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Role of Prolotherapy in Electric Scalp Burns Management

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Abstract

Electric burns are known for difficulty in healing and wound management. There is a lack of growth factors in these chronic wounds and needs to be supplemented with adjuvant therapy that allows for faster healing.This article highlights the role of prolotherapy in the management of electric burns.

Keyword: Sprolotherapy; Electricburns; Scalp burns**.**

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Introduction

Adult wound healing is divided into three stages: the inflammatory phase, proliferative phase, and remodelling phase. The three stages have to occur in conjunction to result in wound healing. Wound bed preparation is a novel concept and can be summarized using T.I.M.E with T for tissue: non-viable or deficient. I for infection/inflammation, M for moisture balance. E for epidermis which was changed to E for an edge.[1] Large wounds often require graft or flap for wound coverage, which require wound bed preparation. Prolotherapy is a procedure in which some irritant substance is injected into the wound that initiates an inflammatory reaction that in turn promote healing of the wound.[2] Recently in literature, we came across the use of prolotherapy for use in wound bed preparation.

Materials and methods

This study was conducted in the Department of Plastic Surgery at a tertiary care centre after getting the departmental ethical committee approval. Informed written consent was taken from the patient. The details of the patient in the study are as follows: 14 year old female without any known comorbidities with a history of accidental electric burns from the low voltage source and sustained

circumferential 3rd to 4th degree burns over the scalp frontal region (Fig. 1).

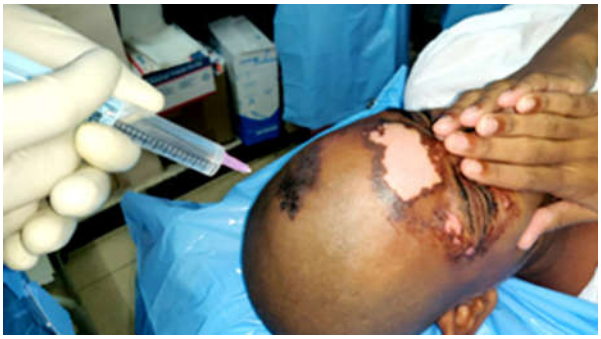

Fig. 1: Prolotherapy for Scalp Burns

Wound bed preparation was done for the patient with prolotherapy with 25% Dextrose (fig. 2) as her ulcer did not show any evidence of healing. Dextrose 25% solution was used as an agent for prolotherapy.

Fig. 2: 25% Dextrose used in prolotherapy

It was injected uniformly on to the wound (10ml) followed by gauze dressing. A repeated session of prolotherapy was given every three days. After 4 sessions of the treatment, the wound was reassessed after 2 weeks for evidence of wound healing.

Results: The wound bed showed good granulation tissue (figure 3).

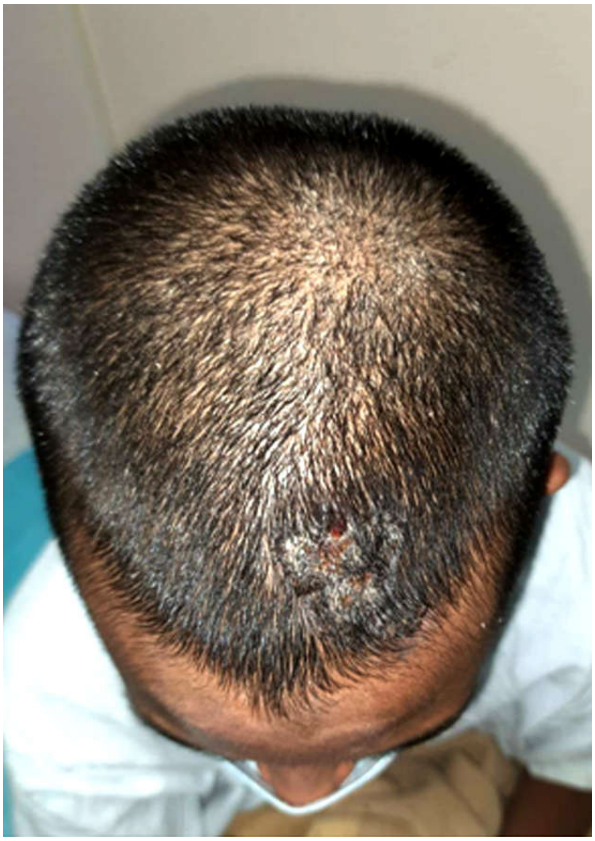

Fig. 3: Healed wound

Prolotherapy is found feasible as an adjuvant modality of wound bed preparation. Its role in wound bed preparation needs investigation by further studies.

Discussion

Burn injury is a major cause of trauma to the human body, with a long healing period. The mortality rate of burn injury has decreased with new treatment modalities, but secondary infections and prolonged healing periods still affect the mortality rates. Many therapeutic methods are available to affect wound healing such as the topical application of insulin, growth factors, negative pressure assisted wound closure, oxidized regenerated cellulose/ collagen, hyaluronic acid conjugated with glycidyl methacrylate or gelatin dressings.

The term prolotherapy was coined by Dr George Hackett in 1956 derived from the Latin word proles meaning offspring or progeny and the English word therapy. It involves injecting an irritant substance into aligament or tendon to improve the growth of new tissue. Multiple agents are used in prolotherapy, such as irritants (phenol), chemo-attractants (sodium morrhuate), and osmotic agents

(dextrose).

However the exact mechanism of prolotherapy is not clear, proponents of the technique believe that the application of hypertonic dextrose causes cell dehydration and osmotic rupture at the injection site that leads to local tissue injury that induces granulocyte and macrophage migration, with the release of the growth factors and collagen deposition.[3] In Vitro studies have shown that concentrations of 5% dextrose have resulted in the production of several growth factors needed for tissue repairs like PDGF, TGF-b, EGF, b-FGF, IGF-1, and CTGF.[4]

In vitro studies have shown that the cultivation of cells in the high glucose culture medium can increase the PDGF expression. PDGF has multiple reparative effects in wounds, including promotion of angiogenesis, fibroblast proliferation, and extracellular production. TGF-b expression is also increased by high glucose.[5,6] TGF-b is involved in different steps of wound healing from inflammation to wound re-epithelialization. Other growth factors increased by high glucose include EGF,b-FGF, IGF and CTGF.

Studies on prolotherapy suggest that there are direct effects on collagen synthesis.[7]A few studies have demonstrated up-regulation of the matrix in response to prolotherapy or in vitro cultivation with high concentrations of glucose. Collagen type-I synthesis is also increased in high glucose cultivation of renal fibroblasts, in a TGF-b-mediated pathway.[8] Cartilage matrix protein aggrecan is increased and reported in chondrocytes cultured inhigh glucose, and in patients who have received intra-articular injections of 12.5% dextrose.[4-8] There were no adverse effects for the prolotherapy with 25% dextrose solution. No local or systemic side effects were demonstrable.

Prolotherapyhas been shown effective in treating many musculoskeletal conditions such as tendinopathies, ligament sprains, back and neck pain, tennis/golfers elbow, ankle pain, joint laxity and instability, plantar fasciitis, shoulder, knee pain and other joint pain. Prolotherapy is useful in the chronic wound and allows to hasten the healing time.Prolotherapy provides analgesia to the patient although the mechanism is not known.

Limitations

The study was done on a single patient and needs a large population-basedstudy to apply in practice

Declarations

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