Journal of Paediatric Surgeons of Bangladesh (2026) Vol. 17 (2)
Official Journal of the Association of Paediatric Surgeons of Bangladesh
https://doi.org/10.3329/jpsb.v17i2.92981

Journal of Paediatric Surgeons of Bangladesh

Original Article

Collagen Sheet Versus Paraffin Gauze and 1% Silver Sulfadiazine Cream Dressing in the Management of Superficial Dermal Burn in Children

Das DK[1], Islam MT[2], Islam MS[3], Rashedi S[4], Hossain M[5], Talukdar M[6], Ahmed T[7], Rahman MT[8]

Abstract

Background: Burn injuries globally challenge both developed and developing nations. Management focuses on achieving swift, complete healing and restoring skin texture and color. However, selecting the most suitable treatment method among diverse options can be daunting. This study assessed the outcomes of collagen sheet dressing compared to paraffin gauze and 1% silver sulfadiazine (SSD) cream dressing for superficial dermal burns in children. Objective: To compare the outcomes between collagen sheet dressing with paraffin gauze and 1% SSD cream dressing in superficial dermal burn in children.

Methods: This 18-month quasi-experimental study at the Department of Paediatric Surgery, Sylhet MAG Osmani Medical College Hospital, included 110 paediatric patients (≤12 years) with superficial dermal burns (≤15% of total body surface area) after obtaining ethical approval and informed consent. Patients were divided into two groups: Group-A received collagen sheet dressing (n=55), and Group-B received paraffin gauze and 1% SSD cream dressing (n=55). Data were collected using separate case record forms and analyzed using SPSS 26.0.

Results: Mean age of the study population was 44.72±33.84 (months) with an almost equal male-to-female ratio. Maximum study patients had multiple burns injury (58.2%) and mostly due to moist heat (87.3%). Both groups were similar in terms of age, gender, site, cause and size of the burn (p>0.05). Group-A patients had significantly shorter healing time (11.87±5.04 vs 13.11±4.94 days) and lesser hospital stay (3.89±2.12 vs 8.20±4.71 days) compared to group-B patients. Three patients (5.5%) from group-A had developed burn wound infection, while in group-B, eight patients (14.5%) had burn wound infection. The total cost of dressing materials was found to be similar between groups (1654.73±914.96 taka in group-A and 1454.55±816.19 taka in group-B, p>0.05). Less frequent dressing changes in collagen sheet dressing (1.71 ± 1.88 vs 3.64 ± 1.27), p<0.05. Conclusion: This study highlights the clear advantages of collagen dressing over paraffin gauze and 1% SSD, including easier application and removal, shorter healing time and reduced hospital stay. However, further larger scale study is recommended.

Keywords: Superficial dermal burn, Collagen sheet dressing, silver sulfadiazine, Paraffin gauze, Paediatric burn.

1. Dibendu Kumar Das
Assistant Registrar, Department of Paediatric Surgery, Khulna Medical College Hospital, Khulna.
2. Md. Tawhidul Islam
Associate Professor, Department of Paediatric surgery, Sylhet MAG Osmani Medical College, Sylhet.
3. Md. Sirazul Islam
Assistant Professor, Department of Paediatric Surgery, Sylhet MAG Osmani Medical College, Sylhet.
4. Shabnam Rashedi
Assistant Professor, Department of Paediatric Surgery, Sylhet MAG Osmani Medical College, Sylhet.
5. Mahabub Hossain
Resident Surgeon, Sylhet MAG Osmani Medical College & Hospital, Sylhet.
6. Manash Talukdar
Assistant Registrar, Department of Paediatric Surgery, Sylhet MAG Osmani Medical College and Hospital, Sylhet.
7. Towkir Ahmed
MS (Phase- B) Resident, Sylhet MAG Osmani Medical College, Sylhet.
8. Md. Tayef Rahman
MS (Phase- B) Resident, Sylhet MAG Osmani Medical College, Sylhet.

