



Research Paper

Effect of silver sulfadiazine cream in the treatment of second-degree burn in children.

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ABSTRACT

Introduction: Burn is a complex disease process, a trauma to physique as well as psyche. Visible disfigurement caused by burns translates into an altered pattern of socialization which in turn can have serious psychological ramifications. Patients with burns require immediate specialized care in order to minimize morbidity and mortality. So, the important part of the management of burns is wound management.

Objective: To assess the efficacy of silver sulfadiazine cream in burn wound management.

Methods: Prospective interventional study was carried out at the Department of Burn and Reconstructive Surgery, faculty of Paediatric Surgery, Bangladesh Shishu Hospital & Institute. A total of 21 patients were included in this study after fulfillment of all selection criteria during the study period.

Result: The mean pain relief time, wound healing and hospital stay were 5.52±0.98 days, 8.0±1.97 days and 8.10±1.97 days respectively.

Conclusion: The application of silver sulfadiazine cream is safe and effective in the treatment of second-degree burn in children.

Keywords: Silver sulfadiazine cream, second-degree burn, wound healing.

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I. INTRODUCTION

Burn injuries are common in children. It always occurs unexpectedly and has the potential to cause death, lifelong disfigurement and dysfunction¹. Burn is a complex disease process, trauma to the physique as well as the psyche. Visible disfigurement caused by burns translates into an altered pattern of socialization which in turn can have serious psychological ramifications. Patients with burns require immediate specialized care in order to minimize morbidity and mortality². A second-degree burn involves the epidermis and dermis. An accurate assessment of burn depth on admission is important in making a decision about dressings and surgery. The burn wound is a dynamic living environment that will alter depending on both intrinsic and extrinsic factors³. The breached skin barrier is the hallmark of thermal injury. Because of the importance of the skin as a barrier to microbial host invasion, it is not surprising that the risk of subsequent burn wound infection and systemic infection correlates with the size of the burn injury². For centuries man has exploited the medical properties of silver-containing compounds. Historically silver was noted to render water potable⁴. In the 19th century, silver compounds were popular remedies for tetanus and rheumatism. Silver was also used to treat colds and gonorrhoea before the advent of more antibiotics in the early 20th century. Later silver nitrate was proposed as a treatment for burn wounds⁵. The ensuing search to improve upon silver nitrate's drug profile culminated in a landmark article by Fox⁶ in 1968 describing the formation and use of silver sulfadiazine (SSD). Soon after, SSD gained popularity becoming the standard treatment for burns to prevent or treat infection and augment wound healing. The aim of this study was to evaluate the effectiveness of SSD cream in respect of time taken for effective pain relief (faces scale), the time required for wound healing, wound infection and hospital stay in the management of second-degree burns in children.

II. METHODOLOGY & MATERIALS

This was a prospective interventional study carried out at the department of Burn & Reconstructive Surgery, Faculty of Paediatric Surgery, Bangladesh Shishu Hospital & Institute. Total 21 patients were included in this study from January 2021 to September 2021 after admission within 24 hours of burn upto 20% body surface area. The exclusion criteria were any comorbidity, allergy to SSD and electric and chemical burns. After admission each patient was thoroughly examined, investigated and all relevant information were noted. The guardian of the patient was informed about the treatment and informed written consent was obtained. Burn wound was washed out with sterile normal saline and application of 1% silver sulfadiazine cream twice daily till complete healing. After discharge each patient was followed up weekly upto 4 weeks. On each followed up healing, scar and itching were monitored. The statistical analysis was conducted using SPSS (Statistical Package for Social Science) version 26 statistical software.

III. RESULTS

At the end of the follow-up, a total of 21 participants were included in the final data analysis. After completion of the data analysis, the results were organized in tabular form and figures. Figures (4-6) showed the effect of pre and post-results of the application of SSD cream.

