

Original Research Article

Biological dressing is a paradigm shift in children's scald burn: our experience

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Received: 02 August 2021

Accepted: 03 September 2021

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ABSTRACT

Background: Burn injury has multiple causes but scald burn is the most common type of burn in children. Prototype of scald burn is hot water burn. Change of burn dressing in children is challenging. Biological collagen dressing has totally changed the management of scald burn or it is a paradigm shift in the management of scald burn in children. Aim of this study was to achieve early wound healing with less complication and to prevent change of frequent dressings in children.

Methods: A prospective study was done in 30 patients of scald burn under 12 years of age between November 2020 to July 2021. Meticulous debridement and derroofing of all blisters and removal of dead skin were performed. Bovine meshed wet collagen dressing was thoroughly rinsed with normal saline three times to remove the preservative isopropyl alcohol. After that collagen dressing applied over the raw area. Paraffin with chlorhexidine impregnated gauze dressing applied over the collagen. First dressing was changed at post operative day five.

Results: All burn wounds healed well between 10-14 days without any complications. In follow up no hypertrophy of skin and almost same skin color had noted.

Conclusions: We conclude that collagen dressing is a paradigm shift in the management of scald burn. It is cost effective, pain less, requires less frequent change of dressing with good match of skin color.

Keywords: Scald burn, Second degree burn, Partial thickness burn, Biological dressing, Collagen dressing

INTRODUCTION

Burn injury has multiple causes but scald burn is the most common type of burn in children.¹ Prototype of scald burn is hot water burn. The severity of burn is decided by the temperature of liquid, duration of contact and viscosity of liquid.² Usually it is second degree (partial thickness) burn, which heals without scarring. Partial thickness burn is very painful with erythematic skin and blisters formation. In most of the cases scald burn do not require skin grafting. It takes 2 weeks to heal. Burn wound which heal within 2 weeks heals without scarring but wound who takes 3 weeks and longer to heal almost always causes scarring.³⁻⁷ There is high susceptibility to get invasive bacterial infection in burn wounds. Infection

related mortality in developing countries is up to 75%.⁸ Change of burn dressing in children is challenging. There is wide variety of fabricated synthetic dressing material available in the market but biological collagen dressing is an ideal dressing in burn wounds.^{9,10} Collagen dressing totally changes the management of scald burn or it is a paradigm shift in the management of scald burn in children. Collagen is essential factor in regeneration, it plays a crucial role in cell adhesion, migration and wound healing.¹¹⁻¹⁴ Collagen dressing has moderate to high absorption capacity, non adhesive and non hydrating in characteristics. This dressing is beneficial in various ways. It provides collagen which helps in faster wound healing with minimal scarring. This dressing covers exposed nerve endings in burn wound hence minimizes

pain to great extent and usually does not require frequent change of dressing.¹⁵ Collagen is natural, non immunogenic and easy to apply over the wound.¹⁶ In follow up, burn wound gets complete epithelialization and pigmentation which leads to better skin color match in comparisons of normal dressing.

Aim and objectives

Aim of this study was to achieve early wound healing with less complication and to prevent frequently change of dressings in children.

METHODS

This observational prospective study was conducted in 30 patients between November 2020 to July 2021 in the department of plastic, aesthetic, burn & reconstructive surgery of Sri. Sai superspeciality hospital Moradabad, Uttar Pradesh. For statistical analysis SPSS software (version 20.0) was used. An inclusion criterion of study was all scald burn patients age range 0-12 years (Figure 1). Exclusion criteria for study were scald burn more than 30% TBSA, age of patient more than 12 years and scald burn after 48 hours of presentation. Informed consent was taken from each patient before participating in the study.



Figure 1: Preoperative scald burn.