Correspondence to: Dibendu Kumar Das
Assistant Registrar, Department of Paediatric Surgery
Khulna Medical College Hospital, E-mail: dibbendu.kmc@gmail.com

Introduction

Burn is an injury to the skin or other organic tissue primarily caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals [1]. Injury by heats occur when some or all of the cells in the skin or other tissues are destroyed by either hot liquids (scalds),

hot solids (contact burns) or flames (flame burns) [1]. Burns are devastating injuries that affect anyone, anytime and anywhere including children. In addition to a high mortality rate, survivors with burn injuries may suffer from lifelong physical and emotional sequelae. The etiology and nature of burn injuries varies significantly by countries [2.3]. Burn injuries are a major epidemiologic problem in the children around the world. Nearly one fourth of all burn injuries usually occur in the children under the age of 16, among them the majority are under the age of five [4]. According to the WHO, it is estimated that each year approximately 11 million people suffer from burn wounds, among them 180,000 people die annually [1]. The impulsivity, high activity and natural curiosity of this age group contribute to the increased incidence of burns. Boys have a higher incidence of burns, accounting for about 60–70% in most reports [2]. Burn wound depths are internationally classified into four degrees. The first degree is superficial burn that involves epidermis of the skin only. Second degree is dermal burn that is further sub classified into (a) superficial dermal burn that involves papillary layer of dermis and (b) deep dermal burn that involves up to reticular layer of dermis. The third-degree burn is deep burn or full thickness burn where full thickness of skin become burned and involve subcutaneous tissue. The fourth degree burn is subdermal burn which involves muscle, bones, fascia [5]. Superficial burn involves the epidermis only which is red and painful. They do not blister, heal normally and do not form scar. Superficial dermal burns involve the epidermis and papillary layer of dermis which is pink, wet and very painful [6]. Blistering is a classical appearance of superficial dermal burn. It is very painful to touch due to exposed nerve endings. If the wounds are kept clean and dressed appropriately, these burn wounds heal without skin grafting and they rarely form scar [6]. Deep dermal burns are pale, having no blister, less severe pain with reduced capillary refilling. Full thickness burns are whitish, lathery in appearance, having no blister, no pain. However, both deep dermal and full thickness burn wounds do not heal well without surgery. Both have a high risk of leaving a poor scar [6]. The precise evaluation of burn depth at admission holds significant importance in making decisions for appropriate management plan like dressings or surgical interventions. The burn wound is a constantly changing and evolving environment. However, the burn wound is a dynamic living environment. It will alter depending on both intrinsic factors (such as release of inflammatory mediators, bacterial proliferation) and extrinsic factors (such as dehydration, systemic hypotension, hypothermia). It is therefore important to observe the wound at regular intervals until healing. When epithelialization is delayed beyond three weeks, the incidence of formation of hypertrophic scar increases. Hypertrophic scars occur in 60% of children with burn under the age of 5 years [7]. The aim of treatment in burn injury is to maintain proper hydration status, balancing electrolyte level, maintain nutritional status, prevention and control of infection and promote proper healing with good aesthetic results. Immediate resuscitation of the patient, accurate assessment of depth and percentage of burn area, prompt initiation of treatment according to ATLS protocol of burn management, appropriate dressing and removal of causative agents are core of burn patient management. To serve better wound care management, a wide variety of pharmacological and wound care products are currently available. An ideal dressing may therefore, be characterized on the basis of its performances. Criteria include: (1) Provision and maintenance of a moist environment, (2) Wound protection from secondary infections by acting as a bacterial barrier, (3) Provision of adequate gaseous exchange, (4) Provision of thermal insulation, (5) Management of excess exudate by allowing non traumatic removal and (6) Be non-antigenic and elastic [8]. Conventional wound management involves disinfection, debridement and provision of a moist environment to encourage the establishment of the best environment for natural healing process [8]. The most commonly used conventional dressing of burn includes wound cleaning followed by application of 1% silver sulfadiazine (1% SSD) cream and occlusive dressing with roller gauze. Initially dressing materials were made-up of fabric material, such as gauge. They provide little or no occlusion. Later compound dressings such as wide mesh gauge are used. Then those are impregnated with paraffin. In last century, various antibacterial agents like 1% SSD cream, carbolic acid, mercuric chloride, penicillin, neomycin, polymixin are incorporated. The dressing is opened on the second day or every alternate day or 3-4 days interval depending on the condition of wound and bandage. The 1% SSD cream has become a drug of choice in burn dressing due to its broad-spectrum action against Gram-positive and Gram-negative bacteria as well as against fungi. However, substantial experience, systemic absorption and pigmentation due to use of 1% SSD cream leading to development of drug observed adverse effects which discourage the use of SSD cream [9]. Frequent painful dressings, especially in paediatric population, is the major concerns of conventional dressing. Although 1% SSD cream is commonly used and is very effective, it cannot be used in some areas, like head, face, genitalia, perineum etc.[9]. Researchers are looking for dressings with better properties and functions due to the many constraints of synthetic and conventional dressings. This has sparked interest in the creation of biological dressings. The ongoing investigation into effective biological dressings has led to the development of collagen-based dressings specifically designed for burn wounds. These have been proven that it possesses superior qualities and offer greater advantages [10]. Collagen is a natural component of the dermal matrix produced by fibroblasts. It functions as protective

