

Topical heparin versus Type I collagen application in the treatment of second degree burns

¹. Dr. Siva Prasad Naik R ². Dr. GNL PrasannaBhavani ³. Dr. SSN Moulika

Key words: Burns healing, Topical application, Type I collagen

Date of Submission: 25-01-2023

Date of Acceptance: 08-02-2023

I. Introduction:

Burns are among the oldest injuries that people today experience and have since man first discovered fire. Autogenous skin is still the best material for burn protection. However, the scarcity of suitable donor skin prompted researchers to explore for substances that would temporarily seal wounds. In recent years, it has been routine practise to temporarily close wounds with biological and synthetic materials(1). There hasn't been a comparison study of burns treated with heparin as a topical application and collagen described, despite the fact that the efficacy of heparin (a glycosaminoglycan) and collagen have been examined independently and proved to be efficacious as against usual care with topical SSD. In our hospital context, it was thought necessary to compare the effectiveness of topical heparin to Type I collagen sheets in the care of partial thickness burns as a temporary dressing strategy(2,3).

Aims and objectives:

In order to assess the results of partial thickness burns treated with topical heparin with collagen Type I, the following criteria must be taken into consideration:

1. Patient comfort with regards to factors like pain and itching.
2. Recovery period.
3. The length of the hospital stay.
4. The scar's condition after six months.
5. The cost-benefit analysis.

Materials and Methods:

40 patients with partial thickness burns (2nd degree), who were admitted into the ward were taken into the study. This is a prospective comparative study conducted at Siddhartha Medical College, Vijayawada between 2021 January to 2022 December.

Inclusion criteria:

Patients of age 18-60 years with partial thickness burns of total burn surface ranging from 5% to 25% were included in the study.

Exclusion criteria:

Patients with TBSA >25%, age less than 18 or more than 60, electrical burns, 1st degree and full thickness burns were excluded.

II. Methodology:

Patients were divided into 2 groups A and B. Group A were treated with topical heparin, whereas group B were treated with type I collagen. In group A, Using a 10cc syringe and 25G needle, heparin sodium IP was sprayed onto the cleansed wound at a concentration of 5000 IU/ml. The formula 5000 IU x TBSA / day was used to calculate the dosage of topical heparin. Gauze pieces soaked in this heparin saline were used to cover the burn wound after half of the predicted dose was sprayed over it and the other half was diluted with saline. Bandages were utilised to cover the heparin saline gauze dressing instead of surgical pads. The next day, the dressing was changed, and the same dosage of heparin was used until the wound epithelized. In Group B, In the same manner, the skin was mechanically cleaned; the wound was then treated with 5% povidone and saline. The wound was covered with a sterile wound covering made of collagen. For simple application, the collagen sheet was submerged in saline for a brief period of time. Until wound adhesion was complete, the spread collagen sheets were let to dry in room temperature and air for a few hours.

The data were entered into excel sheets and analysed using Microsoft excel 2013. Informed and written consent was taken from all the participants of the study. The study abides by the guidelines laid by the declaration of Helsinki.

III. Results:

The mean age of the study population was 22.5 ± 8.5 years. Most patients belonged to the age group 21-30 (65%). Males were 22 (55%), females were 18 (45%). 33% had burns of less than 8% TBSA. 40% had burns ranging from 8% TBSA to 15%. Remaining had burns ranging from 16% TBSA to 25% TBSA. Most common cause of burns were flame burns, followed by scald burns. The mean time taken for epithelialization was 10.2 ± 2.2 days in heparin group. The mean time taken for epithelialization for collagen group was 11.8 ± 3.1 days. The difference is statistically significant at $p < 0.05$.

Complication	Heparin	Collagen	<i>p</i>
Wound infection	1	-	0.07
Bleeding	-	-	-
Sensitivity reactions	-	-	-
Visual analogue score (Mean)	3.1	4.6	0.04

1 patient had itching in the collagen group, whereas 4 persons had itching in the heparin group ($p < 0.05$). Scar color was better in heparin group than collagen group ($p < 0.05$).

IV. Discussion:

Although topical heparin and collagen as a biological dressing have both been proven effective in treating partial thickness burns, no randomised control research has been conducted to determine whether treatment is superior. Comparisons have been made using samples collected during periods of shortfall and from various age groups with comparable burns. However, clinical procedures are mostly used to determine whether a partial thickness burn is superficial or deep and are subject to observer variation(4).

Heparin is used to treat burns because of its anticoagulant properties and those of related compounds. Heparin may play a biological role as an anti-inflammatory, anti-angiogenic, and antimetastatic agent, according to recent basic scientific research. More significantly, heparin may accelerate wound healing at the molecular level, which has significant implications for the management of both acute and chronic burn wounds(5). The benefits of heparin's hypothesised anti-inflammatory and improved wound healing capabilities could include less pain (thus better compliance with dressing changes or physiotherapy), infection, length of hospital stay, and mortality in the immediate post-burn environment. Improved function and range of motion in the extremities, less scarring, and perhaps a decrease in psychiatric or psychosocial sequelae could all be long-term advantages of using heparin to treat burn injuries(6).

Collagen also has similar healing properties, which aid in burn wound healing.

V. Conclusion:

Heparin is better in terms of epithelialization time, pain and scar appearance. Collagen was better in terms of itching, wound infection and scar thickness.

References:

- [1]. Wang Y, Beekman J, Hew J, Jackson S, Issler-Fisher AC, Parungao R, et al. Burn injury: Challenges and advances in burn wound healing, infection, pain and scarring. *Adv Drug Deliv Rev.* 2018 Jan 1;123:3–17.
- [2]. Gupta A, Verghese TJ, Gupta P, Gupta AK. Role of topical heparin in the management of burns: experience in a district government hospital of Karnataka in South India. *Plastic and Aesthetic Research.* 2015 May 15;2:111–4.
- [3]. Markiewicz-Gospodarek A, Koziol M, Tobiasz M, Baj J, Radzikowska-Büchner E, Przekora A. Burn Wound Healing: Clinical Complications, Medical Care, Treatment, and Dressing Types: The Current State of Knowledge for Clinical Practice. *Int J Environ Res Public Health.* 2022 Jan 25;19(3):1338.
- [4]. Schaefer TJ, Szymanski KD. Burn Evaluation And Management. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 [cited 2023 Feb 2]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK430741/>
- [5]. Oryan A, Alemzadeh E, Moshiri A. Burn wound healing: present concepts, treatment strategies and future directions. *J Wound Care.* 2017 Jan 2;26(1):5–19.

- [6]. Masoud M, Wani A, Darzi M. Topical heparin versus conventional treatment in acute burns: A comparative study. *Indian J Burns*. 2014;22(1):43.

Dr. Siva Prasad Naik R, et. al. "Topical heparin versus Type I collagen application in the treatment of second degree burns." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 22(2), 2023, pp. 01-03.