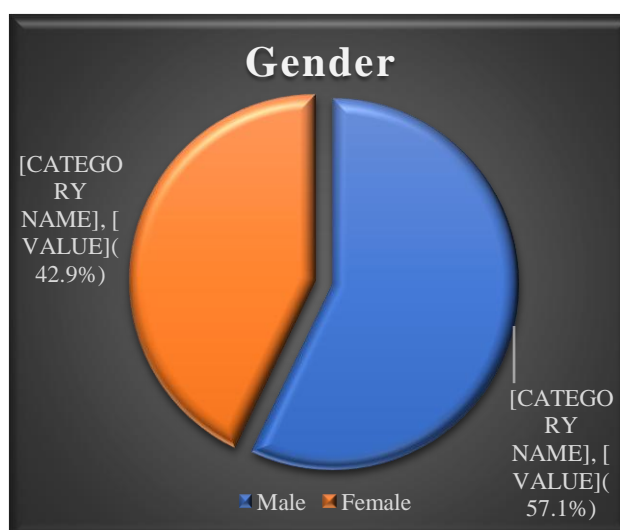


Fig. 1: Gender distribution of the participants(n=21)

Table I: Characteristics of the participants (n=21)

Characteristics	Mean±SD	Rang
Age (in months)	34.9±34.3	5-138
Weight (in kilograms)	13.9±9.8	5.0 - 40.0
Percentage of burn	9.71±3.32	5.0 - 18.0

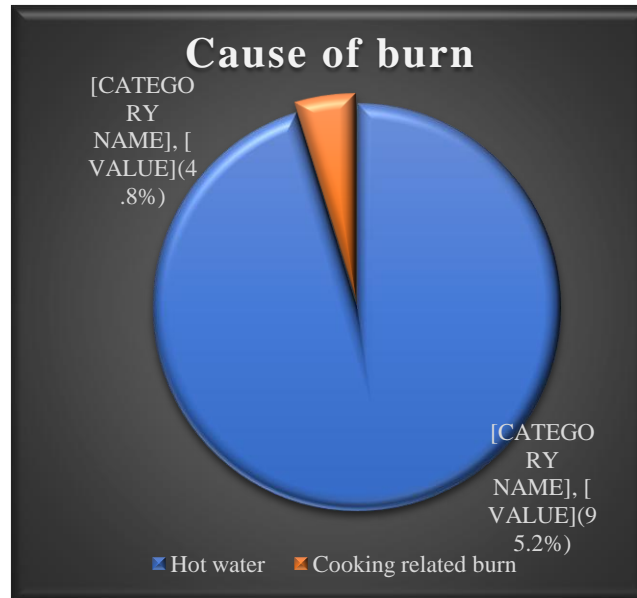


Fig. 2: Causes of the burn (n=21).

Table II: Outcome of variables (n=21)

Variables	Mean±SD	Range
Pain relief time (days)	5.52±0.98	4.0-7.0
Wound healing time (days)	8.0±1.97	5.0-14.0
Hospital stay (days)	8.10±1.97	6.0 – 14.0

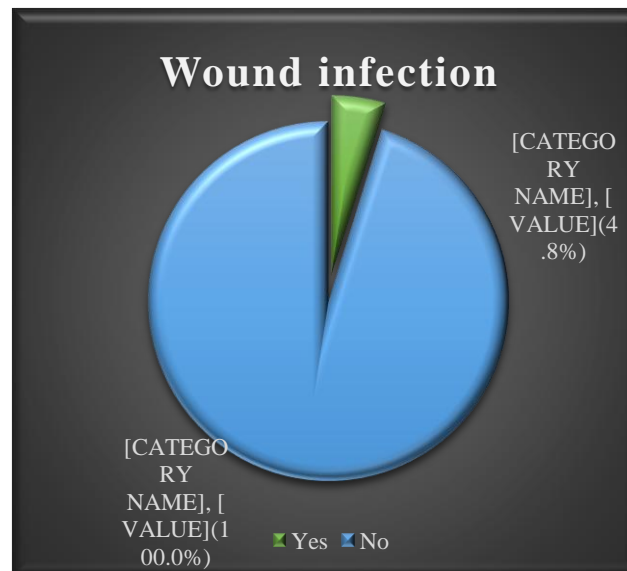


Fig. 3: Wound infection of the participants (n=21)



