ISSN: 0975 -8542

Journal of Global Pharma Technology

Available Online at: www.jgpt.co.in

RESEARCH ARTICLE

Evaluation of Disincentive Effects of 70% Isopropyl Alcohol and 10% Povidone-Iodine Safety Antimicrobial Agents of Skin

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Abstract:

Background: Many disinfectants were used clinically in both single and mixture applications, however there had been few research on disincentive electricity according to sterilization series when the use of an aggregate of disinfectants. Aim; the purpose of present study was to evaluate the antimicrobial of two disinfectants each one alone and when the usage of a combination of them on skin isolates bacteria. Methods; One hindered and eight healthy volunteers were recruited. first groups were treated with a70% isopropyl alcohol on forearm, second groups were treated with 10% povidone-iodine on forearm and third groups were treated with combination of 70% isopropyl alcohol and 10% PVP-I on forearm included disinfections on the both forearm with isopropyl alcohol first followed by 10% PVP-I. Skin cultures have been acquired the usage of cotton swabs three minutes after application of each disinfectant, and then had been inoculated on blood agar plates for bacterial lifestyle Result; There was no significant difference in the number of positive cultures between subject treated with single disinfect (first groups, 150bacterial isolates for subject treated with a 70% isopropyl alcohol; while in the second group 108bacterial isolates for subject treated with10% povidone-iodine ($P < 0.01$)).Third groups was more effective than disinfection with a single agent since there were only 48 bacterial isolates suggesting that there is relationship between disincentive power of mixed two disinfectants that used in present study. Conclusion: The combination of 70% isopropyl alcohol and 10% PVP-I was more effective than disinfection with a single disinfects of them with either 70% isopropyl alcohol or 10% PVP-I disinfect.

Keyword: *Antimicrobial agents, 70% Isopropyl alcohol and 10% povidone-iodine.*

Introduction

A wound is a breach in the pores and skin or mucosa membrane, which may permit the access of microorganisms, probably leading to contamination [1]. Wound tissue offers the rich surroundings important for the proliferation of microbes. It's far characterized by way of hypoxia, necrosis and regularly an accompanying impaired immune reaction attributable to suboptimal delivery of immune effectors molecules via broken blood vessels [2].

This compromised, necrotic, slough tissue gives a warm, wet and nutritive environment, ideal for replication of colonizing microorganism. Microorganism species which had been formerly harmless commensally of the human frame, most normally at the pores and skin, May additionally grow to be pathogenic in wound surroundings [3].

The intention of topical antimicrobial remedy in wound care is to govern microbial colonization and next proliferation consequently promoting the healing of the wounds [4]. Surgical and procedural contamination is a not unusual nosocomial infection, and the importance of infection control has been highlighted by using increases within the length of sanatorium stays and associated scientific charges [5].

The absence of suitable disinfection previous to a clinical manner-inclusive of a surgery, nearby or local anesthesia, or catheter insertion-might also lead to headaches (cerebral meningitis, sepsis, abscess, or necrosis) because of infection and can even result in mortality, therefore, suitable pores and skin training is vital for the prevention of infections. This study aims to identify a best effective disinfection of skin by comparing the effect of two disincentive power when 70% isopropyl alcohol and 10% PVP-I usage each one alone and within combination of them on skin isolates bacteria.

Material and Methods

Subject of Experiment

One hindered and eight healthy volunteers were recruited in current study. The exclusion criteria for the study subjects were as follows; those who had washed forearms within 1 hour prior to the disinfectant application, had been prescribed an antibiotic in the last week, had a latex or powder allergy, were allergic to a specific disinfectant or had a skin-related allergic condition, had a localized or systemic infection, or had a wound on the hands. first groups were treated with a70% isopropyl alcohol on forearm, second groups were treated with 10% povidone-iodine on forearm and third groups were treated with combination of 70% isopropyl alcohol and 10% PVP-I on forearm included disinfections on the both forearm with isopropyl alcohol first followed by 10% PVP-I.

Skin cultures have been acquired the usage of cotton swabs three minutes after application of each disinfectant. Each disinfectant was kept at room temperature, and cotton balls were used for application of disinfectants. For the disinfection procedure and collection of test specimens, a 3-step process was followed.

The first disinfectant was painted repetitively 3 times on the forearm (wrist to elbow), and 3 minutes later the test specimen was collected with a sterile cotton bud on the disinfected area. Then, the second disinfectant was applied 3 times to the same area, and the second test specimen was collected after 3 minutes using the same methods.

