

gluconate. The limitation of this study was convenient sample size and lack of diversity in patient's due to its single center study results. Further studies need to compare the efficacy of these antiseptics in larger number of patients of different surgical specialties with clinically relevant conditions.

Conclusion

Our randomized control trail showed that the use of Chlore hexadine Gluconate as skin surface antiseptic for clean and clean contaminated general surgical and gynaecological procedures has lower risk of surgical site infection than with the use of povidon iodine.

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