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COMPARISON OF THE EFFECTIVENESS OF OCTENIDINE DIHYDROCHLORIDE AND POVIDONE-IODINE ANTISEPTICS ON POST-CIRCUMCISION WOUND HEALING TIME

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ABSTRACT
Circumcision is a minor surgical procedure that results in an acute incision wound and requires optimal care to prevent infection and accelerate epithelialization. Povidone-iodine has long been used as a standard antiseptic, but has been reported to have potential cytotoxicity against fibroblast cells. Octenidine dihydrochloride is an alternative antiseptic with high antimicrobial efficacy and better biocompatibility. This study aims to compare the effectiveness of both antiseptics on post-circumcision wound healing time. The study used a prospective parallel randomized controlled trial (RCT) design at the Darul Khitan Clinic in Bogor City with 34 pediatric patients randomized into two groups (n = 17). The intervention group received octenidine dihydrochloride, while the control group received povidone-iodine. Wound healing was assessed on days 3 and 7 using the WINNER Scale. Data were collected through direct observation and wound assessment by trained healthcare personnel using a standardized observation form. The data were analyzed using an independent t-test ($p<0.05$). The results showed that the mean wound healing score of the octenidine group was higher than that of povidone-iodine (9.59±1.37 vs 7.29±1.96) with a significant difference ($p<0.001$; 95% CI -3.482 to -1.106). It was concluded that octenidine dihydrochloride was more effective in accelerating post-circumcision wound healing than povidone-iodine and could be considered as a more optimal antiseptic choice in clinical practice.

Keywords: circumcision; octenidine; povidone-iodine; wound healing

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INTRODUCTION

Circumcision is the most common minor surgical procedure performed on boys, which automatically results in an acute incision wound that requires optimal wound care. Post-circumcision wound care is crucial to prevent Surgical Site Infections (SSI) and accelerate the epithelialization process, where good superficial wound healing generally takes 5–7 days (Olusanya et al., 2024). To achieve aesthetic and complication-free healing results, the use of topical antiseptic agents post-procedure has become a standard clinical protocol to effectively protect the incision area from pathogenic bacterial invasion (WHO, 2019).

For decades, Povidone-Iodine has been the conventional standard in wound care due to its broad antimicrobial spectrum and affordability. However, the literature indicates that Povidone-Iodine has significant clinical drawbacks. This agent is cytotoxic to fibroblasts when used continuously on open wounds, which actually damages healthy tissue and slows the process of granulation tissue formation (Guddety & Kajagar, 2020). Furthermore, its intense pigmentation often obscures early

signs of inflammatory complications or exudate in the incision area, making clinical observation difficult (Kramer et al., 2018).

In response to the limitations of conventional antiseptics, the application of Octenidine Dihydrochloride (Octenidine HCl) is being implemented in modern wound care practices. Octenidine has been shown to have very strong antimicrobial effectiveness, even being able to eradicate bacterial biofilms persistently without triggering resistance (Salisbury et al., 2022). The main advantages of Octenidine compared to Povidone-Iodine are its much higher level of biocompatibility, non-toxicity to human skin cells, colorlessness, and non-stinging sensation when applied, making it ideal for highly sensitive mucosal areas such as circumcision wounds in children (Pramana et al., 2023).

In Indonesia, including in healthcare facilities and circumcision clinics in the Bogor City area, wound care management is currently undergoing a transition from conventional methods that allow wounds to dry, to modern wound care methods that emphasize moist wound healing and non-toxic agents (Sarwoto et al., 2025). Despite this, many healthcare workers and parents of patients still use Povidone-Iodine due to inherited habits and a lack of health literacy education (Gitarja et al., 2018). To date, there have been no local empirical studies in the Bogor area that specifically evaluate and compare the effectiveness of these two antiseptics across circumcision patient demographics.