scaffolding for migrating epithelial cells in the regenerating skin [11]. Collagens are the most available and unique characteristic proteins in vertebrates. In addition to providing mechanical support to the connective tissue, the collagens form an essential substrate for cellular adhesion and migration. Therefore, collagen is considered to be an important factor in the regenerative process [10]. Several recent evidence showed benefits of using collagen dressing over 1% SSD cream dressing in second degree burn injury. Most of the previous studies on adults to see either the efficacy of collagen sheet alone or comparison between collagen sheet & 1% SSD cream and paraffin gauze. Few studies are done on children using collagen sheet to see its efficacy that shows promising results. So, the aim of the study is to compare the outcome of Collagen sheet dressing versus Paraffin gauze and 1% SSD cream dressing in the wound management of superficial dermal burn in children.

Objectives of the Study

General objective:

- To compare the outcomes of collagen sheet dressing with paraffin gauze and 1% SSD cream dressing in children with superficial dermal burns.

Specific Objectives:

To assess the outcomes of the following dressing methods in children with superficial dermal burns:

- Collagen sheet dressing.
- Paraffin gauze and 1% SSD cream dressing.

To compare the following outcomes between the two groups:

- Duration of complete healing.
- Frequency of dressing changes.
- Occurrence of wound infection.
- Duration of hospital stay.
- Total cost of dressing materials.

Methodology of the Study

• This study was quasi-experimental. This study was conducted in the Department of Paediatric Surgery, Sylhet MAG Osmani Medical College Hospital. The period of study was eighteen months – from September 2022 to February 2024. Pediatric patients with burns admitted to the Department of Pediatric Surgery at Sylhet MAG Osmani Medical College Hospital were evaluated. Those among the target population who fulfilled the enrollment criteria constituted the study population.

Inclusion criteria:

- Age: ≤12 years.
- Patients with superficial dermal burn.
- Patients of burn surface area ≤15% of Total Body Surface Area (TBSA).
- Patients with burn wound not older than 48 hours.

Exclusion criteria:

- Patient with electrical and other non-thermal burns.
- Burn along with other injury.
- Burn in head, scalp, face, genitalia, perineum.
- Patients whose guardians did not provide consent.

Data Collection Procedure

Data were collected using a pre-designed questionnaire developed through literature review and expert consultation. Baseline information, including the cause, type, and total body surface area (TBSA) of burns, was obtained through face-to-face interviews and clinical assessment using the modified Rule of Nine. Eligible patients were enrolled after obtaining written informed consent from their guardians. Participants were allocated alternately into two groups: Group A (collagen sheet dressing) and Group B (paraffin gauze with 1% silver sulfadiazine [SSD] cream dressing), beginning with Group A. All patients received standard burn management, including wound cleansing, removal of necrotic tissue and causative agents, analgesics, antibiotics, tetanus prophylaxis, intravenous fluids when indicated, and other supportive care under strict aseptic precautions. In Group A, the wound was cleaned with normal saline, debrided, and covered with a collagen sheet after rinsing in saline. The sheet was trimmed to fit the wound, air bubbles were removed, and it was allowed to adhere naturally until spontaneous separation following complete epithelialization. In Group B, the wound was cleaned and debrided, followed by the application of 1% SSD cream. The wound was then covered with paraffin gauze, sterile gauze, cotton padding, and a roller bandage. Dressings were routinely changed every three days or earlier if clinically indicated.