Patients were seen in emergency department or outpatient department of plastic surgery. Thorough history and clinical examinations were done. Lund and Browder chart was used to assess the total body surface area. Depth of burn wound was assessed. Informed consent for surgical procedure was taken. Through wound wash with room temperature normal saline was done. Washing with normal saline removed all embedded foreign particles and all other products which were applied over the burnt area as a home remedy. Vigilant monitoring of hypothermia was kept. Meticulous and gentle debridement was done. All blisters were deroofed and all dead skin was excised. Wet meshed collagen dressing was chosen according to wound size. Collagen was prepared before applying. During preparation collagen was washed thoroughly with normal saline three times to remove the Isopropyl alcohol preservative completely. Isopropyl alcohol is irritant in wound and causes severe

pain in post operative period. Before applying the collagen dressing, it was tailored according to wound size. There should not be any air bubble between wound and collagen after applying the collagen dressing. Generally air bubbles do not form with meshed collagen but if any air bubble is present between wound and collagen they should be removed by the back end of adson forceps (Figure 2).



Figure 2: Post debridement and collagen dressing.



Figure 3: Post healing results with good color match.

Smooth contact of collagen with raw area is must for epithelialization and wound healing. Collagen dressing was covered with Paraffin chlorhexidine impregnated gauze completely. After that, over dressing with linen gauze and cotton pad and elastomull bandage was applied. Dressing was fixed with micropore tape gently. Analgesic syrup and antibiotic prophylaxis were given to all patients. Less than 10% of burn patients were discharged on the same day after the procedure. First dressing was opened on 5th post operative day and only the over dressing was changed. Collagen inner layer was left undisturbed. Second dressing was changed at 8th postoperative day, until this time most of collagen absorbed and epithelialization of wound already occurred. This dressing was done with Neosporin ointment and paraffin chlorhexidine impregnated gauze. All burn wounds healed well between 10-14 days without any complications. In post op period after 2 months good skin color match without hypertrophy scar were noted (Figure 3).

RESULTS

Age and sex

Out of 30 cases studied, the youngest patient was of 11 months old and the oldest was of 12 years. The maximum numbers of patients (40%) were seen in 1-3 years of age group as depicted in (Figure 4). There were 12 male (40%) and 18 female (60%) as shown in (Figure 5).

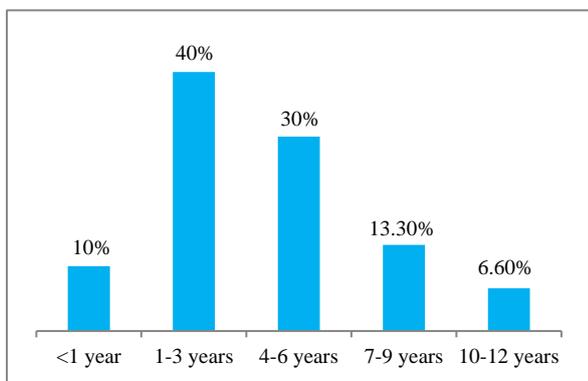


Figure 4: Age-wise distribution of patients.

Body areas affected due to burns

Maximum number of patients 11 (36%) had involvement of Head, neck and trunk areas while 8 (27%) patients had involvement of trunk and lower limbs, 6 (20%) patients had involvement of trunk only and 5 (17%) had involvement of UL, LL and trunk as shown in (Figure 6).

Total body surface area (TBSA) burns

Maximum number of patients 16 (53.6%) were found in this study had 10% of TBSA burn while only 1 patient had 25-30% TBSA burn as shown in (Figure 7).

Etiology

In this study most common etiology was hot water burn seen in 15 (50%) patients and only 1(3.33%) patient had burn due to hot oil as shown in (Figure 8).

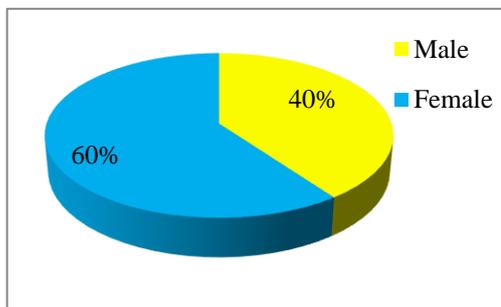


Figure 5: Gender distribution.

