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CASE REPORT

Role of Prolotherapy in Thermal Burns

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ABSTRACT

Burns represent a significant issue globally. Numerous techniques have been created to address burns. These types of injuries may be challenging to handle. Nonetheless, there exists a validated method that enhances the healing speed of wounds. To hasten the recovery process, sediment is an approach that involves the injection of local stimuli into the injuries. This article considers the prolotherapy role in the preparation of the wound bed.

KEYWORDS

• Prolotherapy • Wounds • Burns

INTRODUCTION

One method that has been utilized for difficult wounds is prolotherapy. To enhance wound healing, prolotherapy entails injecting or spraying an irritant into the wound to elicit an inflammatory response. Dextrose, available in concentrations ranging from 12. 5% to 25%, is the most commonly utilized prolotherapy agent in clinical settings. Due to its status as a natural component, solubility in water, and safety for injection in significant amounts and various locations, dextrose is seen as the ideal proliferant. By drying out the cells at the site of injection, hypertonic dextrose solutions create localized tissue damage that attracts granulocytes and macrophages, thereby facilitating the healing process. In this article, we share our experience in preparing the wound bed using prolotherapy.

MATERIALS AND METHODS

In this study, a 42 years old male with 38% thermal burns over anterior and posterior part of chest and abdomen (*Figure 1*) was enrolled

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and managed at the Department of Plastic Surgery, JIPMER, Puducherry, India in june 2024 for a duration of 1 month. The study was ethical approved by the institutional review board.

He underwent a comprehensive clinical evaluation, and vital tests including Hemoglobin, Total Count, Differential Count, Bleeding Time, Clotting Time, Erythrocyte Sedimentation Rate, Random and/or Fasting Blood Sugar, Serum Creatinine, Blood Urea, HIV, HBsAg, and Complete Urine Examination were performed to determine anesthesia suitability and eliminate underlying systemic issues. Furthermore, wound swabs were cultured to determine the type of organism and its susceptibility to antibiotics.

Prolotherapy is used in our patient for promoting the granulation. (*Figure 2*) After 3 weeks of prolotherapy,total body surface area of burns wound was decreased and neoepitheliation occurred .'

Figure 1: Showing thermal burns over the anterior and posterior part of chest and abdomen at time of presentation (BJWAT Score 32)

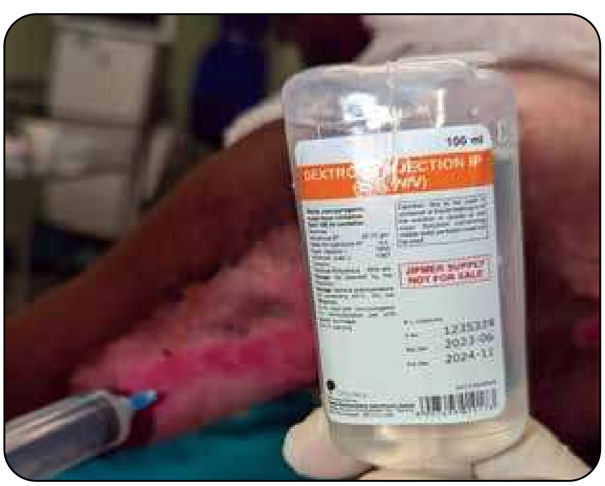

Figure 2: Showing application of prolotherapy over thermal burns

RESULTS

After six rounds of prolotherapy across a span of three weeks, the overall body surface area decreased and neo epithelialization commenced. No negative local or systemic effects were observed with the administration of prolotherapy. (*figure 3*)

Figure 3: Figure showing condition of the wound before and after prolotherapy over thermal burns (BJWAT wound score - 25)

DISCUSSION

A range of substances are utilized in prolotherapy, including osmotic agents (commonly dextrose), chemoattractants (frequently sodium morrhuate), and irritants (such as phenol)[1]. While the exact mechanism of prolotherapy remains uncertain, advocates of the method believe that injecting hypertonic dextrose induces osmotic rupture and cellular dehydration at the injection area, leading to localized tissue damage. This subsequently prompts granulocytes and macrophages to move to the area, secrete growth factors, and lay down collagen. Research conducted in vitro has shown that the generation of various growth factors vital for tissue repair occurs even at dextrose concentrations as minimal as 5%. These growth factors consist of b-FGF, IGF-1, CTGF1, PDGF, TGF-β, and EGF. Investigations carried out in vitro have indicated that PDGF levels can be increased by growing cells in a high-glucose culture medium. PDGF facilitates angiogenesis, fibroblast proliferation, and extracellular matrix production, among other pro-repair actions in skin wounds. Moreover, elevated glucose levels also enhance the expression of TGF-β. Angiogenesis, fibroblast proliferation, inflammation, matrix deposition, remodeling, collagen synthesis, and wound re-epithelialization are all mechanisms in wound healing that TGF-β influences. High glucose further promotes the upregulation of additional growth factors, such as EGF, b-FGF, IGF, and CTGF, all of which have various preparative functions and encourage healing in specific animal wound models with impaired healing[2],[3]. Certain prolotherapy studies suggest potential direct effects on collagen production. The response to dextrose prolotherapy is matrix up-regulation[4]. After patellar tendon fibroblasts are exposed to the prolotherapy agent dextrose, there is an increase in collagen production, which may support tissue regeneration in a skin wound. Through a TGF-β-mediated pathway, a high-glucose culture of renal fibroblasts also enhances collagen type-I synthesis. Alterations in the cartilage matrix protein aggrecan have been noted in patients who received intra-articular injections of 12. 5% dextrose and in chondrocytes cultured in high-glucose[4,5]. In this scenario, the prolotherapy agent we employed was 25% dextrose. It has been applied alongside other modalities. No adverse effects have been reported.

CONCLUSION

Prolotherapy can be used as an adjuvant therapy to reduce total body surface area and neoeitheliazation, and it has been found in this study to play a role in the healing of the burn raw area. But since it's only one case study, it's impossible to draw firm conclusions. The effectiveness of prolotherapy in burn wounds needs to be confirmed by large randomized control trials.

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