Article published online: 2023-07-12

Study to Determine the Effect of Diaper-Based Wound Care Method in Reducing Wound Contamination Period in Patients Suffering from Perianal Burn Wound

Chandrashekhar Subhash Chalwade[1] Abhijeet D. Sawant[2] Ishita Katyal[3]

[1] Department of Plastic and Reconstructive Surgery, Seth G.S Medical College and K.E.M Hospital, Mumbai, Maharashtra, India
[2] Department of Surgical Oncology and Plastic Surgery, Tata Memorial Hospital, Mumbai, Maharashtra, India
[3] Department of Plastic and Reconstructive Surgery, Topiwala National Medical College and BYL Nair Hospital, Mumbai, Maharashtra, India

Address for correspondence Chandrashekhar Subhash Chalwade, MS, FCPS, MCh, Department of Plastic and Reconstructive Surgery, Seth G.S Medical College and K.E.M Hospital, Mumbai 400012, Maharashtra, India (e-mail: drcschalwade@gmail.com).

Indian J Plast Surg 2023;56:378–381.

Abstract

Background Local wound care in perianal burn wounds is difficult owing to the risk of contamination from fecal soiling. The problem is aggravated in small children and bedridden critical patients who are unable to convey passage of stools. We used diaper-based wound care to reduce contamination.

Materials and Methods We used ethylene trioxide sterilized diaper-based dressings in such patients. These were changed at 6-hour interval. Total and mean prevented period of contamination was noted as primary objective parameters. Time to heal, maceration of surrounding skin, and wound culture swab results were noted as other parameters.

Result The diaper-based wound care led to reduced mean daily and total contamination period.

Conclusion This diaper-based wound care method reduces contamination period of perianal wounds in patients suffering from perianal burn.

Keywords
- perianal burn
- diaper-based wound care
- wound contamination

Introduction

Most perianal burns are part of larger injuries. Scald burns are typical for children, whereas flame and chemical burn happens more often in adults.[1,2] Wound care of perineal burn poses many challenges. When these burns occur in small children or patients who are unable to convey soiling of perineal dressings because of passage of stools, it leads to maceration of surrounding skin, wound contamination, and increased probability of invasive infection.[1–4]

We thought that if we could use diapers as disposable, sterile, nonadherent dressing that can be replaced at regular interval easily, it will reduce the contamination period and maceration. Compared with the conventional dressing methods that are usually changed every 24 hours, because of the ease of change of diaper-based wound care, it will be possible to employ a scheduled dressing change at 6-hour interval.

Materials and Methods

This study was conducted in the burn department affiliated to a tertiary care center over a period of 18 months. Informed consent and consent for photography were obtained from all patients or their legal guardian. The authors assert that all procedures contributing to this work comply with the ethical

article published online
July 12, 2023

DOI https://doi.org/10.1055/s-0043-1770787.
ISSN 0970-0358.

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

standards of the relevant national and institutional guidelines on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

It is a prospective, descriptive case series study. The study objective was to determine the effect of diaper-based wound care method in reducing wound contamination period (daily mean and total) in patients suffering from perianal burn wound.

Patients who suffered perianal burns that were largely second-degree burn and were unable to convey passage of stools were included in the study. Patients who had a total burn surface area over 30% or whose large part of wound were third or fourth degree burn or had significant comorbidities were excluded from the study. Patients satisfying above-mentioned inclusion and exclusion criteria were applied diaper-based dressings. These diapers were Pampers Active Baby-taped diapers made by Procter & Gamble Home Products Private Ltd in India. Most common size used was medium size (6–11 kg) with cost of 12 rupees per diaper. For some patients, large size (9–14 kg) was used that cost 14 rupees per diaper. Approximately 4.6 diapers per day per patient were used (averaged). These diapers were ethylene trioxide sterilized. The burn wound apart from perianal area was dressed as per institutional protocol that is considered as conventional dressing method in this study. It includes 1% silver sulfadiazine cream, nonadherent gauze covered with absorbent Gamjee roll that is secured with roller bandages. The perianal area is covered with these diapers whose inner layer was coated with thin layer of liquid paraffin and 1% silver sulphadiazine cream (►**Fig. 1**). This diaper dressing was replaced every 6 hours with another similar diaper dressing. Rest of body dressing was not changed. In case of soiling because of passing of stools, the remaining number of hours to next day dressing time were recorded as **T** (number of hours of prevented contamination or soiling period). Total prevented contamination period was calculated and was averaged to mean daily prevented contamination period.