Fig. 4: Second-degree burn



Fig. 4: after 5 days



Fig. 5: After 12 days

IV. DISCUSSION

Silver sulfadiazine has been commonly used in burn wound management since 1968 to try to overcome the problem of wound infection. The traditional idea that silver sulfadiazine cream is the product of choice for burns is still a reality. But it has rare serious side effects including sensitivity, hemolytic anemia, leukopenia and bacterial resistance⁷. In our study, the mean pain relief was 5.52 ± 0.98 days. Jajra et al⁸ found that the mean pain relief time was 16.70 ± 7.83 days. It is more than the present study. It is due to more body surface area of the burn. In the current study, the mean wound healing time was 8.0 ± 1.97 days. Manzoor et al⁹ observed that the mean wound healing time was 20 ± 4 days. SSD accelerates the normal healing process through the inhibition of matrix metalloproteinases and increases epithelialization¹⁰⁻¹². In the present study 1(4.8%) patient was found with wound infection. SSD has a preventive effect by terminating most of the microorganisms, even fungi¹³. The wound infection was caused by staphylococcus aureus and was treated according to the culture sensitivity report. In this study, the mean hospital stay was 8.10 ± 1.97 days. Vijayakumar et al¹⁴ found a mean hospital stay of 12.6 days. It is nearer to the present study. But Masoud et al² found the average hospital stay was 18.3 days which was more than the present study. The study sample was small since it was undertaken during the COVID-19 pandemic. After discharge from the hospital, patients were followed up on weekly basis for up to 4 weeks. No patient had any sign of abnormal scar formation, itching, wound contracture or cosmetic disfiguration.

V. CONCLUSION

Silver sulfadiazine cream is safe and effective in the treatment of second-degree burns in children.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee.

REFERENCES

- [1]. Okeniyi JA, Olubanjo OO, Ogunlesi TA, Oyelami OA, Adesunkanmi AR. Healing of burns in children: which is the better agent, honey or silver sulphadiazine? Nigerian journal of paediatrics. 2005;32(1):7-11.
- [2]. Masoud M, Wani AH, Darzi MA. Topical heparin versus conventional treatment in acute burns: a comparative study. Indian Journal of Burns. 2014;22(1):43.
- [3]. Papini R. Management of burn injuries of various depths. Bmj. 2004;329(7458):158-60.
- [4]. Lansdown AB. Silver in health care: antimicrobial effects and safety in use. Biofunctional textiles and the skin. 2006;33:17-34.
- [5]. Moyer CA, Brentano L, Gravens DL, Margraf HW, Monafu WW. Treatment of large human burns with 0.5% silver nitrate solution. Archives of surgery. 1965;90(6):812-67.
- [6]. Fox CL. Silver sulfadiazine—a new topical therapy for pseudomonas in burns: therapy of pseudomonas infection in burns. Archives of surgery. 1968;96(2):184-8.
- [7]. Miller AC, Rashid RM, Falzon L, Elamin EM, Zehtabchi S. Silver sulfadiazine for the treatment of partial-thickness burns and venous stasis ulcers. Journal of the American Academy of Dermatology. 2012;66(5):e159-65.
- [8]. Jajra D, Lodha S, Kumar A, Jakhar DS, Singh J. Role of Topical Heparin in Treatment of Burn at Tertiary Care Hospital in Western Rajasthan. Academia Journal of Surgery. 2020;3(1):110-115.
- [9]. Manzoor S, Khan FA, Muhammad S, Qayyum R, Muhammad I, Nazir U, Bashir MM. Comparative study of conventional and topical heparin treatment in second-degree burn patients for burn analgesia and wound healing. Burns. 2019;45(2):379-86.

- [10]. Warriner R, Burrell R. Infection and the chronic wound: a focus on silver. *Advances in skin & wound care.* 2005;18(8):2-12.
- [11]. Atiyeh BS, Costagliola M, Hayek SN, Dibo SA. Effect of silver on burn wound infection control and healing:a review of the literature. *burns.* 2007;33(2):139-48.
- [12]. Demling RH, DeSanti ML. The rate of re-epithelialization across meshed skin grafts is increased with exposure to silver. *Burns.* 2002;28(3):264-6.
- [13]. Vloemans AF, Soesman AM, Suijker M, Kreis RW, Middelkoop E. A randomised clinical trial comparing a hydrocolloid-derived dressing and glycerol-preserved allograft skin in the management of partial thickness burns. *Burns.* 2003;29(7):702-10.
- [14]. Vijayakumar C, Prabhu R, Velan MS, Krishnan VM, Kalaiarasi R, Swetha T. Role of Heparin Irrigation in the Management of Superficial Burns with Special Reference to Pain Relief and Wound Healing: A Pilot Study. *Cureus.* 2018;10(8):e3157.