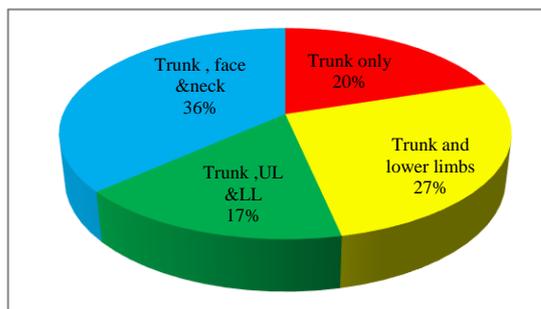


Figure 6: Distribution of patients according body areas affected due to burns.

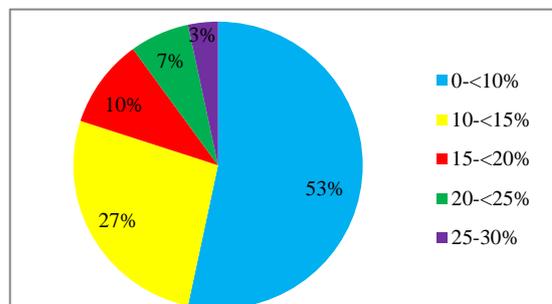


Figure 7: Distribution of patients according to total body surface area (TBSA) burns.

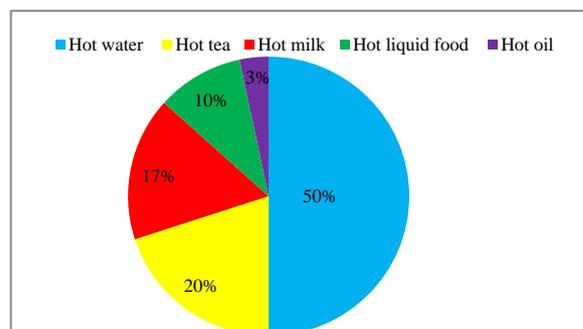


Figure 8: Patient distribution according to burn etiology.

DISCUSSION

Burns are serious health problem globally. In India overall incidence of burn injuries are 6-7 million per year. Out of these 20-25% accounts to pediatric burn due to household accident.¹⁷ Burns are classified according to its depth into four categories- First degree or superficial burn, Second degree or partial thickness, Third degree or full thickness and fourth degree or involving underlying structures. But this classification has more or less theoretical value only.¹⁸ Clinical judgments of burn injury is most valuable, easy, less expensive method to measure the depth of burn wound.¹⁹ This method utilizes some subjective information such as visual appearance of wound, color, capillary refill and sensation to touch and pin prick.^{20,21} Collagen is an important factor in burn wound healing specially in second degree scald burn. Collagen is naturally produced by fibroblast. Collagen helps in wound healing in various ways. It chemo-attract to fibroblast and keratinocyte, which leads to reepithelialization and neovascularization.²² Hence collagen dressing is ideal dressing for burn wound management. In this study most commonly affected age group from the scald burn is 1-3 years. Female children are more prone to scald burn in comparison of male children. Most of the patients have upto 10% TBSA scald burn. Most common etiology of scald burn is hot water followed by hot tea. Krishnamoorthy et al also shown in their study that children under 5 years of age were most commonly affected due to scald burn.²³ This correlates with our study. Lazovic et al concluded that collagen dressing is very useful in first and second degree scald burn specially in childrens.⁹ Waghmare et al also claimed that collagen dressing in scald burn is useful dressing. He found no complication in wound healing in 92% of patients and all wounds healed in between 10-14 days. This study also correlates with our study.¹ There are some limitations of this study. This is a single centre study with a small study group. The result from this study should be validated by a multicenter study in several centers.

CONCLUSION

In this study we concluded that collagen dressing is an ideal dressing for scald burns in children. It is a paradigm shift in the management of scald burn in children. It is cost effective, painless, easy to apply, requires less frequent change of burn dressing, decreases hospital stay. Scald burn wounds heal with very minimal or no scarring and minimize the psychological trauma of patient as well as parents. We did not find any adverse effect of collagen dressing in scald burn in our study.

Funding: No funding sources

Conflict of interest: None declared

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

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Cite this article as: Gupta M, Varshney D. Biological dressing is a paradigm shift in children's scald burn: our experience. *Int Surg J* 2021;8:3339-43.