

A Prospective Comparative Study of Topical Sucralfate 7% vs Silver Sulfadiazine 1% in the Management of Second Degree Burns

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Abstract: *Background:* Burns are a major cause of morbidity and psychological distress, particularly prevalent and severe in developing countries. They can lead to significant economic burdens and complications such as infections, delayed healing, and scarring. While silver sulfadiazine has been a common topical treatment, new alternatives like topical sucralfate are showing potential in improving wound healing and infection control. This study aims to compare the effectiveness of 7% topical sucralfate versus 1% silver sulfadiazine in treating second - degree burns, focusing on healing rate, wound size reduction, infection rates, and overall cosmetic outcomes. *Materials and Methods:* A prospective comparative study was conducted at AVMCH from September 2022 to July 2024. Seventy - six patients with second - degree burns were included in the study and divided into two groups based on convenience sampling: one treated with 7% topical sucralfate and the other with 1% silver sulfadiazine. Both groups were similar in age, gender, burn site, and physical characteristics. Wound assessments, including size measurements and infection rates, were performed on days 0, 3, 7, and 21. Statistical analyses were conducted using SPSS version 28, with significance set at $p < 0.05$. *Results:* The sucralfate group demonstrated a significantly greater reduction in mean wound size compared to the silver sulfadiazine group. By day 21, 86.8% of patients in the sucralfate group achieved complete healing, compared to 68.4% in the silver sulfadiazine group. Furthermore, the sucralfate group had a significantly lower incidence of infection, indicating superior infection control ($p < 0.05$). *Conclusion:* Topical sucralfate 7% is more effective than silver sulfadiazine 1% in managing second - degree burns, providing better outcomes in wound contraction, healing rate, and infection prevention. Sucralfate shows promise as an alternative treatment for burns, potentially improving patient outcomes and reducing complications associated with burn injuries.

Keywords: Burns, Sucralfate, Wound Healing, Silver Sulfadiazine, Infection Control, convenience sampling

1. Introduction

Burns have significant psychological effects on patients. ¹ They are also associated with mortality, with lower rates in developed countries compared to developing ones. ² The annual incidence of burns is higher in poorer countries, where both mild and severe burns are more common. ³ Burns create an economic burden on individuals, as treatment costs vary according to income, particularly affecting low - income patients. Burn wounds heal through inflammation, proliferation, and remodeling, with increased capillary permeability. ⁴ Dermal wounds heal by connective tissue deposition, contracture, and epithelialization, leading to scar formation. ⁵ In young patients, there is a clear relationship between the duration of re - epithelialization and scar formation. Partial - thickness burns that re - epithelialize within 10 - 14 days typically heal without scarring, while those taking longer are more likely to scar. ⁶ Infection is the most common complication following burns and delays granulation formation, leading to scarring and contracture. Infection is also the most common cause of mortality after burns, and many topical antibacterials slow the wound healing rate. ⁷

Topical agents used in burns include silver nitrate, sulfamylon, and a combination of sulfonamide with silver sulfadiazine. ⁸ Silver sulfadiazine, used at a 1% concentration, is effective against both gram - positive and gram - negative pathogens, and has low toxicity and high sensitivity. ⁹ Sucralfate, a topical solution containing sucrose sulfate and aluminum hydroxide, is used at a 7% concentration to treat conditions such as radiation proctitis, stomatitis, peristomal and resistant excoriation, and stomatitis. It has also been found to improve wound healing. ¹⁰

This study aims to compare the effects of topical sucralfate versus silver sulfadiazine in treating second - degree burns, focusing on the time taken for healing and granulation tissue formation. It also seeks to evaluate the cosmetic outcomes and complications of wound healing associated with these topical applications.

2. Material & Method

A prospective comparative study was conducted at AVMCH from September 2022 to July 2024, involving 76 patients with second - degree burns. These patients were included in the study and divided into two groups based on convenience

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sampling: one group received topical sucralfate 7%, and the other received silver sulfadiazine 1%. The study aimed to compare the effectiveness of these treatments in terms of healing rate, wound size reduction, infection rates, and cosmetic outcomes.

Inclusion criteria:

Inclusion criteria were patients aged 18 - 65 with scald or thermal burns covering less than 30% of their total body surface area and presenting within 12 hours of injury.

Exclusion criteria:

Exclusion criteria included immunocompromised states, severe anemia, and specific types of burns such as electrical, chemical, or inhalational burns, and diabetes.

The sample size was calculated based on a similar study, with a power of 80% and a significance level of 5%. Each group consisted of 38 patients. Patients' wounds were cleaned with normal saline and dressed with either silver sulfadiazine 1% or sucralfate 7%. Wound cultures were taken on day 7, and wound size and healing were assessed on days 0, 3, 7, and 21 using the Lund and Browder chart. Data were collected on demographic details, wound healing patterns, and infection rates. The primary outcome variables included healing pattern scores, wound size measurements, wound swabs, and total body surface area of burns.

Statistical analysis was performed using SPSS version 28, with p - values less than 0.05 considered significant. Categorical variables were summarized as frequencies and percentages, while continuous variables were summarized as means and standard deviations. Chi - square or Fisher's exact test was used to compare granulation between the two groups.

