Original Article

Comparative study for the Result of Using Different Topical Agents in Management of Second Degree Burn

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ABSTRACT

Objective: To determine the best method for second degree burn treatment that provide rapid healing, prevent infection, comfortability, cost and returning the patient to full productivity during treatment period.

Study Design: Comparative study

Place and Duration of Study: This study was conducted at the outpatient private clinic from 20th January 2025 to 31st March 2025.

Methods: This comparative study was done in outpatient private clinic for patients were complaining from burn. Sixty patients were enrolled. These patients were randomly divided into three groups, each group consist of 20 patients. 1st group was managed by topical antibiotic (silver sulfadiazine), 2nd group by oil based herbal paste (MEBO) and 3rd group by hydrocolloid dressing. The outcome measures we investigated in early follow-up for number of dressing changes, conformability and time from treatment until wound healing. In late follow-up we assessed, scar quality after 4 to 6 months from time of burn and cost of treatment.

Results: The mean of time healing regarding patients treated with silver sulfadiazine and MEBO was 8 days, while it was 5 days for patients treated with hydrocolloid. Treatment with hydrocolloid was comfortable in 15 patients (75%), 5 patients (25%) for patients treated with silver sulfadiazine and in 4 patients (20%) treated with MEBO. Three patients used silver sulfadiazine developed hyperpigmentation.

Conclusion: Hydrocolloid has superior early outcomes as compared with other agents in management of second degree burn.

Key Words: Topical agent, Management, Second degree burn, Treatment

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INTRODUCTION

Heat has a significant morbidity and mortality rate when it comes to tissue damage or loss. Burns can result in complex issues that need for specialized care and severe forms of trauma with several variations. Burn injuries are one of the major global health issues. At the United States, there are about 1.2 million burn cases annually, the most of which are mild and handled at an outpatient clinic.[1]

Numerous factors influence how burns are evaluated and treated. The burn type - such as thermal, chemical, electrical, or radiation - comes first.

The second factor is the burn's extent, which is typically represented as a percentage of the total body surface area (%TBSA) affected. Next, the burn's depth is classified as full thickness (third degree), partial thickness (second degree), or superficial (first degree). Lastly, additional factors include the patient's age (less than 10 years old or more than 50 years old), any other medical conditions, whether the burn is in a specific location (the face, eyes, ears, nose, hands, feet, or perineum), and whether there are any other injuries, especially traumatic ones or those related to smoke inhalation.[2-5]

The goals of local burn wound care are to minimize the patient's discomfort while preserving the burn site's surface protection, fostering healing, and limiting the wound's progression.[6]

The common dressings used to cover burn wounds are non-adherent films or fine mesh gauze (in conjunction with topical antimicrobials). However, films, foams, alginates, hydrocolloids, and hydrogels can also be used, depending on the unique requirements of the burn wound and the specific qualities of the dressing (e.g., silver containing). These can be administered directly to the site or over a burn that has been treated with a topical medication.[7] Various wound management have been developed for the treatment of superficial burn.[8]

In addition to having strong biocompatibility and maintaining a moist wound environment, proper wound management also speeds up the healing process.[9]

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Additionally, minimizing pain throughout the healing process and reducing the creation of scars are crucial factors to consider when choosing the best wound dressing.[10] The selection of an appropriate wound treatment product is heavily influenced by cost effectiveness as well.[11]

Most burn injuries can be treated as outpatient cases; topical applications of lotions, honey, aloe vera, or antibiotic ointment can be used to heal superficial burns. Topical antibiotics or occlusive dressings can help reduce pain, enhance healing, and minimize wound desiccation when treating partial thickness burns.[12] However, there is no consensus on which local agents is optimal for burn wound management to prevent or control infection or enhance wound healing.[13] Theses modalities of treatment have different effectiveness in treatment of partial thickness burn injuries, healing time, pain during dressing ,patient comfort, post burn scar and also have different price.

METHODS

This comparative study was done in outpatient private clinic from 20th January 2025 to 31st March 2025 for patients were complaining from burn. Despite the fact that burns are the source of many mishaps at home and at work, there are still no widely accepted guidelines for how to treat them. New goods hit the market every day, all vying to be the most successful. All the patients signed an informed consent form and the patients were studied clinically and evaluated before treatment according to age, cause of burn, site of burn and total body surface area of burn (TBSA). Facial burn, 3rd degree burn wounds and extensive burn patients with more than 20 percent body surface burn area were excluded from this study.

Sixty patients were meeting the eligibility criteria were enrolled. These patients were randomly divided into three groups, each group consist of 20 patients. 1st group was managed by topical antibiotic (silver sulfadiazine), 2nd group by oil based herbal paste (MEBO) and 3rd group by hydrocolloid dressing.