Ethical Considerations

Ethical approval for this study was obtained from the Ethical Review Committee of Sylhet MAG Osmani Medical College before data collection. Written informed consent was obtained from the guardian of each participant after providing a clear explanation of the study objectives, procedures, potential benefits, and the voluntary nature of participation. Participants were informed of their right to refuse participation or withdraw from the study at any stage without any consequences. The confidentiality and privacy of all participants were strictly maintained by restricting access to the collected data to the research team only. No financial incentives or other forms of compensation were provided to the participants for taking part in the study.

Result

This Quasi Experimental study was carried out in the Department of Paediatric Surgery, Sylhet MAG Osmani Medical College Hospital from September, 2022 to February, 2024. The primary objective was to compare the outcome between collagen sheet dressing with paraffin gauze and 1% SSD cream dressing in superficial dermal burn in children. A

total number of 110 admitted paediatric patients (≤12 years) with superficial dermal burn (burn surface area ≤15% of total body surface area) were included in the study. The patients were classified into two groups. After initial management, patients of Group-A were managed with 'collagen sheet dressing' (n=55) and patients of Group-B were managed with 'paraffin gauze and 1% SSD cream dressing' (n=55). Appropriate statistical techniques were applied as per requirement for data analysis. Results are presented with tables and graphs where required. The findings are documented. Table-1 showed that the age of all patients was divided into three classes. "Minimum age of the respondents was 3 months and maximum were 144 months. Age in both groups were similarly distributed. Our figure 1 showed that 54.5% were male in Group A, while in Group B, 49.1% were male. Female were 45.5% in Group A and 50.9% in Group B. Both groups had a statistically non-significant difference in gender distribution. have non-significant gender distribution. Table 2 showed that the majority of study children resided in rural areas (76.4%). Both groups did not differ significantly regarding residence status. Table 3 shows the primary site of burn injury; in addition, 58.2% of patients had multiple-site burns. Most burns were due to moist heat (87.3%). Burn description regarding site of injury, cause and size is distributed as shown. Table 4 showed that three patients (5.5%) from group-A had developed burn wound infection, while in group-B, eight patients (14.5%) had burn wound infection. Though wound infection rate was relatively high in group B in contrast to group A but it was statistically not significant (p>0.05). Table 5 showed that wounds of maximum study patients from both groups were healed at 28-days of intervention (98.2% in group-A and 96.4% in group-B). Although most wounds in both groups were healed earlier but at the end of observation the healing status result was statistically not significant (p>0.05). Table 6 showed that the healing time was significantly shorter in collagen sheet dressing than Paraffin gauze and 1% SSD cream dressing. Although healing time difference between the two groups was narrow, it was statistically significant (p<0.05). Table 7 showed that the duration of hospital stay was significantly shorter in collagen sheet dressing than Paraffin gauze and 1% SSD cream dressing. They needed to stay in the hospital for a longer period . This difference was statistically significant (p<0.05). Table 8 showed that the total cost of dressing materials. According to sheet size the price of collagen sheet appeared to be high. But frequent dressing needed huge dressing materials in paraffin gauze and 1% SSD cream dressing group. At the end of treatment up to wound healing the total cost was found nearly same which was statistically not significant between groups (p>0.05). Table 9 showed that the number of dressings was significantly lower in collagen sheet dressing than Paraffin gauze and 1% SSD cream dressing (p<0.05).

Table-1: Distribution of the study subjects by age (N = 110)

Age group (years)	Group A (N=55) n (%)	Group B (N=55) n (%)	Total (N=110) n (%)
≤1 year	7 (12.7)	6 (10.9)	13 (11.8)
>1 year to 5 years	35 (63.6)	35 (63.6)	70 (63.6)
>5 years	13 (23.6)	14 (25.5)	27 (24.5)

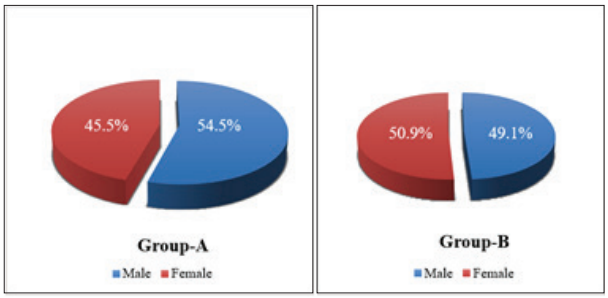


Figure 1: Distribution of the study subjects by gender (N = 110)

