Case Report

Case Series: New, Effective, Treatment Choice for Post-Burn Pruritus

Chinaroonchai K, MD[1], Muangman P, MD[1]

[1] Division of Trauma Surgery, Department of Surgery, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand

Background: Pruritus following major burns affects the functional and psychological qualities of life of severe-injury survivors. The treatment for refractory cases is limited, with only fair outcomes.

Objective: This case series evaluated a new choice of treatment for post-burn pruritus cases.

Materials and Methods: Severe, post-burn, pruritus cases at the Burns Unit of Siriraj Hospital were enrolled. A glycerin-based, highly concentrated, collagen lotion was applied in combination with an oral, anti-itching medication to treat severe, post-burn pruritus. Visual analog scale scores for itching, modified Vancouver Scar Scale scores, and the quality of life of all cases were compared pre- and post-treatment.

Results: Five severe, post-burn, pruritus cases participated in this study. After treatment, the subjects' visual analog scores for itching, total itching hours, and quality of life improved.

Conclusion: A glycerin-based, highly concentrated, collagen lotion can improve the skin moisture balance, scar appearance, pruritus-symptom severity, and quality of life of severe post-burn pruritus cases.

Keywords: Post burn pruritus, Burn scar pruritus, Collagen lotion, Post burn pruritus treatment

J Med Assoc Thai 2020;103(Suppl.2): 100-4
Website: http://www.jmatonline.com

Functional and psychological impairments after severe burn injuries inevitably affect the quality of life of patients. They are encouraged to resume their normal daily activities as much as possible after their wounds have healed, but factors other than the physical aspects of wound healing also need to be considered. Having no recurrent wounds does not mean that post-burn victims can live happily, and the presence of scars is one of their major concerns. Not only can scarring affect the cosmetic appearance of post-burn victims, but it might also have psychological ramifications. How can individuals afflicted with severe burns regain self-confidence and self-esteem when their reflections in a mirror are too frightening or revolting to look at? Itching is also a significant problem for post-burn victims, and it is quite challenging to successfully treat. Post-burn itching is found in more than 80% of burn patients, and its severity is influenced by an individual's age, sex, and the percentage of the total body surface area that is affected by the burn[(1)]. The itching associated with post-burn pruritus can lead to new wounds that easily become infected in both normal and previously injured skin; however, most new wounds occur in areas of scarring that are unstable. Scars that have been gained following a recent injury are particularly susceptible to wound recurrence because of the poor strength of the new-tissue components and the presence of hyperinflammatory cytokines that induce itching. Another consequence of the itching accompanying recurrent wounds is poor sleep quality and a disturbance of an individual's daily activities and function.

The pathophysiology of post-burn pruritus is not well understood. Multiple pathways have been found to be involved. Local chemical substances, like histamine, are not the only cause, and there is believed to be some response of the central nervous pathway. As the mechanism for itching differs from those for other conditions like skin disease, the response of itching to antihistamine medications has proven to be mediocre. Consequently, many medications (not just antihistamines) have been used in combination in order to improve their efficacy in controlling itching and to decrease the dose-dependent side effects of single-agent therapy. The most common combination of medications to treat post-burn itching is an antihistamine plus gabapentin. In this regard, certain first-generation antihistamines, like hydroxyzine, have proven to be more effective at relieving itching than other drugs in the same class.

One of the factors affecting the severity of post-burn itching is the post-burn scar condition. A bad or unstable scar makes the itching symptom worse than otherwise. Active scars and an angry scar appearance lead to a strong inflammatory response in the surrounding skin area and the

Correspondence to:
Chinaroonchai K.
Division of Trauma Surgery, Department of Surgery, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.
Phone: +66-2-4197727 to 9
E-mail: ku31829@hotmail.com

How to cite this article: Chinaroonchai K, Muangman P. Case Series: New, Effective, Treatment Choice for Post-Burn Pruritus. J Med Assoc Thai 2020;103(Suppl.2): 100-4.

production of high levels of histamine. Consequently, adequate post-burn scar treatment is one component of the management of post-burn pruritus.

Materials and Methods

This case series was conducted at the Burns Unit, Siriraj Hospital, 2017 to 2018. Patients suffering from severe, post-burn, pruritus symptoms were included. The severity of their itching symptom was measured and evaluated by their visual analog scale (VAS) scores for itching. The severe pruritus group was defined as individuals with a VAS score of more than 5, coupled with the symptoms of a disturbed sleep quality and an effect on their daily activities and function. All patients received standard, post-burn, scar treatment like a pressure garment, silicone gel, and a silicone sheath. Additionally, a glycerin-based, highly concentrated collagen lotion, Stimulen (Southwest Technologies Inc., North Kansas City, MO, USA; distributed by Well Concept Co., Ltd. Thailand; Figure 1) was applied to the patients' skin twice daily for 4 weeks. The VAS scores were measured before using the Stimulen lotion and every week during the 4-week study period; the itchiest skin areas were also photographed every week during that time. A 5-D Pruritus Scale Questionnaire was administered before and after the treatment to assess the severity of itching and quality of life[2]. Moreover, the modified Vancouver Scar Scale was used to evaluate the scarring pre- and post-treatment[3]. Finally, the anti-itching medications administered were recorded at the commencement and conclusion of the treatment program.

