

The effect of T-lysine cream on the wound healing process

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Asmaa Awni Haydar ^{1*}

Abstract

Background and objective: Wound healing is a dynamic process that can be compromised in patients with chronic and metabolic conditions or unhealthy lifestyles. Objectives of study is to demonstrate a hyaluronate-containing supramolecular structure which enhances repalysYAL[®]cream effectiveness, sodium chloride with thymine (T-LysYal[®]); 1- notable progress in the healing of wounds. 2- the production of minuscule collagen strands. 3- a shorter recovery period.

Methods: Case study, the test group received standard treatment followed by lysine cream to indicate the size and depth ulcer from the 1st week to the 3rd week. Our patients were a 1-year child and 29 years old male who presented with a second degree of total body surface area (TBSA) burn and skin grafts at the burn center of Rozhawa Hospital/ Hawler/ Iraq. The observations were approved by the Ethics committee college of pharmacy in compliance with the ethical standard. Initially assessed as superficial partial-thickness in-depth, the wounds were treated conservatively with dressings and repalysYAL[®] cream 2-3 times per day; however, represents the healing process in short-term individual therapy.

Results: In case 1; The patient had been exposed to flash deep burn to the right palm (thermal injury) mainly of superficial partial thickness; any necrotic tissue present needs to be removed to take full advantage of the product's potential. When (repalysYAL[®]) cream is used, there will be a physiological increase in the exudate, which will have to be managed to avoid maceration. While in case 2; The patient presented surgical wound dehiscence in the inner compartment of the left foot with leakage of purulent material and signs of necrotizing fasciitis. with using (repalysYAL[®]) cream, the wound reduces scar formation due to 90% and increase fibroblast by 30% when a blood vessel is formed to which blood is supplied, the cells are cultivated and divided to form new tissue and an organ.

Conclusion: Signaling pathways that induce cellular and tissue responses after injury, which may be impeded during chronic wound healing, were greatly improved using lysine cream as a therapy.

Keywords: Wound; Wound healing; T-lysine product; Decubitus ulcers.

Introduction

The destruction of normal anatomical structure and function is classified as a wound. This can be as simple as a breach in the skin's epithelial integrity, or it can be more serious, extending into subcutaneous tissue and causing compensation in other structure like tendons, muscles, arteries, nerves, parenchymal organs, and even

bone.¹ Chronic wounds are expected to affect 120 per 100 000 people aged 45 to 65, rising to 800 per 100 000 people aged 75 and up.² A physiologic response to tissue injury follows the three major phases of wound healing: hemostasis, inflammation, proliferation, and maturation or remodeling.³ Wounds that aren't healing properly, such as delayed acute wounds

¹ Department of Pharmacology, College of Pharmacy, Hawler Medical University, Erbil, Iraq.

Correspondence: asmaa.haydar@hmu.edu.krd

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and chronic wounds, haven't progressed through the regular stages of healing. Due to delayed, partial, or disorganized healing, such wounds usually develop pathogenic inflammation.^{4,5}

Injury triggers the clotting cascade, which ensures hemostasis and provides the fundamental matrix architecture for the invasion and recruitment of inflammatory and other cells through the formation of a fibrin clot. The first phase of hemostasis begins immediately after wounding, with vascular constriction and fibrin clot formation. The clot and surrounding wound tissue release pro-inflammatory cytokines and growth factors such as transforming growth factor (TGF)- β , platelet-derived growth factor (PDGF), fibroblast growth factor (FGF), and epidermal growth factor (EGF).⁶ Platelets trapped in the clot release growth factors and chemokines into the wound area as well. The clinical use of platelet-rich plasma to improve healing⁷ and poor healing in animal models recapitulating platelet diseases demonstrates the need of platelets and their products for effective tissue reconstitution.⁸ Platelets adhere to damaged blood vessels, initiate a release reaction, and initiate a hemostatic reaction, resulting in a blood-clotting cascade that prevents excessive bleeding and provides provisional protection for the wounded area. Platelets release a wide range of growth factors, cytokines, and other survival or apoptosis-inducing agents.⁹

In connective tissues, fibroblasts are one of the most common cell types. Under normal physiological conditions, these cells are in charge of tissue homeostasis. When tissues are wounded, fibroblasts become activated and develop into myofibroblasts, which produce massive contractions and actively create ECM proteins to aid wound closure.