Based on this transition phenomenon and the literature gap, this study aims to directly compare the clinical effectiveness of Povidone-Iodine and Octenidine HCl antiseptics in circumcision wound care. Comparative research on these wound care interventions is crucial for establishing an Evidence-Based Practice (EBP) foundation for healthcare professionals, ensuring clinical decision-making is no longer based on outdated practices but rather on proven scientific evidence to improve healing outcomes and patient comfort (Irwan et al., 2022). Therefore, this study aimed to compare the effectiveness of octenidine dihydrochloride and povidone-iodine antiseptics in promoting post-circumcision wound healing in pediatric patients.

METHOD

This study was a prospective, parallel, randomized controlled trial (RCT) conducted at the Darul Khitan Clinic in Bogor City for 7 days. All parents or legal guardians provided written informed consent before the patients were included in the study. Pediatric patients indicated for elective circumcision procedures and who met the inclusion criteria were included in this study. Patients with a history of blood clotting disorders, local infections before the procedure, systemic comorbidities, allergies to the tested antiseptic agents, or immunocompromised conditions were excluded from the study. A total of 34 patients were included in this study. The sample was randomized into two groups with a 1:1 ratio (n = 17 per group) using a sequentially numbered sealed envelope technique. The intervention group received wound care using Octenidine HCl antiseptic, and the control group received treatment using Povidone-Iodine.

Standard circumcision procedures were performed before wound care intervention in both groups. Pharmacological therapy with oral paracetamol analgesics was administered according to the doctor's instructions. In both groups, the wounds were cleaned using normal saline first, then dressing or wound care was carried out as follows: Octenidine HCl antiseptic was applied evenly to the incision area in the intervention group, while Povidone-Iodine was applied to the wounds of the control group. The frequency of wound care in both groups was twice a week. Patients were monitored regularly from the day of recruitment. Wounds were evaluated and their healing progress was assessed on the 3rd and 7th days post-procedure. Assessment of clinical outcomes of circumcision wound healing was measured using the WINNER Scale instrument. Data analysis was performed using an independent t-test to compare the mean WINNER Scale scores between the two

groups. A p-value <0.05 was considered statistically significant. All statistical analyses were performed using IBM SPSS software version 2.3 .

RESULT

Table 1.
Difference in Winner Values for Wound Healing on Day 3 and Day 7

Group	n	Mean ± SD	95% CI	p-value
Control	17	7.29 ± 1.96	-3,482 – -1,106	<0.001
Intervention	17	9.59 ± 1.37		

The results of this study indicate that there is a significant difference in antiseptic effectiveness between octenidine dihydrochloride and povidone-iodine on the duration of post-circumcision wound healing at the Darul Khitan Clinic in Bogor City. Based on the mean healing score (Winner score), the intervention group using octenidine dihydrochloride had a mean of 9.59 ± 1.37, while the control group using povidone-iodine had a mean of 7.29 ± 1.96. The statistical test showed a p-value <0.001, indicating that the difference between the two groups is statistically significant. In addition, the 95% confidence interval (-3.482 to -1.106) does not cross zero, which confirms the presence of a significant difference between the intervention and control groups. The mean wound healing score in the octenidine group was higher than in the povidone-iodine group.

DISCUSSION

This finding indicates that octenidine dihydrochloride may accelerate epithelialization and tissue repair compared to povidone-iodine. This result is consistent with previous research showing that octenidine has high antimicrobial effectiveness and supports an optimal wound environment for tissue regeneration (Assadian et al., 2020). Mechanistically, octenidine dihydrochloride works by damaging the cell membranes of microorganisms without causing significant tissue toxicity. Experimental studies have shown that octenidine has a lower cytotoxic effect on fibroblasts than iodine-based antiseptics, thus not inhibiting the proliferation phase of wound healing (Landsman et al., 2021). This mechanism may explain why the intervention group experienced faster wound healing in this study.

On the other study, povidone-iodine is known as a broad-spectrum antiseptic that is effective in killing bacteria, viruses, and fungi. However, several recent studies have reported that repeated use of povidone-iodine on open wounds can affect the viability of fibroblasts and keratinocytes, which play an important role in granulation and epithelialization (Bigliardi et al., 2020). This may explain why the mean healing score in the povidone-iodine group was lower than that in the octenidine group in this study. Clinical studies on chronic wounds also show that the use of octenidine-based preparations results in faster wound size reduction and decreased inflammatory markers compared to conventional antiseptics (Kramer et al., 2021). Although the context differs from post-circumcision wounds, the fundamental principles of wound healing remain similar, namely infection control and optimization of tissue regeneration.

