Available online at **www.ijmrhs.com**

ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2022, 11(5): 42-46

A 1-Year Randomized Controlled Trial of Topical Sucralfate *vs*. Silver Sulfadiazine in the Management of Second-Degree Burns

Devendra Dhaker and Arvind Joshi*

Department of General Surgery, Chirayu Medical College & Hospital, Bairagarh, Bhopal, Madhya Pradesh, India

**Corresponding e-mail: doctormpbhopal@gmail.com*

Received: 08-Mar-2022, Manuscript No. ijmrhs-22-56468; **Editor assigned:** 11-Mar-2022, PreQC No. ijmrhs-22-56468 (PQ); **Reviewed:** 02-Apr-2022, QC No. ijmrhs-22-56468 (Q); **Revised:** 05-Apr-2022, Manuscript No. ijmrhs-22-56468 (R); **Published:** 30-May-2022, J-invoice: J-56468

ABSTRACT

Background: *Small scars have been linked to bad psychosocial outcomes emphasizing the necessity of wound healing treatments that are successful. According to burn clinicians, there is a strong link between scar formation and the time it takes to re-epithelialize, especially in children. The major goal of burn wound healing is to speed up the healing and closure process.* ***Aim:*** *The current research aimed to examine the effects of Silver sulfadiazine, and topical Sucralfate in the treatment of second-degree superficial burn wound healing.* ***Methods:*** *The study enrolled 80 patients of both sex under the age group of 30 years with 50 percent second-degree superficial burns. Patients were evenly split into two groups. Patients in group A received topical sucralfate dressing, whereas those in group B received 1% Silver sulfadiazine dressing. The patients' demographics, history, physical, and systemic examinations were all documented and for the detailed analysis, SPSS 20.0 was employed.* ***Results:*** *Granulation emerged in 20 (50%) of patients in less than a week, while in group B, granulation appeared between 15 and 20 days in 22 (55%) of patients (p=0.134). The average day of granulation in group A was 8.12 ± 1.96 days compared to 8.94 ± 3.69 days in group B (p=0.392). On days 1, 7, and 14, the wound culture was performed.* ***Conclusion:*** *Topical sucralfate dressing is more effective than silver sulfadiazine dressing in terms of promoting early granulation in the healing of second-degree superficial burns, but its antibacterial activity is equivalent to silver sulfadiazine dressing. To reinforce the notion, multicentric experiments with larger sample sizes are required.*

Keywords: Sucralfate, Wound healing, Silver sulfadiazine, Second-degree burns

INTRODUCTION

Burns are among the most serious injuries, having a high death and morbidity rate [1]. The prevalence of burns in underdeveloped nations is substantially higher than in industrialized ones, and burns are one of the leading causes of death worldwide [2,3]. Burns are changing injuries that may progress to more serious ailments over time [4]. Deep burns that take a long time to heal might leave you with considerable scarring and contractures [5]. According to burn physicians, there is a clear link between scar development and the time it takes to re-epithelialize in youngsters. According to Cubison, et al., partial thickness burns that re-epithelialize within the recommended time frame of 10-14 days do so without scarring, however those that take longer than that would inevitably scar [6]. Scarring is more likely to occur if recovery takes longer than three weeks [6]. Small scars have been linked to bad psychosocial outcomes in children, emphasizing the necessity of wound healing treatments that are successful. The creation of granulation tissue, collagen deposition, re-epithelialization, and contraction are the four fundamental components of healing [7,8]. One of the most prevalent side effects of burns is infection [9,10]. In the event of wound infection, however, there is a delay in healing, which is followed by scarring and contracture development also infection is the leading cause of mortality after burn damage, the majority of existing topical antibacterial medicines slow wound healing [11,12]. Sucralfate is a mixture of sucrose, a disaccharide sugar, with sulfate and aluminum [12,13]. Sucralfate is a drug that is used to treat ulcers in the gastrointestinal system [14,15]. Sucralfate binds to the basic Fibroblast Growth Factor

(bFGF) and raises its levels in the wound [16]. Various occasional investigations have shown that topical sucralfate is safe and effective for skin protection and wound healing in people [12,17,18].