Both fibroblasts and myofibroblasts are important in wound healing because they generate traction and contractile forces, which help the wound contract. The mechanisms of force generation in

fibroblasts and myofibroblasts, as well as methodologies for measuring such cellular forces because of the dual effects that fibroblasts/myofibroblasts have in the wound healing process: an appropriate amount of force generation and matrix deposition is advantageous for wound healing; excessive force generation and matrix deposition is detrimental to wound healing.¹⁰

The process of repair of a chronic skin lesion (CSL) and decubitus ulcers (DUs) is very complex which implicated not just the patient's nutritional and metabolic condition but also a complex and integrated series of physiological mechanisms that modulate the acute and chronic inflammatory process, proliferation of cell lines involved in graduation tissue formation in the wound and lastly, the process of remodeling of the extracellular matrix (ECM) associated with keratinization of the lesion.¹¹

Hyaluronic acid (HA) is a fundamental component of the human connective tissue. HA may exert anti-inflammatory and immune-modulating activities. A supramolecular complex containing lysine hyaluronate, (repalysYAL[®]) cream is thymine T-lysine-Hyaluronate sodium chloride which acts as supramolecular to create nanotubes (cell to cell communication). This active ingredient is stereochemically conjugated by the non-covalent bond between L-Lysine Hyaluronate (as Host) and Thymine sodium chloride (as Guest).¹²

The goal of this study was to see how well T-Lysyal treating wound, the active ingredient in (repalysYAL[®])cream, a class IIb medical apparatus, worked in wound management. T-Lysyal is a supramolecular complex that has been found to regulate wound healing in a beneficially. Aim of this study is to assess the wound healing efficacy of lysine cream in a participant by promoting thin collagen fibers which will result in a better quality of life.

Case presentation.1

A 1 year-old child was brought to the Emergency Department having been exposed to flash deep burn to the right palm (thermal injury) mainly of superficial partial thickness. The epidermal layer had blistered and been removed, but the underlying dermis remained sensate and with a brisk capillary refill. Remarkably, all of the flash burns from the welding accident had affected previously grafted or scarred skin. The patient was admitted for 48 hours to establish a dressing plan using T-lysine cream and care protocol on the ward. Apply a film of the (repalysYAL[®]) cream using a small spatula or forceps.

The cream product should be applied to the bed of the lesion, carefully on the edge or margin of the lesion and the skin around the lesion. Cover with non-adherent, greasy gauze. If a cavity or channel of a fistula needs to be medicated, it is recommended to use greasy gauze onto which the product should be applied to

zones. The product being used should be left to act for 2-3 minutes; medicate using the protocol already in use. Any necrotic tissue present needs to be removed to take full advantage of the product's potential. When (repalysYAL[®]) cream is used, there will be a physiological increase in the exudate, which will have to be managed to avoid maceration.¹³ Once comfortable, he was discharged home to have dressings in the community and for clinic follow-up; within an expectation, his wounds would heal within the 6-week target.

Eighteen days later, the patient represented to the Emergency Department feeling feverish. On examination, he had slough, infected burn wounds on the right hand. Skin is red to pale pink in color, develops extensive blistering and blanches poorly due to the destruction of blood vessels, then commenced on intravenous antibiotics. Despite the wounds having been previously assessed as superficial partial thickness (Figure 1).