Table-2: Residence distribution of the study patients (N=110)

Residence	Group A (N=55) n (%)	Group B (N=55) n (%)	Total (N=110) n (%)
Urban	10 (18.2)	16 (29.1)	26 (23.6)
Rural	45 (81.8)	39 (70.9)	84 (76.4)

Table-3: Distribution of the study subjects by burn description (N = 110)

Variables	Group A (N=55) n (%)	Group B (N=55) n (%)	Total (N=110) n (%)
Site of injury			
Chest	15 (27.3)	16 (29.1)	31 (28.2)
Abdomen	10 (18.2)	5 (9.1)	15 (13.6)
Back & Buttocks	12 (21.8)	18 (32.7)	30 (27.3)
Arm front	3 (5.5)	4 (7.3)	7 (6.4)
Both arms	6 (10.9)	3 (5.5)	9 (8.2)
Leg front	3 (5.5)	5 (9.1)	8 (7.3)
Both legs	6 (10.9)	4 (7.3)	10 (9.1)
Cause of burn			
Dry heat	6 (10.9)	8 (14.5)	14 (12.7)
Moist heat	49 (89.1)	47 (85.5)	96 (87.3)
Size of burn (TBSA %), Mean	9.67	9.07	9.37

Table 3 presents the primary anatomical site of burn injury. In addition, 58.2% of patients had burns involving multiple sites; these patients were classified under their primary site for this table.

Table 4: Comparison of study groups by burn wound infection (N=110)

Variables	Group A (N=55) n (%)	Group B (N=55) n (%)	Total (N=110) n (%)	p-value
Burn wound infection				
Yes	3 (5.5)	8 (14.5)	11 (10.0)	0.112
No	52 (94.5)	47 (85.5)	99 (90.0)	

Table 5: Comparison of study groups by healing status at 28 days (N=110)

Variables	Group A (N=55) n (%)	Group B (N=55) n (%)	Total (N=110) n (%)	p-value
Healing status after 28 days				1.000
Healed	54 (98.2)	53 (96.4)	107 (97.3)	
Not healed	1 (1.8)	2 (3.6)	3 (2.7)	

Table 6: Comparison of study groups by duration of complete healing time (n=110)

Group	Healing Time (days)Mean ± SD	p-value
Group A (N=55)	11.87 ± 5.04	0.027
Group B (N=55)	13.11 ± 4.94	

Table 7: Comparison of study groups by duration of hospital stay (n=110)

Group	Duration of Hospital Stay (days)Mean ± SD	p-value
Group A (N=55)	3.89 ± 2.12	<0.001
Group B (N=55)	8.20 ± 4.71	

Table 8: Comparison of study groups by total cost of dressing materials (n=110)

Group	Dressing Material Cost (BDT)Mean ± SD	p-value
Group A (N=55)	1654.73 ± 914.96	0.216
Group B (N=55)	1454.55 ± 816.19	

Table 9: Comparison of study groups by number of dressings (n=110)

Group	Number of Dressings Mean ± SD	p-value
Group A (N=55)	1.71 ± 1.88	<0.001
Group B (N=55)	3.64 ± 1.27	