The anti-inflammatory and bacteriostatic effects of sucralfate have also been validated by clinical data [18,19]. The bactericidal agent silver sulfadiazine is effective against both germ-positive and germ-negative microorganisms [20]. Silver sulfadiazine, which has low toxicity and high sensitivity, has been utilized to treat burn injuries at a concentration of 1% [20,21]. Silver sulfadiazine is thought to slow wound healing by inhibiting fibroblast and epithelial growth [5,22]. The present study aims to examine the efficacy of topical sucralfate *vs.* silver sulfadiazine in the management of second-degree burns. Improvements in therapy have resulted in lower burn mortality over time; nonetheless, the surgical care of burn 4 injuries remains a problem.

MATERIALS AND METHODS

From January to December 2018, a randomized controlled experiment was done at the Department of General Surgery, Chirayu Medical College & Hospital, Bhopal, India. A total of 80 patients (both sex) under the age group of 30 years were split into two groups: 40 in group A were treated with topical sucralfate dressing and 40 in group B were treated with 1% silver sulfadiazine dressing. The research included all patients with 50% superficial second-degree thermal burns and scalds. The nature of the study was explained to all of the patients who were chosen, and signed informed permission was acquired. The study was authorized by the Ethical Research Committee of Medical College in Bhopal, India, before its start.

Exclusion Criteria

Patients with >50% burn, comorbidities such as diabetes mellitus, HIV/AIDS, severe anemia (5% HB), hypoproteinemia (total protein 5 g/dL), and debility, as well as electric, corrosive, and inhalational burns, were excluded from the research. Patients were interviewed and their demographic information was gathered. A full history, physical, and systemic examination were performed on all of the patients who were part of the research. These results were documented on a performance that had been previously prepared and tested. A complete blood count, biochemical testing, serological tests, plasma proteins, random blood sugar, renal function tests, and culture and sensitivity tests were all carried out.

Photographs of the burn wounds were taken. Discharge was ordered due to cultural and sensitivity concerns. Wounds were treated and changed regularly. Wounds were monitored for healing or the emergence of healthy granulation tissue for a maximum of 21 days (the study's endpoint), and the pace of healing was compared.

SPSS 20.0 was used to combine and analyze the data. Rates, ratios, and percentages were used to represent categorical data. The Fisher's exact test, chi-square test, and independent sample t-test were used to compare continuous data reported as mean standard deviation. Statistical significance was defined as p=0.05.

RESULTS

The sex and age distribution of the patients were shown in Figure 1 and Figure 2 respectively. In group A, 20 patients (50%) had granulation within 7 days, but in group B, 18 patients (42.5%) had granulation between 15 and 20 days (p=0.138). Group A had an average granulation day of 8.12 ± 1.96 days, whereas group B had an average granulation day of 8.94 ± 3.69 days (p=0.392, Table 1). On days 1, 7, and 14, there was no significant difference in wound culture in both groups (p>0.050) (Table 2).

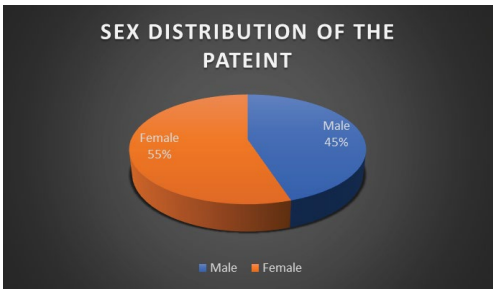

Figure 1 Sex distribution of the patient

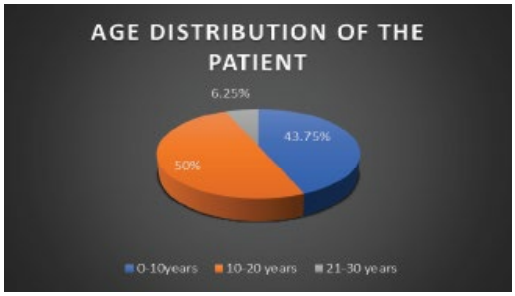

Figure 2 Age distribution of the patient

Table 1 Days of granulation

Day of Granulation	Group A, (n %)	Group B, (n %)	p-value
<7 days	20 (50)	9 (22.5)	0.134
8-14	4 (10)	6 (15)	
15-20	15 (37.5)	22 (55)	
No granulation	1 (2.5)	3 (7.5)	

Table 2 Wound culture

Intervals	Findings	Group A, (n %)	Group B, (n %)	p-value
1st DAY	Positive	16 (40)	12 (30)	0.412
	Negative	24 (60)	28 (70)	
7th AY	Positive	16 (40)	19 (47.5)	0.624
	Negative	19 (47.5)	21 (52.5)	
14th DAY	Positive	16 (40)	12 (30)	0.356
	Negative	8 (20)	28 (70)	

DISCUSSION

Burns is one of the most prevalent ailments worldwide. In the treatment of burn injuries, a variety of drugs and surface coatings have been tried. The primary goal of its use is to speed up epithelial healing and avoid scar formation.