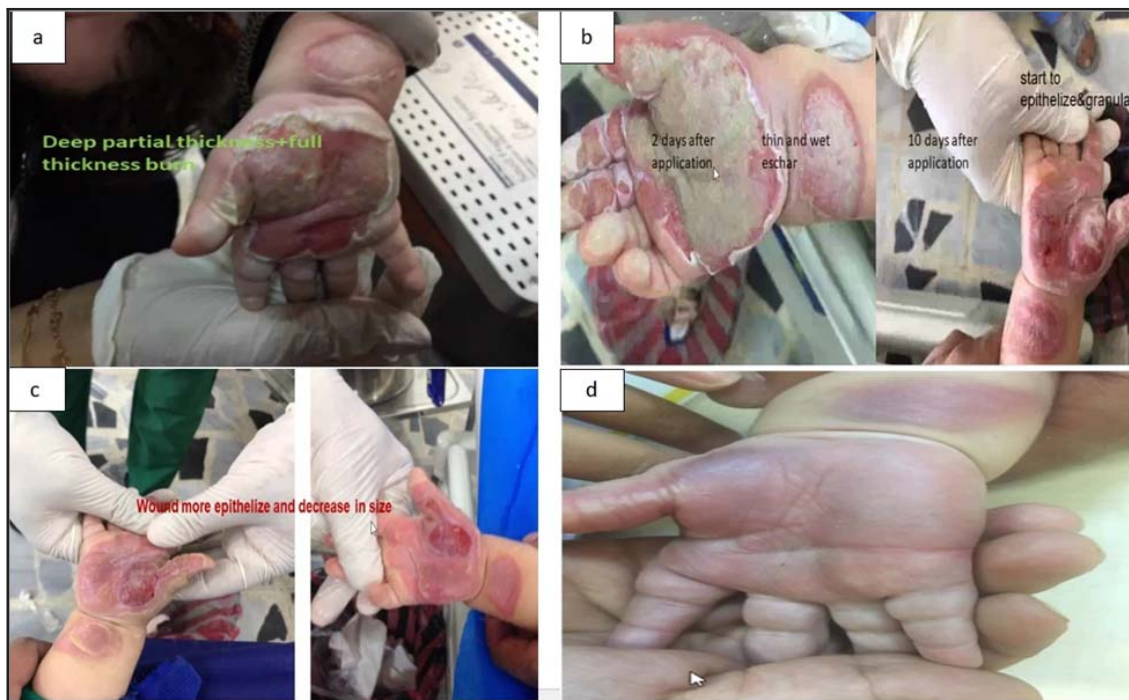


Figure 1 (a) Wound burns of right palm scar on readmission, before grafting, (b) the wound was cleaned on the ward to remove a thick layer of slough later 10 days start to epithelize and granulate, (c) after 18 days wound more epithelize and decrease in size, (d) after 6 weeks later post grafting.

Case presentation.2

A 29-year-old man was sent to the Emergency Room after his left foot was superficially burnt by hot water. His burns were diagnosed as second-degree assess the total body surface area (TBSA) involved in burn patients with superficial partial-thickness burns involving the first layer and a portion of the second layer.

The patient presented surgical wound dehiscence in the inner compartment of the left foot, with leakage of purulent material and signs of necrotizing fasciitis. The epidermal layer had blistered and been removed, but the underlying dermis remained sensate and with a brisk capillary refill.



Figure 2 (a) wound burning scar second-degree burn injury of left foot superficial, (b) skin graft after one week dressing with using (repalysYAL[®]) cream stating from 20 February 2020; 2-3 time per day, (c, d) after 15 days the wound reduces scar formation due to 90% and increase fibroblast by 30% When a blood vessel is formed to which blood is supplied, the cells are cultivated and divided to form new tissue and an organ. During new tissues and organs form, the polymer scaffolds are degraded and disappeared¹⁴ and converting collagen by the action of (repalysYAL[®]) cream, (e) after 21 days the wound completely heals.

