

Effect of Colostrum Dressing on Second-Degree Burn Wounds

Majid Ismayilzade, Halil Ibrahim Canter

ABSTRACT

OBJECTIVES: Although there are 2 categories of second-degree burn injuries (deep and superficial), the course of treatment is primarily determined according to the healing response of the burned area. The search for low-cost, useful, and highly effective wound care materials for patients with second-degree burns is still ongoing. In this study, we assessed the effects of a topical bovine colostrum on the healing process of patients with second-degree burn injuries.

MATERIALS AND METHODS: Patients with second-degree burn injuries received paraffin gauze dressing (Bactigras) impregnated with the cream Corakjn, which contains bovine colostrum. We noted localization, cause of the burn, and percentage of burn surface area. On day 7, day 14, and day 28 of treatment, we determined the rate of wound healing after the closed wound dressings were reapplied in 3 days.

RESULTS: Most patients in our study had upper limb and chest area burns. The mean percentage of burn surface area was 17.8%. The most common etiological factor was exposure to hot liquid. The mean rate of wound healing was 66.7% on day 7, 85.5% on day 14, and 93.1% on day 28.

CONCLUSIONS: Favorable effects of colostrum were demonstrated in this observational clinical trial with a small population. Further comparative studies with a large population will contribute positively to the literature.

KEY WORDS: *Bovine colostrum, Second-degree burn injury, Topical application*

From the Department of Plastic and Reconstructive and Aesthetic Surgery, Istinie University Faculty of Medicine, Istanbul, Turkey

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CORRESPONDING AUTHOR: Majid Ismayilzade, Department of Plastic and Reconstructive and Aesthetic Surgery, Istinie University Faculty of Medicine, Istanbul Turkey

Phone: +90 539 228 44 82 **E-mail:** mecidismayilzade@hotmail.com

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INTRODUCTION

Although burn injuries involve the skin and subcutaneous tissues, the trauma is comprehensive, affecting the whole organism as a result of depth of the burn, surface area, the causative agent, infections that may develop during follow-up, and metabolic and hemodynamic conditions.¹ Although burns can be classified in different ways, depth and width of the burn are most important, especially for treatment and patient management. Although the width of the burn can dictate priorities of interventions, which can involve patient fluid loss, the depth of the burn is more important in the prognosis of burn area recovery. First-degree burns occur most often as a result of sun exposure or sudden flame exposure, and they are superficial at the epidermis level.^{2,3} The entire epidermis and some layers of the dermis are damaged by the burn in second-degree burn injuries, in which blisters are commonly seen.^{2,3} Full-thickness burns, which include all layers of skin, are seen with third- and fourth-degree burns, and surgical intervention should be planned as the first option.⁴⁻⁶

Although second-degree burn injuries are divided into deep and superficial, treatment is mostly determined according to response of wounds. Frequently applied treatment methods for second-degree burn injuries include secondary healing with a proper wound care. Several studies have reported on the use of wound dressing materials consisting of collagen and similar substances in secondary wound care.⁷⁻¹⁰ These dressing materials are both expensive and have the potential to cause different interactions, depending on the degradation time. Therefore, the search continues for inexpensive, practical, and maximum effective care materials for wound care for patients with second-degree burns.

Colostrum is the secretion produced by the mammary gland immediately after birth and provides nutrition to babies. Colostrum also increases the body's protection against pathogens, ensures the development of the immune system, and enables the growth, maturation, and repair of many tissues.¹¹ In the literature, the therapeutic

effects of colostrum in immune disorders, cardiovascular diseases, allergies, and hematological disorders have been demonstrated.¹² Topical applications of colostrum have also had favorable effects on wound healing, especially with regard to its anti-inflammatory properties.¹³ In this study, we evaluated the effects of topical application of bovine colostrum on the healing process in patients with second-degree burn injuries.

MATERIALS AND METHODS

For this study, we considered patients with second-degree burn injuries seen in our department between 2022 and 2023. Patients underwent conventional wound care for 10 days; patients who showed no sign of healing were included in our study. Patients with accompanying diseases, smokers, and those with irregular follow-up were excluded. Written consent forms were obtained from patients, and the study was conducted according to the principles in the Declaration of Helsinki.