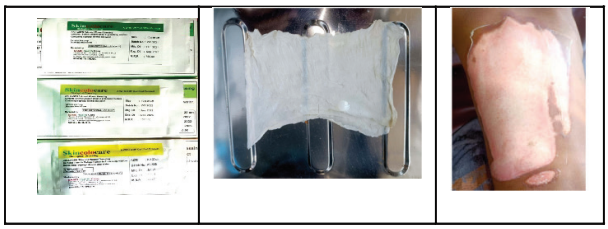


Figure 2. Preparation and Application of Collagen Sheet



Figure 3. Healing Process Following Collagen Sheet Dressing

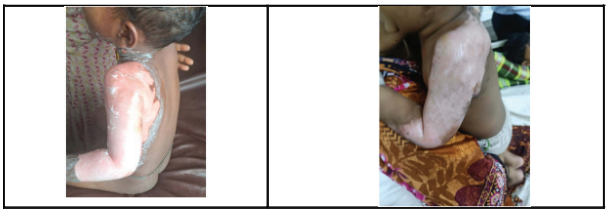


Figure 4. Paraffin Gauze and 1% Silver Sulfadiazine Dressing

Discussion

The ultimate goal of burn wound management is to obtain complete healing in the shortest period and regain near normal cutaneous texture. With the availability of various treatment and dressing options, selecting the most appropriate method for each patient can be difficult. This study aimed to assess the outcomes of collagen sheet dressing compared to paraffin gauze with 1% silver sulfadiazine (SSD) cream dressing for superficial dermal burns in children. A total of 110 pediatric patients (aged ≤12 years) with superficial dermal burns (covering ≤15% of the total body surface area) were included in the study. They were purposively assigned into two groups for comparison. A study in India by Singh and Bhatnagar, (2020) noted a shorter period of complete healing with collagen sheet dressing (59.09% cases within 5-7 days) compared to Paraffin gauze and 1% SSD cream dressing (33.33% cases within 5-7 days) [12]. Similarly, a Bangladeshi study by Dhar et al. (2022) found faster healing with collagen sheet dressing (10.47±2.21 days) compared to 1% SSD cream dressing with roller gauze bandage (13.07±2.22 days, p <0.001) [13]. Mehta et al. (2019), in an Indian study, reported quicker healing with collagen impregnated with 1% SSD cream dressing (7.47±3.13 days) compared to 1% SSD cream with conventional occlusive dressing (12.88±4.91 days, p <0.001) [9]. Devi RL et al. (2019) observed healing on average in 11.80 days with collagen

compared to 17.77 days with silver sulfadiazine [14]. In this study, it was found that collagen sheet dressing significantly reduced healing time compared Paraffin gauze and 1% SSD cream dressing (11.87±5.04 vs 13.11±4.94 days). In the present study, the duration of hospital stay was notably shorter with collagen sheet dressing group compared to Paraffin gauze and 1% SSD cream dressing group as no further dressing changes were needed (3.89±2.12 vs 8.20±4.71 days). Observation for natural healing process with spontaneous detachment of collagen sheet was done. In the collagen sheet dressing group, most patients underwent a single sheet application. Singh and Bhatnagar, (2020) demonstrated that the majority of patients treated with Collagen sheet dressing (90%) required hospital stays of fewer than 2 days, contrasting with only 8.3% of patients with shorter hospital stay in Paraffin gauze and 1% SSD cream dressing group [12]. Similarly, Saxena and Malviya, (2022) reported an average hospital stay of 16.7 days in the silver sulfadiazine group, compared to 13.7 days in the collagen dressing group [15]. Devi RL (2019) found a lower infection rate in the collagen group (13.3%) compared to the silver sulfadiazine group (40%) [14]. Additionally, Singh and Bhatnagar, (2020) reported a low infection rate of 4.5% in the collagen sheet dressing group, with no cases exhibiting signs of systemic sepsis. In this study, three patients (5.5%) in collagen sheet dressing group developed burn wound infections, while eight patients (14.5%) in paraffin gauze and 1% SSD cream dressing group experienced such infections [12]. Though the difference of infection rate between two groups was seemed to be high but it was statistically non-significant. In this study found that the cost of a single collagen sheet dressing is high compared to paraffin gauze and 1% SSD cream dressing. The total cost of dressing materials was found to be statistically similar between groups (1654.73±914.96 vs1454.55±816.19) at the end of treatment. Collagen sheets are typically used only once. No need for further dressing changes and shorter hospital stay could easily offset the initial cost difference (1.71±1.88 vs 3.64±1.27). Multiple dressings were needed in paraffin gauze and 1% SSD cream dressing group that ultimately increased the total cost. Similarly, Mathew et al. (2021) observed that collagen dressing was more cost-effective than 1% SSD cream due to factors such as the need for fewer dressings, shorter hospital stay, reduced pain and decreased time and labor for both the patient and accompanying individuals [16]. Another study in India, Mehta et al. (2019) also observed cost effectiveness in silver sulfadiazine impregnated collagen sheet dressing against other conventional dressing [9].

Conclusion

This study clearly demonstrated that collagen sheet dressing is superior to Paraffin gauze and 1% SSD cream dressing. Early wound healing with lesser hospital stay are significant in collagen sheet dressing. Less wound infection seen in collagen sheet dressing but it was statistically not significant. Single dressing with collagen sheet compared to multiple and frequent dressing changes with paraffin gauze and 1% SSD cream significantly reduce the total cost of dressing materials in the management of superficial dermal burn in children.