3. Result

In the present study, 76 patients with second - degree burns were divided into two groups: 38 patients received topical silver

Table 1: Comparison of the mean parameters between the groups

	Silver		Sucralfate		p - value
	Mean	SD	Mean	SD	
Age yrs	38.5	14.1	34.5	17.4	0.51
Height	159.0	7.1	160.7	21.4	0.62
Weight	66.6	8.6	67.2	19.6	0.22
HR	76.1	4.5	76.6	8.5	0.51
SBP	130.6	7.1	126.8	11.9	0.24
DBP	78.9	6.7	79.9	6.8	0.36
Wound size D0	79.3	37.9	66.7	35.3	0.12
Wound size D3	70.8	34.5	51.2	32.9	0.01*
Wound size D7	55.4	30.1	38.0	27.4	0.01*
Wound size D21	3.3	2.1	2.8	1.8	0.66

Table 2: Distribution of gender and wound features between the groups

		Silver		Sucralfate		Chi - square (p - value)
		Count	N %	Count	N %	
Gender	Female	19	50.0%	13	34.2%	0.65 (0.52)
	Male	19	50.0%	25	65.8%	
D0	Pale granulation tissue	3	7.9%	7	18.4%	1.84 (0.175)
	Pink granulation tissue	35	92.1%	31	81.6%	
D3	Healthy granulation tissue	38	100.0%	38	100.0%	-
D7	Healthy granulation tissue	38	100.0%	38	100.0%	-
D21	Healed	26	68.4%	33	86.8%	1.15 (0.05) *
	Healthy granulation tissue	3	7.9%	4	10.5%	
	Pale granulation tissue	9	23.7%	1	2.6%	
Wound swab D7	E coli	6	15.7%	2	5.2%	1.200 (0.05) *
	Negative	27	71.1%	34	89.6%	
	Staph	5	13.2%	2	5.2%	

The mean age, gender distribution, burn site, height, weight, heart rate, and blood pressure were comparable between the two groups. However, significant differences were noted in wound healing outcomes. The sucralfate group demonstrated a significantly greater reduction in mean wound size and a higher healing rate, with 86.8% of cases healed by day 21 compared to 68.4% in the silver sulfadiazine group. Additionally, the sucralfate group experienced a lower incidence of infection (p<0.05).

4. Discussion

Second - degree burns pose significant clinical management challenges due to the risks of infection, pain, and potential scarring. Topical treatments are crucial in accelerating wound healing, reducing pain, and minimizing infection risks. This study aims to compare the efficacy and safety of two widely used agents in burn care: Topical Sucralfate 7% and Silver Sulfadiazine 1%. Silver Sulfadiazine is a standard treatment known for its broad antimicrobial activity, ^{11, 12} while

Sucralfate, primarily used for peptic ulcer disease, has shown promise in enhancing epithelialization and providing pain relief through its mucosal protective properties. ^{13, 14} By evaluating these agents in a clinical setting, this study seeks to determine which provides superior outcomes in terms of healing time and infection control for patients with second - degree burns. ¹⁵

In this study, 76 patients were included in the study and divided into two groups based on convenience sampling, with 38 receiving topical silver sulfadiazine 1% and 38 receiving topical sucralfate 7%. The groups were comparable in terms of mean age, gender distribution, burn site, physical characteristics, and vital parameters. A significant decrease in mean wound size was observed in the sucralfate group compared to the silver group. Additionally, 86.8% of the sucralfate group achieved healing by day 21, compared to 68.4% in the silver group. The incidence of infection was lower in the sucralfate group, indicating better infection control (p<0.05).

Banati A et al. found that the sucralfate cream group required significantly less time for epithelialization (18.8 days) compared to other topical agents (24.6 days), with a P value of less than 0.001. ¹⁶ Godhi AS et al. reported that sucralfate dressing not only has an antibacterial effect similar to silver sulfadiazine but also speeds up the healing of second - degree superficial burns. ¹⁰ Koshariya M et al. suggested that topical sucralfate significantly decreases pain and accelerates healing without detrimental effects, highlighting its potential as a future supplementary or alternative therapy. ⁸

The healing success rate was 86.8% in the sucralfate group compared to 68.4% in the silver sulfadiazine group. The lower incidence of infections in the sucralfate group underscores its enhanced infection control capabilities. These findings suggest that topical sucralfate 7% is an effective alternative to silver sulfadiazine 1% for managing second - degree burns. Sucralfate's ability to promote more rapid wound contraction, accelerate healing, and reduce infection rates presents a compelling case for its adoption in clinical practice. This could lead to improved patient outcomes, reduced healing times, and lower risks of burn - related complications. Further research and larger - scale studies could solidify sucralfate's role in burn care, potentially redefining standard treatment protocols for second - degree burns.

5. Limitations

The limitations of this study include single - centre study design, short - term follow up, lack of blinding, lesser sample size.

6. Conclusion

The results indicate that topical sucralfate 7% is more effective than silver sulfadiazine 1% in reducing wound size, accelerating healing, and preventing infections in second - degree burns. Therefore, sucralfate emerges as a promising alternative for burn management, potentially leading to improved patient outcomes and a lower risk of complications.

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