Wounds with necrotic tissues were subjected to debridement. Thereafter, samples were taken from the wounds and antibiotherapy was determined. A paraffin gauze dressing (Bactigras) impregnated with the cream Corakjn, which includes bovine colostrum, was applied to the wounds. We reviewed percentage of burn surface area, cause of the burn, and localization. After closed wound dressings were reapplied in 3 days, the wound healing rates at days 7, 14, and 28 of treatment were determined. Wound healing rate was calculated as burn wound area minus the unhealed wound area divided by the percentage of the burn wound area (Figure 1).

RESULTS

Ten patients who meet the criteria of second-degree burn injury were included in this retrospective study. The mean age was 38.3 years; male-to-female ratio was 6:4. Among our patients, 70% had a burn injury in more than 1 anatomical area. Areas mostly affected were the upper limb, followed by the chest area. The mean percentage of burn

surface area was 17.8%. The most common etiological factor was exposure to hot liquid.

The mean rate of wound healing was 66.7% on day 7, 85.5% on day 14, and 93.1% on day 28. Patients showed no side effect from colostrum, and no complications were reported. Figure 1 and Figure 2 show the healing effects of bovine colostrum.

DISCUSSION

Several studies have investigated the healing effects of both synthetic and biological materials on burn wounds. Recently, Tarff and colleagues found that topical application of bovine colostrum facilitated corneal reepithelialization

FIGURE 1. Calculation of Wound Healing Rate



FIGURE 2. Second-Degree Burn Injury, Including Superficial Layer Components, in Back Area of 34-Year-Old Patient



A, Before the topical colostrum application. **B,** Day 10. **C,** Day 17 results after topical colostrum application.

FIGURE 3. Second-Degree Burn Injury Including Deep Layer Components in Inner Arm Area of Pediatric Patient**A, Day 5. B, Day 10. C, Day 15. D, Day 20** results during Corakjn cream application.

and wound healing by suppressing the inflammatory process in an ocular alkali burn model.¹⁴ The important effects of colostrum on wound healing may be associated with its anti-inflammatory pathways. Bovine colostrum contains several bioactive ingredients, such as immunoglobulins, enzymes, cytokines, lactoferrin, growth factors, and vitamins.¹⁵ Growth factors can facilitate effects on wound healing. In a 2024 review, Yalçintaş and colleagues stated that these growth factors significantly affect the tissue repair process and cell proliferation.^{16,17} In our study, we tried to benefit from the constructive effect of colostrum on second-degree burn wounds of patients who had limited or no clinical response to conventional methods. At the end of 1 month, we observed successful epithelialization in the burn areas of almost all patients.

Although many materials are recommended for the care of burn wounds, in practice, the process of changing dressings is painful for patients. Having a fewer number of dressings and having longer intervals between dressings can provide comfort for patients. Although rarely performed, a clinical study that compared the effects of colostrum on deep wounds has been conducted. In their study, Kshirsagar and colleagues reported that colostrum dressings are more practical because less dressings are needed and wound healing is promoted.¹⁸ In our study, dressing changes were applied every 3 days and application of routine dressings, which is generally performed every other day, was avoided.

There are different brands of creams containing bovine colostrum, depending on the percentage of colostrum. Although the Corakjn brand that we used in our study contains 4%, other creams contain colostrum in the range of 5% to 10%. More studies are needed that compare the effects of these percentages on wound healing. If applied topically to the wound, colostrum cream may leave a

cement-like residue on the wound site, and patients should be warned about this clinical presentation. In addition, it is important for patients to be informed about cleaning the previous dressing residues and then applying the new cream if they perform the dressings themselves. The cement-like layer in wounds containing dense exudate may contribute to the accumulation of fluid underneath. Therefore, the use of this cream in the early stages of a burn is perhaps not recommended.

Although patients with only second-degree burn injuries were included in our study, the width of burn areas was not considered as a distinguishing feature. Complete recovery of the wide wounds occurred later because it took longer time to cover a total distance of wound. Thus, wound healing rate was not 100%, even on day 28, because we included some patients with wide burn areas.

CONCLUSIONS

Favorable effects of colostrum were demonstrated in this observational clinical trial with a small population. Further studies with a large population will contribute positively to the literature.