Figure 1. Stimulen lotion utilizes a glycerin base and a high concentration of collagen.

Results

The mean age of the 5 burn patients who were enrolled was 46.8 years. One of the five had a severe case of acute post-burn itch (with a duration of <6 months post injury) while the rest had severe cases of chronic post-burn itch (each having a duration of >6 months post injury; Table 1). The average post-injury time was 13.4 months. All 5 patients' VAS scores for itching decreased after treatment, as illustrated in Figure 2. They also reported that their itching severity, determined using the 5-D Pruritus Scale, had decreased over the course of treatment (Figure 3). Moreover, the period of itching fell, while the subjects' sleep quality and quality of life were better (Table 2). In addition, the modified Vancouver Scar Scale scores improved, especially in terms of the pliability aspect (Figure 4). Finally, the dosages of gabapentin for all patients were able to be decreased after treatment, as detailed in Table 3.

Discussion

Almost all post-major-burn survivors suffer with itching[4-6]. Most of them still report the symptom after the closure of the burn wound. Post-major-burn itching has been reported to be aggravated by, and related to, multiple factors[6,7]. For instance, demographic characteristics, like sex and race, have been found to be related to the severity of the itching. The extensiveness of the injury, grafting procedure, time to wound closure, and degree of scarring have also been found to be linked with the degree of itching. The severity of the itching is not only associated with the progression of the burn injuries during a patient's hospital admission, but also to the individual's subsequent living environment and self-care methods (such as the use of hot water bathing), the degree of sweating experienced, and the use of skincare products. The whole pathway of the pathophysiology of post-burn pruritus is still unknown. Numerous factors influence the severity of the itching symptom in individual patients, and no effective tools are currently available to predict the symptom or its severity in real practice.

The itching symptom is believed to be strongly related to having an open wound and post-burn scarring. This encourages most medical personnel who treat burns to focus mainly on treating the wound and the associated scarring

Table 1. Demographic data

Case No.	Age (Year)	Sex	Type of Burn	Post-injury period
1	3	Male	Scald injury	5 months from injury
2	40	Male	Electrical injury	20 months from injury
3	56	Female	Scald injury	13 months from injury
4	66	Female	Scald injury	17 months from injury
5	69	Female	Hot oil	12 months from injury

in the hope that the itching will recede after wound closure or scar maturation. Nevertheless, some patients still report an unbearable degree of itching even though their wounds and scars appear to be healed. This situation is indicative of the multifactorial pathophysiology of post-burn pruritus. The theory of central sensitization, in which abnormal signals are perceived by brain neurons to be an itch, has been used to explain the itch experienced by patients with a severe case of the itching symptom[8,9]. In practice, most post-burn patients are prescribed a first-line drug as an antihistamine agent to relieve the itching symptom in the same way that those medications are typically used for the symptomatic treatment of itching in other disease conditions. Unfortunately, in 80% of post-burn cases, the itching fails to be controlled, despite the patients being administered the maximum antihistamine dosage and experiencing a bothersome sedation side effect[4]. As some of the itch signals are generated via the central sensitization pathway of the brain, we treat severe itch in the same way that we treat chronic neuropathic pain. In detail, we use gabapentin[10] or pregabalin[11], which recent studies have reported has good efficacy to control itching when combined with an antihistamine. However, those studies also reported that a minority of patients failed to respond to that treatment. Such severe or refractory cases have no gold standard treatment. The experimental treatments that have been reported to date combined many types of medication with non-pharmacological approaches, such as a Solanaceae-free diet[12], the use of skin moisturizers and emollients[13], laser treatment[14], and transcutaneous electrical nerve stimulation.

The current research was a pilot study of a glycerin-based, highly concentrated, collagen lotion used as an adjunctive treatment agent for severe, post-burn pruritus. Our results revealed improvements in the subjects' visual analog scale scores for itching, hours of suffering with itching, and sleep quality. These results imply that the subjects gained a better quality of life through the improvements they gained in itch severity. The condition of their scars, including their vascularity and pliability, also improved after 4-weeks of treatment. As well, the daily dosage of gabapentin needed to control itching dropped over the treatment period. Based on our results, the tested lotion was effective in relieving itch severity for both acute and chronic post-burn pruritus cases. The results are interesting, but the sample size was too small to make firm conclusions. A larger clinical trial should be conducted in a randomized manner to provide more information and enable concrete conclusions to be reached.