Maceration around wound edge and time to heal were also noted. The maceration was noted around the wound edges as nil (0), minimum (<1cm), moderate (1–3 cm), and severe (>3 cm). These factors were noted till perianal wounds healed (►**Fig. 2**). The findings were averaged to per day number of hours for which contamination of the wound was prevented and were recorded in master sheet. The time to heal (complete epithelialization) for part of the wound which was covered with diapers was noted as number of days. Weekly wound swabs were taken from the perianal part of wound that clinically appeared to be most likely infected. The results were noted in case record form.

Any replacement of the diaper dressing apart from those planned in the study (either due to irritability of the child or due to noticing of passage of stools by parents or hospital staff) was not included for data to be recorded, as these dressings would have been changed in conventional wound care too and it would have led erroneous increase in the prevented contamination period.

The data was analyzed statistically to calculate mean, mode, and range.

Results and Analysis

Out of the total 26 patients enrolled in the study, 8 were females and rest were males. Mean age of patients was 22.6 months with a range of 4 and 36 months. Commonest mechanism of burn was scald burn (22), while it was flame

Fig. 1 (**A**) A patient with perianal burn wound; (**B**) Wound apart from perianal area (covered with diaper-based dressing) dressed as per conventional protocol; (**C**) Diaper-based dressing applied to perianal burn wound.

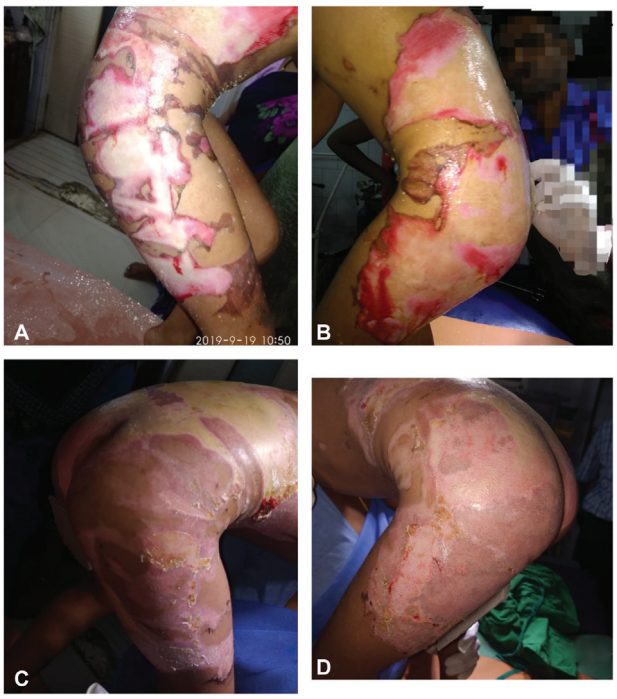

Fig. 2 (**A, B**) A patient with perianal burn wound on day 4; (**C, D**) Same wound on day 12 showing minimal maceration and good healing.

burns for the remaining four patients. Mean total body surface area was 17 with a range of 5 and 28 (standard deviation [SD]: 5.87). Their wounds healed in an average 13.65 days with range of 10 and 17 days (SD: 2.17 days; ►**Table 1**).[5]

Average total duration of prevented contamination till wound healing was 103.15 hours with a range of 78 and 144 hours (SD: 14.69 hours). Average mean duration per day of prevented contamination of perianal wound was 7.656 hours with a range of 5.2 and 10.2 hours (SD: 1.117 hours).

Of total 55 wound swabs sent for cultures, only 4 were positive. The isolated microorganism in these was pseudomonas aeruginosa in two cases and *Klebsiella pneumoniae* in two cases.

Only four of twenty-six patients had moderate maceration (1–3 cm). Two of them had loose motions. Rest of the 22 patients had either no or minimal maceration.

Discussion

Despite advances in burn wound management, wound care of perineal region burn is a major challenge to surgeons involved in burn care.[1–4] Many of the wound care methods in other parts of body are being kept in place for more than a day or two. The rationale was maintenance of moist, aseptic environment with less disruption of body's healing mechanism.[6]

Perianal area along with gluteal region has a unique difference in requirement in terms of wound care that it is frequently a source of wound contamination because of passage of stools.[2] Often the problem is compounded if patient experiences antibiotic-related diarrhea. A diverting colostomy[7,8] or a nonsurgical fecal diversion[9,10] has been well described in literature. Bordes et al have working recommendations for perineal burn wound.[11] All these point to the need for management of fecal contamination in perianal burn wound care. Some surgeons prefer open method of wound care for the ease of access, which will allow cleaning, and reduce contamination and maceration.