REFERENCES

1. Żwieriełto W, Piorun K, Skórka-Majewicz M, Maruszewska A, Antoniewski J, Gutowska I. Burns: classification, pathophysiology, and treatment: a review. *Int J Mol Sci.* 2023;24(4):3749. doi:10.3390/ijms24043749
2. Yastı AÇ, Şenel E, Saydam M, Özok G, Çoruh A, Yorgancı K. Guideline and treatment algorithm for burn injuries. *Ulus Travma Acil Cerrahi Derg.* 2015;21(2):79-89. doi:10.5505/tjtes.2015.88261
3. O'Brien SP, Billmire DA. Prevention and management of outpatient pediatric burns. *J Craniofac Surg.* 2008;19(4):1034-1039. doi:10.1097/SCS.0b013e318177217c

4. Jeschke MG, van Baar ME, Choudhry MA, Chung KK, Gibran NS, Logsetty S. Burn injury. *Nat Rev Dis Primers*. 2020;6(1):11. doi:10.1038/s41572-020-0145-5
5. Rowan MP, Cancio LC, Elster EA, et al. Burn wound healing and treatment: review and advancements. *Crit Care*. 2015;19:243. doi:10.1186/s13054-015-0961-2
6. Wang Y, Beekman J, Hew J, et al. Burn injury: challenges and advances in burn wound healing, infection, pain and scarring. *Adv Drug Deliv Rev*. 2018;123:3-17. doi:10.1016/j.addr.2017.09.018
7. Palackic A, Duggan RP, Campbell MS, et al. The role of skin substitutes in acute burn and reconstructive burn surgery: an updated comprehensive review. *Semin Plast Surg*. 2022;36(1):33-42. doi:10.1055/s-0042-1743455
8. Widjaja W, Tan J, Maitz PKM. Efficacy of dermal substitute on deep dermal to full thickness burn injury: a systematic review. *ANZ J Surg*. 2017;87(6):446-452. doi:10.1111/ans.13920
9. Pham C, Greenwood J, Cleland H, Woodruff P, Maddern G. Bioengineered skin substitutes for the management of burns: a systematic review. *Burns*. 2007;33(8):946-957. doi:10.1016/j.burns.2007.03.020
10. Shahrokhi S, Arno A, Jeschke MG. The use of dermal substitutes in burn surgery: acute phase. *Wound Repair Regen*. 2014;22(1):14-22. doi:10.1111/wrr.12119
11. Bagwe S, Tharappel LJ, Kaur G, Buttar HS. Bovine colostrum: an emerging nutraceutical. *J Complement Integr Med*. 2015;12(3):175-185. doi:10.1515/jcim-2014-0039
12. Aguilar-Toalá JE, Hernández-Mendoza A, González-Córdova AF, Vallejo-Cordoba B, Liceaga AM. Potential role of natural bioactive peptides for development of cosmeceutical skin products. *Peptides*. 2019;122:170170. doi:10.1016/j.peptides.2019.170170
13. Doillon CJ, Lehance F, Bordeleau LJ, Laplante-Campbell MP, Drouin R. Modulatory effect of a complex fraction derived from colostrum on fibroblast contractility and consequences on repair tissue. *Int Wound J*. 2011;8(3):280-290. doi:10.1111/j.1742-481X.2011.00783.x
14. Tarff A, Drew-Bear LE, Di Meglio L, et al. Effect of topical bovine colostrum in wound healing of corneal surface after acute ocular alkali burn in mice. *Exp Eye Res*. 2022;220:109093. doi:10.1016/j.exer.2022.109093
15. Li Q, Li N, Cai W, Xiao M, Liu B, Zeng F. Fermented natural product targeting gut microbiota regulate immunity and anti-inflammatory activity: a possible way to prevent COVID-19 in daily diet. *J Funct Foods*. 2022;97:105229. doi:10.1016/j.jff.2022.105229
16. Yalçıntaş YM, Duman H, López JMM, et al. Revealing the potency of growth factors in bovine colostrum. *Nutrients*. 2024;16(14):2359. doi:10.3390/nu16142359
17. McGrath BA, Fox PF, McSweeney PLH, Kelly AL. Composition and properties of bovine colostrum: a review. *Dairy Sci Technol*. 2015;96(2):133-158. doi:10.1007/s13594-015-0258-x
18. Kshirsagar AY, Vekariya MA, Gupta V, et al. A comparative study of colostrum dressing versus conventional dressing in deep wounds. *J Clin Diagn Res*. 2015;9(4):PC01-PC4. doi:10.7860/JCDR/2015/12004.5739