Conclusion

A glycerin-based, highly concentrated collagen lotion is an option to improve the skin moisture balance,

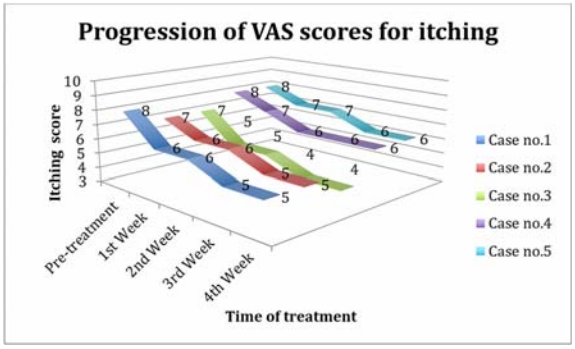

Figure 2. The progression of the VAS scores for itching (VAS = visual analog scale).

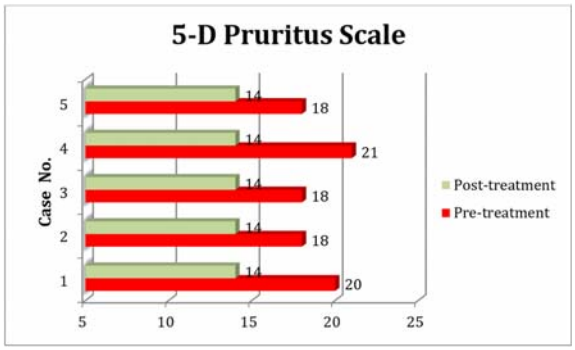

Figure 3. The 5-D Pruritus Scale.

Table 2. Period of itching symptoms and sleep quality pre- and post-treatment

Case No.	Itching hours (hours)			Sleep quality scale	
	Pre-treatment	Post-treatment	Improvement in hours	Pre-treatment	Post-treatment
1	15	12	3	4	3
2	15	12	3	4	3
3	14	12	2	4	3
4	17	12	5	4	3
5	11	9	2	4	3

Sleep quality scale: 1 = never affects sleep; 2 = occasionally delays falling asleep; 3 = frequently delays falling asleep; 4 = delays falling asleep and occasionally wakes me up; 5 = delays falling asleep and frequently wakes me up

Table 3. Medications pre- and post-treatment

Case No.	Pre-treatment		Post-treatment	
	Hydroxyzine (mg/day)	Gabapentin (mg/day)	Hydroxyzine (mg/day)	Gabapentin (mg/day)
1	30	300	30	100
2	30	900	30	300
3	30	600	30	–
4	30	700	30	200
5	30	700	30	300

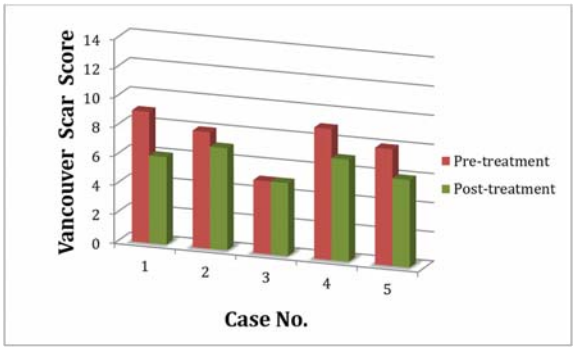

Figure 4. VSS pre- & post-treatment (VSS = Vancouver Scar Scale).

scarring appearance, severity of pruritus symptoms, quality of life, and sleep of severe post-burn pruritus patients.

What is already known on this topic?

Post-burn pruritus is one of the burdensome problems in major burn survival and it makes the quality of life worsen especially sleep quality. Severe and refractory post-burn pruritus has no best standard treatment.

What this study adds?

One of the adjunctive treatment choices in severe and refractory post-burn pruritus.

Acknowledgements

This research project was supported by Mr. Tanut Sornmanapong for facilitate research coordinative process.

Potential conflicts of interest

The authors declare no conflict of interest.

References

1. Zachariah JR, Rao AL, Prabha R, Gupta AK, Paul MK, Lamba S. Post burn pruritus—a review of current treatment options. Burns 2012;38:621-9.
2. Elman S, Hynan LS, Gabriel V, Mayo MJ. The 5-D itch scale: a new measure of pruritus. Br J Dermatol 2010;162:587-93.
3. Fearmonti R, Bond J, Erdmann D, Levinson H. A review of scar scales and scar measuring devices. Eplasty 2010;10:e43.
4. Vitale M, Fields-Blache C, Luterman A. Severe itching in the patient with burns. J Burn Care Rehabil 1991;12:330-3.
5. Carrougher GJ, Martinez EM, McMullen KS, Fauerbach JA, Holavanahalli RK, Herndon DN, et al. Pruritus in adult burn survivors: postburn prevalence and risk factors associated with increased intensity. J Burn Care Res 2013;34:94-101.
6. Van Loey NE, Bremer M, Faber AW, Middelkoop E,

Figure 5. A 69-year-old female sustained burn injuries from hot oil. A) The most itchy skin area before treatment. B) The most itchy skin area after 4 weeks of treatment. The scarring and skin moisture level had improved.