In this trial, topical sucralfate dressing outperformed SSD treatment in terms of early granulation in the healing of second-degree superficial burns, but there was no antibacterial advantage. Although the data isn't conclusive, clinical findings in a variety of different circumstances are likely to confirm sucralfate's beneficial impact [15]. Banati et al. evaluated the function of topical sucralfate in the treatment of burn injuries and found that sucralfate increased the rate of epithelialization and the emergence of healthy granulation tissue in second and third-degree burns, respectively [12]. As a consequence, despite some methodological changes, the current study's findings are in agreement with those published by Banati, et al. [4,12]. Sucralfate is reported to have several wound-healing properties. Neo angiogenesis, stimulation of the local immune response, and the presence of growth factors such as Epidermal Growth Factor (eGF), Transforming Growth Factor (TGF), and basic fibroblast growth factor all play a role in wound healing (bFGF). Sucralfate works by boosting the levels of both bFGF and eGF in the injured tissue. The burned injured skin cells release interferon gamma and cytokines, which inhibit inflammation and give a calming effect [6]. Furthermore, it has no negative consequences, Tsakayannis, et al. examined the effects of topical sucralfate ointment on non-healing venous stasis ulcers and found that there was a lot of granulation tissue, neoangiogenesis, and wound contraction [23]. Many clinical trials have now shown the efficacy of topical sucralfate in the gut. Similarly, research done on mice by Burch, et al. found that sucralfate cream accelerates cell proliferation in the superficial skin layer, resulting in dermis and epidermis thickening [15]. Sucralfate has been determined to be an efficacious and safe chemical for topical

application and oral intake, except for a few trials that have shown aluminum toxicity [22]. As a result, the purpose of this research was to assess the effectiveness of topical sucralfate against SSD in the healing of second-degree superficial burns in terms of the number of days necessary for healing or the presence of healthy granulation tissue, as well as the antibacterial impact. SSD resulted in granulation tissue in 22/40 patients after 15-20 days, while sucralfate resulted in granulation tissue in 20/40 patients after 7 days.

In both groups, wound culture was shown to be favorable and grew from day 1 to 14. As a result, neither sucralfate nor SSD had an antimicrobial impact on burn injuries. Other research, in contrast to our results, has demonstrated that topical sucralfate has antibacterial activity; however, the specific mechanism of action is unknown. In this area, further study is required. Controlling bacterial infections requires thorough shower washing, cleansing, and wound debridement on a timely basis.

These findings, however, need more investigation owing to the research's shortcomings, which include small sample size and a short study period of just 21 days, during which all of the wounds did not heal fully. Finally, since this research focused on second-degree burns, it cannot be applied to all burn injuries.

CONCLUSION

The current study found that topical sucralfate dressing is more effective than silver sulfadiazine dressing in terms of promoting early granulation in the healing of second-degree superficial burns, while its antibacterial activity is equivalent to silver sulfadiazine dressing. Overall, topical sucralfate accelerated the healing of second-degree superficial burn wounds, and it should be administered as a stand-alone agent or in conjunction with other topical treatments. To reinforce the notion, multicentric experiments with a larger sample size are required.

DECLARATIONS

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

[1] Olabanji, J. K., et al. "A ten-year review of burn cases seen in a Nigerian teaching hospital." *Journal of Burns & Surgery Wound Care,* Vol. 2, 2003, p. 1.

[2] Davies, J. W. L. "Challenges for the future in burn research and burn care. The 1990 AB Wallace memorial lecture." *Burns,* Vol. 17, No. 1, 1991, pp. 25-32.

[3] Chester, D. L., and R. P. G. Papini. "Skin and skin substitutes in burn management." *Trauma,* Vol. 6, No. 2, 2004, pp. 87-99.

[4] Singer, Adam J., and Steve A. McClain. "The effects of a high-potency topical steroid on cutaneous healing of burns in pigs." *Academic Emergency Medicine,* Vol. 9, No. 10, 2002, pp. 977-82.

