

# Comparison of Sucralfate, Silver Sulfadiazine, and Chlorhexidine Gluconate in Open Versus Close Partial Thickness Burn Dressing: A Comparative Study

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## Abstract

**Purpose:** The purpose of this study was to compare open versus close partial thickness burn dressing with sucralfate, silver sulfadiazine (SSD), and chlorhexidine gluconate.

**Materials and Methods:** A prospective cross-sectional analytical study was carried out in Paediatric Surgical Ward of a tertiary center of West Bengal in a patient with 1 and 2° burns with close dressing with sucralfate, SSD, and chlorhexidine gluconate for a period of 3 weeks. The outcome was compared with the previous record of hospital in a patient with 1 and 2° burn under the age group of 15 years.

**Results:** Of 30 patients, 12 (40%) and 18 (60%) were male and female, respectively. 28 (93.33%) patients were <10 years of age who sustained the burn injury. The total number of death was observed only in 2 cases (6.66%). While comparing with the previous records of the past 5 years, it was noted that total death occurred in open dressing technique death was recorded in 11 (36.66%) patients.

**Conclusion:** Close dressing of partial thickness injury is better technique in comparison to open dressing to minimize the mortality.

**Key words:** Chlorhexidine gluconate, Close dressing, Partial thickness burn injury, Silver sulfadiazine, Sucralfate

## INTRODUCTION

The main purpose of burn wound healing is to promote early healing and closure. The delayed healing has considerable influence on the long-term quality and cosmosis of a hypertrophic scar. A small scars have been considered negative psychosocial outcomes for children, hence, the importance of effective wound healing techniques.<sup>[1]</sup> There is

a strong relationship between scar formation and time taken to re-epithelialize in children as explained by burn clinicians. Cubison *et al.*<sup>[2]</sup> have explained that the partial thickness burns that reepithelialize within the optimal time period of 10–14 days generally do so without scarring, and those taking >3 weeks will invariably scar. Burns re-epithelializing at between 2 and 3 weeks will have variable amounts of scar tissue laid down depending on many factors including skin type, anatomical location of the burn, and age of the child.<sup>[2]</sup> If the healing takes more than 3 weeks, the risk of scarring is increased.<sup>[2]</sup> However, in case of wound infection, there is delayed healing and followed by scarring and contracture formation thereafter.<sup>[2]</sup> Scars, if situated around a joint, can lead to joint contracture and loss of function, resulting in ongoing scar reconstruction to keep up with the child's growing body.<sup>[3]</sup>

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In the past 3–4 decades, the most commonly practiced method of burn treatment was daily baths, dressing changes, and antiseptic or topical silver sulfadiazine (SSD)-based creams; however, these procedures were very distressing and painful for children even after administration of analgesic.<sup>[4]</sup> It is an established fact that burn wound care procedures are traumatic for children and the resultant stress has been shown to interrupt and delay the cascade of wound healing.<sup>[4]</sup>

Hence, our aim is to minimize the wound infection, contracture formation to nil, and earliest possible rehabilitation. This necessitated that especially in the pediatric population, choosing a dressing that can be applied and removed with minimal pain stress and incidence of infection to the child to restore the rehabilitation at optimal level. Since it was observed that there is higher incidence of wound infection, septicemic shock, and death in open dressing, we tried close dressing and studied the ultimate outcome in terms of morbidity and mortality. A dressing that requires less frequent reapplication has obvious benefits by decreasing the number of dressing change procedures the child has to undergo.

## MATERIALS AND METHODS

This prospective cross-sectional analytical study was conducted in a Paediatric Surgical Ward tertiary health care center of Kolkata, West Bengal, from September 2016 to August 2018 with a sample size of 30. Approval and prior permission for this study were taken from Institutional Ethical Committee. The participant for this study was recruited from Paediatric surgical emergency of tertiary health care center. The outcome was compared with the records of previous 5 years in same age group of child under the age of 15 years.

### Inclusion Criteria

Children who were aged 0–15 years with 1° and 2° burn injury and a burn total body surface is of  $\leq 60\%$  presenting within first 48 h post-injury were included in this study.

### Exclusion Criteria

Children will be excluded from this study if they present >48 h post-burn, have received silver dressings before presentation, present with cold, flu, or viral symptoms, for example, upper respiratory tract infection, have received inappropriate first aid, have known reaction to silver products, and have a cognitive impairment.

### Intervention

The patient was primarily washed with normal saline then dapped with normal saline soaked gauze followed by application of thin film of sucralfate-SSD (with SSD),

sucralfate-chlorhexidine gluconate ointment followed by application of jelonet and light roller bandage. The dressings in all cases will be carried out by staff experienced in burn dressing application. The pain, behavioral scores, hemodynamic status, and respiratory rate will be recorded by the primary investigator before and after the dressing has been applied. The dressing was repeated at an interval of 72 h and was looked for any discharge, smell color change, any slough granulation tissue, and pain sensation. At each dressing change, pain, behavior, and physiological measures (pulse rate and respiratory rate) will be taken before and after dressing removal and before and after the reapplication of a new dressing. The time is taken for the dressing removal, cleaning and reapplication procedure, and quantity of dressings. The time taken for the dressing removal, cleaning and reapplication procedure, the number of nurses required completing the entire procedure, quantity of dressings used, and analgesia given to the participant will be recorded.

The healing process started from 7 days onward. The epithelialization was observed around 21 days. After epithelialization, the wound was kept open for rest of period. The patient was discharged after 4 weeks with an advice of application only moisturizer. Follow-up of the patient was done for 6 months.