Dressing was done daily in case of silver sulfadiazine and MEBO while every five days in case of hydrocolloid. The change dressing was performed until the wound be healed. The wounds were deemed cured when they became a vibrant pink color, ceased exuding, and showed no signs of healing. The outcome measures we investigated in early follow up for number of dressing changes, conformability and time from treatment until wound healing. In late follow-up we assessed, scar quality after 4 to 6 months from time of burn and cost of treatment.

RESULTS

There were 24 (40%) females and 36 (60%) males (Fig. 1). The age range of those presenting was 1 year to 60 years, with a mean age of 30.3±10.2 years. The cause of burn was scalds (70%) and flame was (30%). The most common site affected by burn was upper limb (50%) followed by lower limb (33%). The average total body surface area was 8%. The main of time healing regarding patients treated with silver sulfadiazine and MEBO was 8 days, while it was 5 days for patients treated with hydrocolloid. Treatment with hydrocolloid was comfortable in 15 patients (75%), 5 patients (25%) for patients treated with silver sulfadiazine and in 4 patients (20%) treated with MEBO. All burn area treated with the three types of treatment return to same normal skin features (color, firmness, hair distribution, except few patients developed hyperpigmentation (Tables 1-3, Figs.1-2.).

Table No.1: Comparison of burn areas among three groups

Burn area	Silver sulfadiazine		MEBO		Hydrocolloid dressing		P value
	No.	%	No.	%	No.	%	
Upper limbs	12	43	10	59	8	53	0.8
Lower limbs	10	36	5	29	5	33	
Trunk	6	21	2	12	2	14	
Total	28	100	17	100	15	100	

Table No.2: Comparison of genders between the three groups

Gender	Silver sulfadiazine		MEBO		Hydrocolloid dressing		P value
	No.	%	No.	%	No.	%	
Male	18	64	12	71	5	40	0.1
Female	10	36	5	29	9	60	
Total	28	100	17	100	15	100	

Table No.3: Frequency distribution of comfortability and its comparison between the three groups

Variable	Silver sulfadiazine	MEBO	Hydrocolloid dressing	P value
Time of healing	9.1±1.3	8.01±1.4	5.1±2.1	0.001
Comfortability				
Yes	7	4	11	0.003
No	21	13	4	
Total	28	17	15	

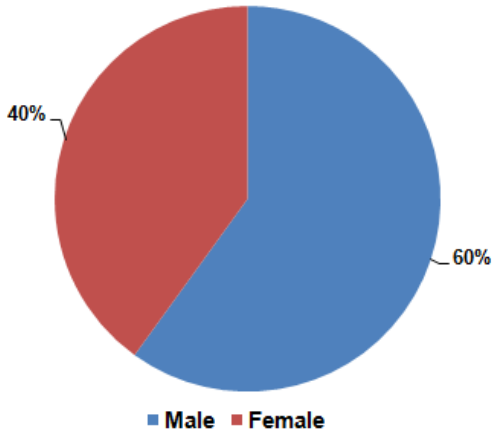

Figure No. 1: Distribution of genders

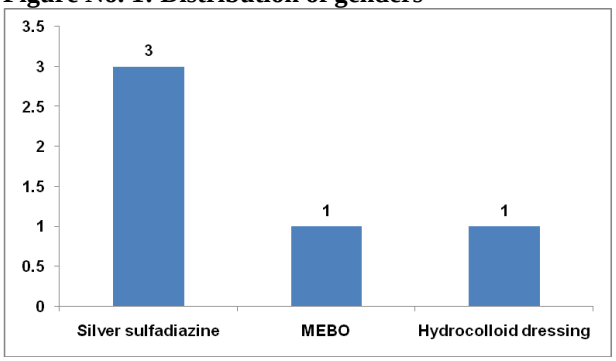

Figure No. 2: Frequency of hyperpigmentation in the three groups

DISCUSSION

According to our study, burn was more common in female (60%) this due to most women spend many hours a day preparing food so there is more chance to get burn and upper limb is the most common site affected by burn although our results regarding gender and site of burn are statically not significant. A study was done by Daryabeigi[14] show that burn was more prevalent in men due to their work and contact with burning substances.

To determine the best method for burn treatment, we must consider the goals of burn treatment, like rapid healing, prevent infection, comfortability, cost and returning the patient to full productivity during treatment period.[15]

Hydrocolloid are wildly used because of it is like in structure to extracellular matrix, it contains many pore so can retain a moist healing environment for angiogenesis that help in healing.[15-16]

Researcher found hydrocolloid had statically significant better wound healing, pigmentation fewer dressing changes and less cost and this go with our study. Researcher found that MEBO is a great burn wound dressing alternative because it reduces bacterial colonization, shortens the wound healing duration, reduces the need for analgesics and antibiotics, and produces better-looking wound healing.[17] While in our study there is no difference in time period of healing between MEBO and silver sulfadiazine.