Discussion

Burns are an excruciatingly painful condition. The acknowledged suffering and repercussions of a burn victim in a thermal catastrophe defies explanation. Patients' quality of life is harmed by burn sequelae, which have long-term emotional and social implications. If new therapeutic resources are developed, this scenario may alter. The use of a topical T-lysine (repalysYAL®) cream enhance healing and relieve pain was used in this study. Traditional burn treatment would have taken longer to manage pain, begin healing (re-epithelization), and avoid scarring. Patients in this topical (repalysYAL®) cream study done by Upadhyay *et al*, 2009 were reported in which healing impairment in burn injury is characterized by increased free-radicals-mediated damage, delayed granulation tissue formation, reduced angiogenesis and decreased collagen reorganization leading to chronic wound healing.¹⁵ Amino acid and hyaluronic acid mixtures boost the formation of extracellular matrix (ECM) components, particularly neo-elastin, and a more efficient deposition of elastic fibers (blastogenesis), while also increasing collagen production. Lysine hyaluronate (repalysYAL®) cream, a new hyaluronic acid formulation, would speed up decubitus ulcer healing faster than sodium hyaluronate.¹⁶

A considerable rise in wound contraction rate, hydroxyproline, hexosamine, and protein content confirmed. Greater wound contraction in SBT-treated rats could be attributed to increased fibroblast activity in regenerated wound tissue. Wound contraction is thought to be aided by myofibroblasts. To maintain the contraction by applying strain on the surrounding extracellular matrix (ECM) and secreting ECM proteins such as collagen. Collagen is a key protein in the ECM and a component that helps to strengthen wounds. The increased amounts of hydroxyproline and hexosamine in SBT-treated burn wounds most likely endowed the regenerated

wound tissue with strength. In comparison to the untreated control group, SBT treated burn sites had more collagen type-III expression. In the early stages of wound healing, collagen type-III is the most common kind of collagen, and it helps to provide strength to the provisional ECM.¹⁷ Apply a film of the (repalysYAL®) product using small spatula or forceps. The product should be applied to the bed of the lesion, carefully on the edge or margin of the lesion and the skin around the lesion. Cover with non-adherent, greasy gauze. If a cavity or channel of a fistula needs to be medicated, it is recommended to use greasy gauze onto which the product should be applied to achieve better spread within the non-visible zones. The product being used should be left to act for 2-3 minutes; medicate using the protocol already in use. Any necrotic tissue present needs to be removed to take full advantage of the product's potential. When RepalysYAL® is used, there will be a physiological increase in the exudate, which will have to be managed to avoid maceration.¹¹ MMPs are key players in every phase of the healing process, that is, eliminate damaged protein, destroy the provisional ECM, facilitate migration to the center of the wound, remodel the granulation tissue, probably control angiogenesis and also regulate the activity of some growth factors.¹⁸ Increased MMP-2 and -9 expression in SBT-treated experimental rats revealed that SBT was crucial in ECM remodeling. Study done by Beggs *et al*. explain that the growth factors, and cytokines, are associated with a number of cell and tissue repair mechanisms functioning as signaling molecules in the inflammatory response and in the modulation of cell proliferation and differentiation. Transforming growth factor beta (TGFβ) enhances fibroplasia and the production of ECM components such as collagen, elastin and laminin whilst suppressing the ECM breakdown. It is also apparent that the relative proportions of cytokines can modulate the process of

wound repair.¹⁹

The use of T-lysyl-based cream (repalysYAL®) cream in the presentation case, as shown in Figures 1 and 2, which increases wound contraction and dermis and epidermis rebuilding, is regarded the foundation of wound management in this study. The lesion has always healed in a centripetal direction, thanks to a mechanism of tissue regeneration that was eliminated from the edge. After the application of Lysyl, there will be neo-vascularization of the margins as well as structural alterations.

The clinical utility of this study is to discover a new way for treating burn wounds and diabetic foot ulcers in the early stages, as this has proved beneficial in decreasing the progression of inflammation and lowering ulcer complications.

Conclusion

According to the results of this study, lysine cream is efficient in increasing ulcer healing and is well tolerated. The velocity of T-lysyl-based cream contraction and the kind of histological tissue acquired over a short period of time necessitate more active wound treatment at an early stage. The use of a lysine-based cream for at least three weeks resulted in a reduction in the size and depth of the ulcer, as well as faster wound healing. It is thought that lysine promotes angiogenesis by attaching growth factors to their receptors by functioning as a cell surface.

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Competing interests

The author declares that she has no competing interests.

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