This study was compared with previous record of treatment 1°–2°C burn with the age matched same sample size treated in our ward in the past 5 years with the same pharmacological compound by open dressing.

### Observation

Of 30 patients, 12 and 18 were male and female, respectively [Figure 1, Table 1]. Majority of the patients were <10 years of age who sustained the burn injury. So far, mode of injury was maximally with contact with boiling water. The total number of death was observed only in 2 cases (6.66%). While comparing with the previous records of

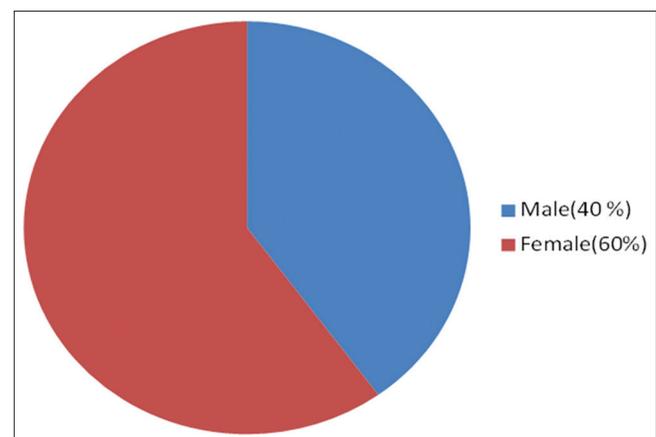


Figure 1: Sex distribution of the patient

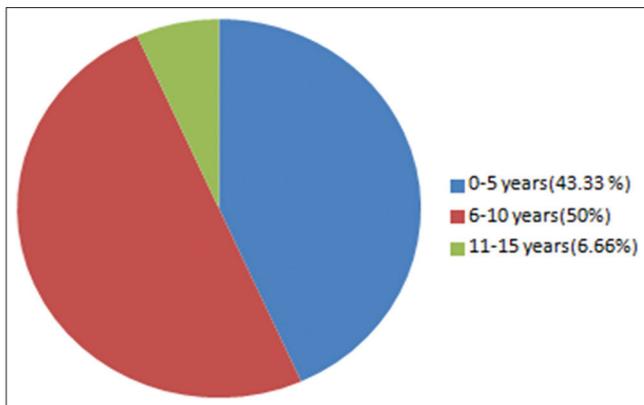


Figure 2: Distribution of patient in different age group

Table 1: Sex distribution

Male (%)	Female (%)
12 (40)	18 (60)

Table 2: Age distribution of the patient

Age group (year)	Number of the patient (%)
0-5	13 (43.33)
6-10	15 (50.0)
11-15	2 (6.66)

the past 5 years, it was noted that total death occurred in open dressing technique death was recorded in 11 (36.66%) patients [Figure 2, Table 2].

## DISCUSSION

Majority of the patient were <10 years of the patient (93.33%). This can be explained by the fact that maximum number of patients were from low-income group residing in one room and crowded population in slum area of city. It was noted that <10 years of age group of child kept confined in one room. A portion of room was used for kitchen purpose. In our study, pain and distress during dressing procedures remain a major challenge while treating acute burn injuries.<sup>[5]</sup> The silver dressing is the gold standard technique in burn dressing. The previous

study clearly depicts these dressings only show benefits using these silver dressings in comparison with SSD creams for burn injuries and is not specific to pediatric or adult patients.<sup>[6]</sup> Therefore, in pediatric silver dressings are associated with lower levels of pain and rapid wound re-epithelialization and are considered imperative and for clinical care and evidence-based practice in this field as well. A strong correlation has been established between the rate of re-epithelialization of a burn wound and the risk of hypertrophic scarring. Partial thickness burn injuries that take healing time 10–14 days are at a very low risk of developing hypertrophic scarring, in comparison to those wounds taking >3 weeks to re-epithelialize are likely to result in hypertrophic scarring.<sup>[2]</sup> Dressings that are comfortable and easy to move in and that require infrequent changes or open type are also beneficial for the pediatric population. Open types of dressing are more prone to get infection, septicemia, and death thereafter. Decrease in pain and distress experienced during a dressing procedure can have positive implications psychosocially for the child as well as encouraging re-epithelialization of the wound within the optimal healing timeframe.<sup>[5]</sup>

Conclusively, it has been found that closed dressing in partial thickness burn injury is better option than that of open type because of faster rehabilitation and lesser mortality.

## REFERENCES

1. Van Baar ME, Polinder S, Essink-Bot ML, Van Loey NE, Oen IM, Dokter J, *et al.* Quality of life after burns in childhood (5-15 years): Children experience substantial problems. *Burns* 2011;37:930-8.
2. Cubison TC, Pape SA, Parkhouse N. Evidence for the link between healing time and the development of hypertrophic scars (HTS) in paediatric burns due to scald injury. *Burns* 2006;32:992-9.
3. Robert R, Meyer W, Bishop S, Rosenberg L, Murphy L, Blakeney P. Disfiguring burn scars and adolescent self-esteem. *Burns* 1999;25:581-5.
4. Gravante G, Caruso R, Sorge R, Nicoli F, Gentile P, Cervelli V. Nanocrystalline silver: A systematic review of randomized trials conducted on burned patients and an evidence-based assessment of potential advantages over older silver formulations. *Ann Plast Surg* 2009;63:201-5.
5. Miller K, Rodger S, Kipping B, Kimble RM. A novel technology approach to pain management in children with burns: A prospective randomized controlled trial. *Burns* 2011;37:395-405.
6. Wasiake J, Cleland H, Campbell F. Dressings for superficial and partial thickness burns (review). *Cochrane Database Syst Rev* 2008;2008:1-85.

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