The investigator wore a sterile surgical mask, hat, and gloves and each subject wore a disposable sterile mask to prevent contamination during the disinfection or specimen collection. The subjects were instructed not to talk, cough, or move during the procedure. The collected test specimens were inoculated on culture media (blood agar plate, Micro media, Busan, Korea) in three different directions and incubated for 48 hours at 37℃ in aerobic conditions.

Diagnosis of Bacterial Isolates

After Gram stained slides of bacteria isolates were prepared ;the diagnosis of obtaining bacteria was first by microscopically examine to study their cellular morphology, size, consistency and color. Then biochemical tests include (catalase, oxidase, Coagulase tests as well as IMVIC test (indol production, methyl

red, vogas-proskauer and citrate utilization) and TSI (triple sugar iron) was performed [6].

Result and Discussion

The result of first group in current investigation in which subject treated only with a70% isopropyl alcohol have been reveal in (t@able 1), while result of second group in which subject treated only with10% povidone-iodine have been reveal in (Table 2). There was no significant difference in the number of positive cultures between subject treated with single disinfect (first groups , 150 bacterial isolates for subject treated with a 70% isopropyl alcohol; while in the second group 108 bacterial isolates for subject treated with10% povidone-iodine ($P < 0.01$).

Finally the combination of 2disinfection was applied in (Table 3). These groups were more effective than disinfection with a single agent since there were only 48 bacterial isolates suggesting that there is relationship between dies infective power of mixed two disinfectants that used in present study.

Table 1: Disinfection with a70% isopropyl alcohol

Bacterial isolate	NO .of bacterial isolates
E. coli	48
Bacillus spp	30
Staphylococcus epidermides	42
Streptococcus spp	30
Total	**150**

Table 2: Disinfection with a10% povidone-iodine

Bacterial isolate	NO .of bacterial isolates
E. coli	36
Bacillus spp	24
Staphylococcus epidermides	30
Streptococcus spp	18
Total	**108**

Table 3: Disinfection of both of 70% isopropyl alcohol and 10% povidone-iodine

Bacterial isolate	NO .of bacterial isolates
E. coli	12
Bacillus spp	6
Staphylococcus epidermides	18
Streptococcus spp	12
Total	**48**

Although several alcohols were shown to be effective antimicrobials, ethyl alcohol (ethanol, alcohol), isopropyl alcohol (isopropanol, propan-2-ol) and n-propanol (particularly in Europe) are the maximum extensively used [7]. Alcohols show off rapid huge-spectrum antimicrobial hobby towards vegetative bacteria (which includes mycobacteria), viruses, and fungi however are not sporicidal.

However, recognized to inhibit sporulation and spore germination [8], however this impact is reversible [9].Due to the lack of sporicidal interest, alcohols are not endorsed for sterilization however is extensively used for both hard-surface disinfection and skin antisepsis.

Lower concentrations can also be used as preservatives and to potentiate the pastime of different biocides. Many alcohol merchandise consist of low degrees of different biocides (in particular chlorhexidine), which continue to be at the skin following evaporation of the alcohol, or excipients (together with emollients), which lower the evaporation time of the alcohol and may drastically growth product efficacy [10]. In trendy, isopropyl alcohol is taken into consideration barely extra efficacious in opposition to micro organism and ethyl alcohol is stronger in opposition to viruses [11]; however, that is depending on the concentrations of each the energetic agent and the take a look at microorganism. As an example, isopropyl alcohol has more lipophilic homes than ethyl alcohol and is much less active against hydrophilic viruses (e.g., poliovirus), usually, the antimicrobial activity of alcohols is extensively decrease at concentrations beneath 50% and is superior within the 60 to ninety% range.

Little is thought about the specific mode of movement of alcohols, however based totally at the extended efficacy within the presence of water, its miles usually believed that they cause membrane harm and speedy denaturation of proteins, with next interference with metabolism and cell lysis [12].

That is supported with the aid of specific reports of denaturation of Escherichia coli dehydrogenases [13] and an expanded lag section in Enterobacteraerogenes, imagined to be because of inhibition of metabolism required for fast cell department [14].

Conclusion

The combination of 70% isopropyl alcohol and 10% PVP-I was more effective than disinfection with a single disinfects of them with either 70% isopropyl alcohol or 10% PVP-I disinfect.

Acknowledgements

The author would like to thank the staff of Conservative, Basic and Medical science Department in college of nursing/ University of Babylon, College of biotechnology, University of Al-Qasim Green,

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