In the present study, we found that hydrocolloid is more comfortable for patients as other many studies found the same results due to using hydrocolloid improve quality of life by decreasing the pain because of infrequent change dressing.

We found few patients 3 developed hyper pigmentation of skin when using silver sulfadiazine cream and this is due to a side effect of drug or delay in wound healing and secondary skin reaction with hyperpigmentation when using this cream.

CONCLUSION

Hydrocolloid has superior early outcomes as compared with other agent there is no difference in time period no difference in healing period between MEBO and silver sulfadiazine.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Ahmed Miri Saadoon
Drafting or Revising Critically:	Ahmed Miri Saadoon
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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REFERENCES

1. Sanjaya H, Warda A, Better A. Wound care assessment on burn patients. Physiopedia 2012; 1(5): 15-9.
2. Mehta M, Tudor GJ. Parkland formula. Treasure Island: StatPearls Publishing, 2021;11:513790.
3. Sahin C, Kaplan P, Ozturk S, Alpar S, Karagoz H. Treatment of partial-thickness burns with a tulle-gras dressing and a hydrophilic polyurethane membrane: a comparative study. J Wound Care 2019;28(1):24-28.
4. Eyvaz K, Kement M, Balin S, Acar H, Kündeş F, Karaoz A, et al. Clinical evaluation of negative-pressure wound therapy in the management of electrical burns. Ulus Travma Acil Cerrahi Derg 2018;24(5):456-61.
5. Wu YT, Chen KH, Ban SL, Tung KY, Chen LR. Evaluation of leap motion control for hand rehabilitation in burn patients: an experience in the dust explosion disaster in Formosa Fun Coast. Burns 2019;45(1):157-64.

6. Yoshino Y, Ohtsuka M, Kawaguchi M. The wound/burn guidelines - 6: Guidelines for the management of burns. J Dermatol 2016; 43:989
7. Garcia Garcia JA, Gonzalez Chavez AM, Orozco Grados JJ. Topical antimicrobial agents for the prevention of burn-wound infection. what do international guidelines recommend? A systematic review. World J Plast Surg 2022;11(3):3-12.
8. Collier M. Understanding the principles of wound management. J Wound Care 2006; 15: 24-8.
9. Schiefer JL, Daniels M, Grigutsch D, Fuchs PC, Schulz A. Feasibility of Pure Silk for the Treatment of Large Superficial Burn Wounds Covering Over 10% of the Total Body Surface. J Burn Care Res 2020;41(1):131-140.
10. Maurer K, Renkert M, Duis M, Weiss C, Wessel LM, Lange B. Application of bacterial nanocellulose-based wound dressings in the management of thermal injuries: Experience in 92 children. Burns 2022;48(3):608-614.
11. Schiefer JL, Aretz GF, Fuchs PC, Bagheri M, Funk M, Schulz A, Daniels M. Comparison of wound healing and patient comfort in partial-thickness burn wounds treated with SUPRATHEL and epictehydro wound dressings. Int Wound J 2022;19(4):782-790.
12. Lloyd EC, Rodgers BC, Michener M, Williams MS. Outpatient burns: prevention and care. Am Fam Physician. 2012 Jan 1;85(1):25-32. Erratum in: Am Fam Physician 2012;85(12):1127.
13. Norman G, Christie J, Liu Z, Westby MJ, Jefferies JM, Hudson T, et al. Antiseptics for burns. Cochrane Database Syst Rev 2017;7(7): CD011821.
14. Daryabeigi R, Heidari M, Hosseini SA, Omranifar M. Comparison of healing time of the 2 degree burn wounds with two dressing methods of fundermol herbal ointment and 1% silver sulfadiazine cream. Iran J Nurs Midwifery Res 2010 Summer;15(3):97-101.
15. Chaganti P, Gordon I, Chao JH, Zehtabchi S. A systematic review of foam dressings for partial thickness burns. Am J Emerg Med 2019;37(6): 1184-90.
16. Chen G, Zhou Y, Dai J, Yan S, Miao W, Ren L. Calcium alginate/PNIPAAm hydrogel with body temperature response and great biocompatibility: Application as burn wound dressing. Int J Biol Macromol 2022;216:686-97.
17. Hoogewerf CJ, Hop MJ, Nieuwenhuis MK, Oen IM, Middelkoop E, Van Baar ME. Topical treatment for facial burns. Cochrane Database Syst Rev 2020;7(7):CD008058.