Diapers have been described as an effective dressing for patients undergoing arthroscopy.[12] We used diaper-based dressing method as described above. We believe it would have the benefits of closed wound care while simultaneously

Table 1 Descriptive analysis

Sr. no	Age in months	Gender	Mechanism of burn	TBSA	No. of days for healing	Total duration of prevented contamination in no. of hours	Average (daily) duration of prevented contamination in no. of hours (T mean)	Wound swabs (number sent, positive (P) or negative (N) for bacterial growth	Maceration around wound edge (averaged) No = 0, minimal <1cm, moderate >1cm–3 cm, severe >3cm	Comment
Number	26	M = 18 F = 8	Scald = 22 Flame = 4					Total swabs = 55 Positive =3 Negative = 52	No= 4 Minimal = 18 Moderate = 4 Severe = 0	2 patients had loose motions
Mean	22.65			17	13.65	103.153846	7.656			
Mode	36	M	Scald	20	13	108	7.5	Negative	Minimal	
Min	4			5	10	78	5.2			
Max	36			28	17	144	10.2			
SD				5.87	2.17	14.6988	1.117			

Abbreviations: SD, standard deviation; TBSA, total body surface area.

reducing contamination of the wound and maceration of the surrounding skin.

Dressing change when fecal soiling occurs is desirable but frequently impractical. In conscious, cooperative adult patients, one may be able to minimize if not prevent this contamination, but in population where patient is unable to convey the motion (small children, unconscious, critical or comatose patients) contamination is difficult to minimize.

The diaper-based dressings that we used were easy to change. It reduced the contamination period.

Conclusion

The diaper-based wound care method reduces wound contamination period in patients suffering from perianal burn wound. For perianal burn wounds, this method can become a practical alternative to conventional dressing method because of its ease of application.

Place of Study

The study was conducted at Burn Unit, Kasturba Hospital, Mumbai.

Authors' Contributions

We ascertain that all authors have contributed to the study.

Statement of Conforming to the Declaration of Helsinki

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

CTRI Status

This study was not registered on CTRI.

Conflict of Interest

None declared.

References

1 Angel C, Shu T, French D, Orihuela E, Lukefahr J, Herndon DN. Genital and perineal burns in children: 10 years of experience at a major burn center. J Pediatr Surg 2002;37(01):99–103
2 Michielsen DP, Lafaire C. Management of genital burns: a review. Int J Urol 2010;17(09):755–758
3 Hoshino T, Enomoto Y, Inoue Y. Association between perineal burns injury and in-hospital mortality: a retrospective observational study from the nation-wide burn registry in Japan. J Burn Care Res 2022;43(02):419–422
4 Bangma CH, van der Molen ABM, Boxma H. Burn to the perineum and genitals: management, results and function of the thermally injured perineum in a 5-year-review. Eur J Plast Surg 1995; 18:111–114
5 https://www.openepi.com/Power/PowerCC.htm
6 Palmer Q Bessey, Chapter 11 - Wound care, Editor(s): David N. Herndon, Total Burn Care (Third Edition), W.B. Saunders, 2007, Pages 127–135, ISBN 9781416032748. https://doi.org/10.1016/B978-1-4160-3274-8.50014-3. (https://www.sciencedirect.com/science/article/pii/B9781416032748500143
7 Quarmby CJ, Millar AJ, Rode H. The use of diverting colostomies in paediatric peri-anal burns. Burns 1999;25(07):645–650
8 Price CE, Cox S, Rode H. The use of diverting colostomies in paediatric peri-anal burns: experience in 45 patients. S Afr J Surg 2013;51(03):102–105
9 Bordes J, Goutorbe P, Asencio Y, Meaudre E, Dantzer E. A non-surgical device for faecal diversion in the management of perineal burns. Burns 2008;34(06):840–844
10 Kement M, Acar HA, Barlas IS, et al. Clinical evaluation of a temporary fecal containment device for non-surgical fecal diversion in perineal burns. Ulus Travma Acil Cerrahi Derg 2011;17 (02):123–127
11 Bordes J, Le Floch R, Bourdais L, Gamelin A, Lebreton F, Perro G. Perineal burn care: French working group recommendations. Burns 2014;40(04):655–663
12 Kapila A, Bhargava A, Funk L, Copeland S, Levy O. "Wet Diapers - Dry Patients": An effective dressing for patients undergoing arthroscopic shoulder surgery. Arthroscopy. 2005 Feb;21(02):253–255

