

Wound Treatment with Moist Dressing Technique Using NaCl 0.9% And Garamycin On The Number Of Bacterial Colonies

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ARTICLE INFO	ABSTRACT
<p>Keywords: <i>Moist Wound Dressing, Diabetic Ulcers, Bacterial Colonization</i></p>	<p><i>This study investigates the effects of moist dressing techniques using 0.9% NaCl and Garamycin on bacterial colony counts in diabetic gangrene wounds. Diabetic ulcers represent a significant challenge in wound management, as improper treatment can lead to severe complications, including infection and amputation. A controlled experimental approach was employed, utilizing diabetic rats induced with alloxan to establish hyperglycemia. The treatment group received moist dressings with 0.9% NaCl and Garamycin over seven days, while bacterial colony counts were assessed before and after treatment. Results indicated a significant reduction in bacterial colonies from an average of 291.625 to 69.75 post-treatment, demonstrating the effectiveness of the combined treatment in preventing bacterial growth. This reduction underscores the importance of maintaining a moist environment for wound healing and the role of antibacterial agents in managing diabetic wounds. The findings contribute valuable insights into optimal wound care practices, emphasizing the need for appropriate dressing selection to enhance healing outcomes and minimize infection risks.</i></p>

INTRODUCTION

Acute injuries are injuries that occur suddenly. Wound condition assessment and wound care management greatly affect the wound healing process. Knowledge of wound care and wound dressing products can reduce the risk of infection, if the acute wound is contaminated can hinder the healing process. The selection of appropriate dressings to protect the wound from microorganisms and the length of dressing change are adjusted to the healing process and the amount of exudate released (Waluyo, 2021).

Diabetic wounds are initially categorized as ordinary wounds, but if the wound management is not appropriate, it will experience infection, ulceration and gangrene (Saputra et al., 2023). Diabetic ulcers cause erosion of the skin starting from the dermis layer to deeper tissues, if not properly treated, the healing process of the ulcer will take a long time and even peripheral neuropathy can occur which results in amputation (Suriani et al., 2023).

Infected wounds go through three stages, namely contamination, colonization, and infection. Wound contamination is the presence of microbes that do not replicate in open wounds. Relatively small amounts of microbes do not affect the inflammatory response and wound healing process, but if microbial replication causes colonization, then the risk of infection occurs. An increase in the number of microbes can prolong the inflammatory phase and further tissue damage. When microbes migrate deep into the wound and multiply rapidly, triggering the onset of infection (Li et al., 2021).

Wound care is currently growing. The principle of wound care is the moist wound dressing technique, which is that the wound is maintained in moist conditions. The goal of keeping the wound moist is to support the wound healing process, maintain the risk of tissue fluid loss and cell death. Ulcers in damp conditions help wound heal up to 45%. The results of diabetic ulcer treatment for 7 days showed no signs of infection, tissue perfusion improved, and the wound healing process occurred (Jundapri et al., 2023). Garamycin belongs to the class of bactericidal drugs that have antimicrobial properties. The results of irrigation research of NaCl 0.9% + Gentamicin

sulfate 80 mg and 160 mg were effective in preventing the occurrence of Surgical Area Infection in orthopedic elective surgery patients compared to NaCl 0.9% alone (Rahman et al., 2020).

METHOD

The research method was experimental, the sample used by mice with diabetic gangrene. The sampling formula uses the Federer formula. Federer's formula is a formula that is often used to calculate samples with experimental research (Dewi Friska et al., 2020). The wound treatment carried out on rats with acute gangrene diabeticum wounds was by giving NaCl 0.9% + Garamycin 80 mg compress to 8 rats. The rats used were mice that were conditioned to have diabetes mellitus by being given the drug Alloxan. White rat (*R. norvegicus*) test animals were checked for blood sugar levels using GCU glucose sticks. Then give aloxan induction at a dose of 120 mg/KgBB intraperitoneally. After 72 hours or 3 days, the blood sugar levels of animals that had been induced by aloxan were retested. The normal blood sugar level of rats is 50-135 mg/dl and is said to be hyperglycemic when the blood sugar level of rats >135 mg/dl. After it was known, the sugar level of > 135 that would be made acute wounds and the treatment carried out was in the treatment group one with moist dressing wound treatment using NaCl 0.9% plus garamycin. Wound care is carried out for 7 days. Evaluation to determine the condition of the wound by examining the number of bacterial colonies before, after treatment, and the average number of bacterial declines.

RESULTS AND DISCUSSION

Table 1. Number of Bacterial Colonies Before and After Moist Dressing Wound Treatment with NaCL 0.9%+Garamycin in Diabetic Gangrene Acute Wound Rats

No	Rat Group	Number of Bacterial Colonies Before Treatment	Number of Bacterial Colonies After Treatment	Average decrease in the number of bacterial colonies
1	K1 Rats 1	425	103	322
2	K1 Rats 2	287	77	210
3	K1 Rats 3	293	79	214
4	K1 Rats 4	289	89	200
5	K1 Rats 5	274	63	211
6	K1 Rat 6	455	43	412
7	K1 Rats 7	187	62	125
8	K1 Rats 8	123	42	81
Total number of colonies		2333	558	1775
Average Decrease in Bacterial Colonies		291,625	69,75	221,875

Based on table 1, it appears that the group of rats with gangrene diabeticum before wound treatment after making incision wounds in the back area averaged 291.625 bacterial colonies and after moist wound treatment with NaCl 0.9% Garamycin 80 mg compress, the average number of bacterial colonies was 69.75. Wound care is carried out for 7 days every morning and evening. This result is in line with previous research conducted on orthopedic acute wounds, which found no increase in the number of microbial colonies compared to NaCl compress treatment of only 0.9% (Rahman et al., 2020). Garamycin is a class of bactericidal drugs that have antimicrobial properties, so acute wound treatment with NaCl 0.9% compresses added to garamycin 80 mg can prevent bacterial growth (Bhittani et al., 2020). This can be seen from the average decrease in the number of bacterial colonies after wound treatment with moist or moist treatment on the knee with acute gangrene diabetic wounds. Diabetic acute gangrene wounds if not treated properly can continue to become chronic wounds. Bacterial colonies will increase in number due to the cleanliness of the environment and the presence of a medium where bacteria breed. The medium where bacteria breed is the one that has nutrients derived from, among others,

carbohydrates (Atmanto et al., 2022). The addition of garamycin as an anti-bacterial can help suppress the growth of bacterial numbers in the treatment of acute wounds of rats with diabetic gangrene.

CONCLUSION

This study showed that wound treatment with moist dressing techniques using NaCl 0.9% and Garamycin significantly reduced the number of bacterial colonies in mice with diabetic gangrene. The results showed a decrease in the average bacterial colony from 291,625 before treatment to 69.75 after seven days of treatment. This emphasizes the importance of keeping the wound moist to support the healing process and prevent infection. The use of Garamycin as an antibacterial agent in combination with NaCl 0.9% has been shown to be effective in suppressing bacterial growth, so it can help prevent further complications in diabetic wounds. Therefore, the selection of the right treatment method is crucial in diabetic wound management to speed up the healing process and prevent infection.

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