Nieuwenhuis MK. Itching following burns: epidemiology and predictors. Br J Dermatol 2008;158: 95-100.
7. Nedelec B, LaSalle L. Postburn itch: A review of the literature. Wounds 2018;30:E118-24.
8. Ikoma A, Rukwied R, Stander S, Steinhoff M, Miyachi Y, Schmelz M. Neurophysiology of pruritus: interaction of itch and pain. Arch Dermatol 2003;139:1475-8.
9. Goutos I. Neuropathic mechanisms in the pathophysiology of burns pruritus: redefining directions for therapy and research. J Burn Care Res 2013;34:82-93.
10. Ahuja RB, Gupta R, Gupta G, Shrivastava P. A comparative analysis of cetirizine, gabapentin and their combination in the relief of post-burn pruritus. Burns 2011;37:203-7.
11. Ahuja RB, Gupta GK. A four arm, double blind, randomized and placebo controlled study of pregabalin in the management of post-burn pruritus. Burns 2013;39:24-9.
12. Alonso PE, Rioja LF. Solanidine and tomatidine trigger scar pruritus. Burns 2016;42:535-40.
13. Nedelec B, Rachelska G, Parnell LK, LaSalle L. Double-blind, randomized, pilot study assessing the resolution of postburn pruritus. J Burn Care Res 2012;33:398-406.
14. Ebid AA, Ibrahim AR, Omar MT, El Baky AM. Long-term effects of pulsed high-intensity laser therapy in the treatment of post-burn pruritus: a double-blind, placebo-controlled, randomized study. Lasers Med Sci 2017;32:693-701.

กรณีศึกษากลุ่มผู้ป่วย: ทางเลือกใหม่ที่มีประสิทธิภาพดีสำหรับการรักษาอาการคันในผู้ป่วยแผลไหม้

กุสุมา ชินอรุณชัย, พรพรหม เมืองแมน

ภูมิหลัง: อาการคันในผู้ป่วยที่หายจากบาดเจ็บแผลไหม้รุนแรงรบกวนคุณภาพชีวิตทั้งด้านการใช้ชีวิตทั่วไปและด้านจิตใจ ข้อมูลวิธีการรักษาผู้ป่วยที่มีอาการคันแม้ว่าจะได้รับการรักษาด้วยวิธีมาตรฐานไปแล้ว (refractory cases) มีข้อมูลที่จำกัดและรายงานถึงผลการรักษาที่ไม่ดี

วัตถุประสงค์: เพื่อศึกษาทางเลือกใหม่ของการรักษาอาการคันในกลุ่มผู้ป่วยแผลไหม้ที่มีอาการคันแม้ว่าจะได้รับการรักษาด้วยวิธีมาตรฐานไปแล้ว (refractory cases)

วัสดุและวิธีการ: ศึกษาถึงผลของการใช้โลชั่นคอลลาเจนเข้มข้นที่มีกรีเซอรีนเป็นตัวทำละลายทาร่วมกับการให้ยากินลดอาการคันในผู้ป่วยแผลไหม้ที่มีอาการคันรุนแรงแม้ว่าจะได้รับการรักษาด้วยวิธีมาตรฐานไปแล้ว (refractory cases) ในหอผู้ป่วยไฟลวก โรงพยาบาลศิริราช โดยติดตามประเมินเปรียบเทียบ Visual analog score ของอาการคัน, modified Vancouver Scar Scale scores ของแผลเป็น และติดตามระดับคุณภาพชีวิตก่อนและหลังได้รับการรักษา

ผลการศึกษา: ผู้ป่วยแผลไหม้ที่มีอาการคันรุนแรงแม้ว่าจะได้รับการรักษาด้วยวิธีมาตรฐานไปแล้ว (refractory cases) จำนวน 5 รายพบว่าการรักษาด้วยโลชั่นสามารถลด Visual analog score ของอาการคัน, จำนวนชั่วโมงของอาการคัน และเพิ่มระดับคุณภาพชีวิต

สรุป: การใช้โลชั่นคอลลาเจนเข้มข้นที่มีกรีเซอรีนเป็นตัวทำละลายทาในผู้ป่วยแผลไหม้ที่มีอาการคันรุนแรงสามารถเพิ่มความชุ่มชื้นที่ผิวหนัง ทำให้แผลเป็นดีขึ้น บรรเทาอาการคันและทำให้คุณภาพชีวิตดีขึ้น