Recommendations

Further multicenter randomized controlled studies with larger sample sizes are recommended to validate the findings of this study. Based on the present findings, collagen sheet dressing may be considered a preferable alternative to paraffin gauze with 1% silver sulfadiazine (SSD) cream for the management of superficial and partial-thickness burns.

Limitations

This study has several limitations. Some eligible participants or their guardians were reluctant to accept a new dressing material and showed limited interest in attending repeated follow-up visits, which may have affected participant recruitment and follow-up compliance. In addition, detailed information regarding dietary intake, medication use, and nutritional interventions was not collected, which might have influenced wound healing outcomes. Finally, participants were selected using purposive sampling rather than probability-based sampling, introducing the potential for selection bias and limiting the generalizability of the study findings.

References

1. World Health Organization. 2018. Fact-sheet: Burn (last updated 6 March, 2018), Accessed on 24 February 2023 Retrieved from https://www.who.int/news-room/fact-sheets/detail/burns#:~:text=A%20burn%20is%20an%20injury,hot%20liquids%20(scalds
2. Dissanaike S, Rahimi M. Epidemiology of burn injuries: highlighting cultural and socio-demographic aspects. International review of psychiatry. 2009 Jan 1;21(6):505-11.
3. Jeschke MG, van Baar ME, Choudhry MA, Chung KK, Gibran NS, Logsetty S. Burn injury. Nature reviews Disease primers. 2020 Feb 13;6(1):11.
4. Krishnamoorthy V, Ramaiah R, Bhananker SM. Pediatric burn injuries. International journal of critical illness and injury science. 2012 Jan 1;2(3):128-34.
5. Coran AG, Adzick NS, Krummel TM, Laberge JM, Shamberger R, Caldamone A. Pediatric Surgery E-Book: Expert Consult-Online and Print. Elsevier Health Sciences; 2012 Jan 30.

6. Douglas HE, Dunne JA, Rawlins JM. Management of burns. Surgery (Oxford). 2017 Sep 1;35(9):511-8.

7. Papini R. Management of burn injuries of various depths. Bmj. 2004 Jul 15;329(7458):158-60.

8. Babu M. Collagen based dressings—a review. Burns. 2000 Feb 1;26(1):54-62.

9. Mehta MA, Shah S, Ranjan V, Sarwade P, Philipose A. Comparative study of silver-sulfadiazine-impregnated collagen dressing versus conventional burn dressings in second-degree burns. Journal of Family Medicine and Primary Care. 2019 Jan 1;8(1):215-9.

10. Ramakrishnan KM, Babu M, Jayaraman V, Shankar J. Advantages of collagen based biological dressings in the management of superficial and superficial partial thickness burns in children. Annals of burns and fire disasters. 2013 Jun 30;26(2):98.

11. Clore JN, Cohen IK, Diegelmann RF. Quantitation of collagen types I and III during wound healing in rat skin. Proceedings of the Society for Experimental Biology and Medicine. 1979 Jul;161(3):337-40.

12. Singh A, Bhatnagar A. Management of superficial partial thickness burn with collagen sheet dressing compared with paraffin gauze and silver sulfadiazine. Annals of burns and fire disasters. 2020 Sep 30;33(3):233.

13. Dhar LK, Jahan I, Talukder A, Hossain MA, Kaiser A, Razia S, Sarker B, Anam S, Satter T, Ali A, Bhuiyan MH. A Comparative Study of Collagen Sheet versus 1% Silver Sulfadiazine Dressing in Superficial Partial Thickness Burns. Mymensingh Medical Journal: MMJ. 2022 Jul 1;31(3):649-55.

14. Devi RL. Comparison of Collagen Dressing with Sulfadiazine Dressing in Management of Partial-thickness Burns.

15. Saxena, P.K. & Malviya, V.K., 2022. A comparative study between collagen dressing and silver sulphadiazine dressing in scald burn with special reference to wound healing and hospital stay: A hospital-based retrospective study. International Journal of Health Sciences & Clinical Research, 5(1), 636–640.

16. Patient B. A Comparative Study On Silver Sulfadiazine with Collagen Dressing. Int J Acad Med Pharm. 2026;8(4):88-93.