Overall, these findings strengthen the evidence that octenidine dihydrochloride is more effective than povidone-iodine in accelerating post-circumcision wound healing. Therefore, selecting an appropriate antiseptic not only affects infection prevention but also influences the quality and speed of wound healing. Octenidine may be considered a more optimal antiseptic alternative in clinical practice, particularly for minor surgical procedures such as circumcision.

CONCLUSION

This study concluded that there was a significant difference in effectiveness between the antiseptics octenidine dihydrochloride and povidone-iodine on the duration of post-circumcision wound healing at the Darul Khitan Clinic in Bogor City, where the group using octenidine showed a higher wound healing score. These findings indicate that octenidine dihydrochloride is more effective in

accelerating the wound healing process than povidone-iodine, so it can be considered as a more optimal antiseptic choice in post-circumcision wound care.

REFERENCES

Assadian, O., Kramer, A., Ouriel, K., Suchomel, M., McLaws, M.L., Rottman, M., Leaper, D., & Trampuz, A. (2020). Suppression of bacterial growth in wounds by octenidine dihydrochloride. International Wound Journal, 17(3), 678–686. https://doi.org/10.1111/iwj.13306

Bigliardi, PL, Alsagoff, SAL, El-Kafrawi, HY, Pyon, JK, Wa, CTC, & Villa, MA (2020). Povidone iodine in wound healing: A review of current concepts and practices. International Journal of Surgery, 76, 35–41. https://doi.org/10.1016/j.ijsu.2020.02.007 \

Gitarja, WS, et al. (2018). Wound care management in Indonesia: Issues and challenges. Asian Wounds, 1(2).

Guddety, S. R., & Kajagar, B. M. (2020). Comparison of octenidine wound gel versus povidone-iodine dressing in healing of chronic wounds: A randomized controlled trial. KLE University Science Health Journal, 13(3). https://kleijhsbr.researchcommons.org/journal/vol13/iss3/11/

Irwan et al. (2022). The effectiveness of modern wound care training on improving nurses' knowledge in chronic wound care. Journal of the Gorontalo Ministry of Health Polytechnic.

Kramer, A., Dissemond, J., Kim, S., Willy, C., Mayer, D., Papke, R., & Assadian, O. (2021). Consensus on wound antisepsis: Update 2021. Skin Pharmacology and Physiology, 34(1), 1–15. https://doi.org/10.1159/000511230

Kramer, A., et al. (2018). Consensus on wound antisepsis: Update 2018. Skin Pharmacology and Physiology, 31(1), 28–58. https://doi.org/10.1159/000481545

Landsman, A., Mehrara, B. J., & Rojas, A. (2021). Comparative cytotoxicity of commonly used antiseptics on human fibroblasts. Journal of Wound Care, 30(4), 280–286. https://doi.org/10.12968/jowc.2021.30.4.280

Olusanya, AA, et al. (2024). Wound healing and cosmetic outcomes in neonatal circumcision using three different techniques. PubMed Central.

Pramana, I., et al. (2023). Comparison of the antiseptic effectiveness of octenidine dihydrochloride with povidone-iodine for contaminated wounds in vivo. Medical Journal of Malaysia, 78(4). https://www.e-mjm.org/2023/v78n4/octenidine-dihydrochloride.pdf

Salisbury, AM, et al. (2022). Antibiofilm efficacy of polihexanide, octenidine and sodium hypochlorite based wound irrigation solutions. Advances in Microbiology, Infectious Diseases and Public Health. https://doi.org/10.1007/5584_2022_732

Sarwoto, S., et al. (2025). Effectiveness of modern wound care techniques in wound patients. Dharmas Indonesia Journal of Health Sciences.

World Health Organization. (2019). Manual for early infant male circumcision under local anesthesia and HIV prevention. World Health Organization. https://iris.who.int/handle/10665/324740