[5] Singer, Adam J., et al. "Curcumin reduces injury progression in a rat comb burn model." *Journal of Burn Care & Research,* Vol. 32, No. 1, 2011, pp. 135-42.

[6] Cubison, Tania CS, Sarah A. Pape, and Nicholas Parkhouse. "Evidence for the link between healing time and the development of Hypertrophic Scars (HTS) in paediatric burns due to scald injury." *Burns,* Vol. 32, No. 8, 2006, pp. 992-99.

[7] Hassan Zadeh, Gholam Reza, et al. "Evaluation of effect of compund of *Olea Europea L.* and *Myrtus Communis L.* on burn wound healing." *Anatomical Sciences Journal,* Vol. 1, No. 4, 2003, pp. 21-28.

[8] Ahmed, Emad T., Osama M. Abo-Salem, and Ali Osman. "The influence of Egyptian propolis on induced burn wound healing in diabetic rats; antibacterial mechanism." *Science Journal of Medicine and Clinical Trials,* Vol. 2012, 2011.

[9] Mehdikhanloo, N., and GH R. Hasanzadeh. "The effect of compound of *Brassica Oleracea L.* and egg-white on

burn wound healing in rat." *Journal of Sabzevar University of Medical Sciences,* Vol. 11, No. 4, 1970, pp. 6-12.

[10] Nascimento, Ednaldo Gomes do, et al. "Evaluation of chitosan gel with 1% silver sulfadiazine as an alternative for burn wound treatment in rats." *Brazilian Surgical Record,* Vol. 24, No. 6, 2009, pp. 460-65.

[11] Williams, Felicia N., et al. "The leading causes of death after burn injury in a single pediatric burn center." *Critical Care,* Vol. 13, No. 6, 2009, pp. 1-7.

[12] Banati, Anjana, Siti Roy Chowdhury, and Saswati Mazumder. "Topical use of sucralfate cream in second and third degree burns." *Burns,* Vol. 27, No. 5, 2001, pp. 465-69.

[13] Marks, I. N. "Sucralfate-safety and side effects." *Scandinavian Journal of Gastroenterology,* Vol. 26, No. sup185, 1991, pp. 36-42.

[14] Szabo, Sandor, and Daniel Hollander. "Pathways of gastrointestinal protection and repair: Mechanisms of action of sucralfate." The American Journal of Medicine, Vol. 86, No. 6, 1989, pp. 23-31.

[15] Burch, R. M., and B. A. McMillan. "Sucralfate induces proliferation of dermal fibroblasts and keratinocytes in culture and granulation tissue formation in full-thickness skin wounds." Agents and Actions, Vol. 34, No. 1, 1991, pp. 229-31.

[16] Lyon, Calum C., et al. "Topical sucralfate in the management of peristomal skin disease: An open study." Clinical and Experimental Dermatology, Vol. 25, No. 8, 2000, pp. 584-88.

[17] Hayashi, A. H., H. Y. C. Lau, and D. A. Gillis. "Topical sucralfate: Effective therapy for the management of resistant peristomal and perineal excoriation." Journal of Pediatric Surgery, Vol. 26, No. 11, 1991, pp. 1279-81.

[18] Tumino, Giovanni, et al. "Topical treatment of chronic venous ulcers with sucralfate: A placebo controlled randomized study." International Journal of Molecular Medicine, Vol. 22, No. 1, 2008, pp. 17-23.

[19] Bergmans, D., et al. "In vitro antibacterial activity of sucralfate." European Journal of Clinical Microbiology and Infectious Diseases, Vol. 13, No. 7, 1994, pp. 615-20.

[20] McQuestion, Maurene. "Evidence-based skin care management in radiation therapy: Clinical update." Seminars in Oncology Nursing, Vol. 27, No. 2, 2011, pp. e1-17.

[21] Durmus, A. S., Mehmet Cengiz Han, and I. Yaman. "Comperative evaluation of collagenase and silver sulfadiazine on burned wound healing in rats." Firat University Health Sciences Veterinary Journal, Vol. 23, No. 3, 2009, pp. 135-39.

[22] Atiyeh, Bishara S., et al. "Effect of silver on burn wound infection control and healing: Review of the literature." Burns, Vol. 33, No. 2, 2007, pp. 139-48.

[23] Tsakayannis, Dimitris, et al. "Sucralfate and chronic venous stasis ulcers." The Lancet, Vol. 343, No. 8894, 1994, pp. 424-25.