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Research Article

Role of Phenytoin Solution in The Management of Non-Healing Ulcer

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Abstract:

Phenytoin, originally used as an anticonvulsant, has shown promise in wound healing due to its ability to enhance fibroblast proliferation and neovascularization. This study evaluates the effectiveness of topical phenytoin in treating a non-healing ulcer in a 15-year-old male who developed the condition following post-burn contracture release. Phenytoin solution, diluted to 5 mg/ml, was used to irrigate the wound, followed by the application of a collagen scaffold and sterile dressing. The results demonstrated a significant improvement in wound healing, supporting the role of phenytoin in promoting connective tissue regeneration and granulation tissue formation. These findings are consistent with previous studies showing that phenytoin stimulates fibroblast activity, collagen deposition, and reduces bacterial contamination. Given its accessibility, affordability, and safety, topical phenytoin is recommended as a viable treatment option for non-healing ulcers.

Keywords: phenytoin; wound management

Introduction

Chronic ulcers and various other types of wounds pose a considerable economic, social, and public health challenge, which is increasingly significant as the population ages. Phenytoin plays an essential role in tissue repair, especially by promoting fibroblast proliferation and neovascularization. It has proven effective in the healing process of diabetic ulcers, traumatic injuries, chronic venous ulcers, and other non-healing chronic wounds.

Materials and Methods

This was a study conducted in the Department of Plastic Surgery in a tertiary care center in South India. The patient was a 15 year old male with history of post burn contracture who underwent contracture release following which he developed a non-healing ulcer over the dorsum of right foot. Regenerative therapy was administered using phenytoin solution as follows:

- A 2ml vial containing 100mg of phenytoin solution was taken (50mg/ml).
- 8ml of 0.9% normal saline was taken and added to the phenytoin solution, giving a dilution of 5mg/ml.
- This solution was used to irrigate the wound, followed by placing a two-layered collagen scaffold and covering it with a sterile dressing and splint.

Results

The topical applicatin of phenytoin led to a notable improvement in wound healing.

Figure 1: A 2ml vial contains 100mg of Phenytoin

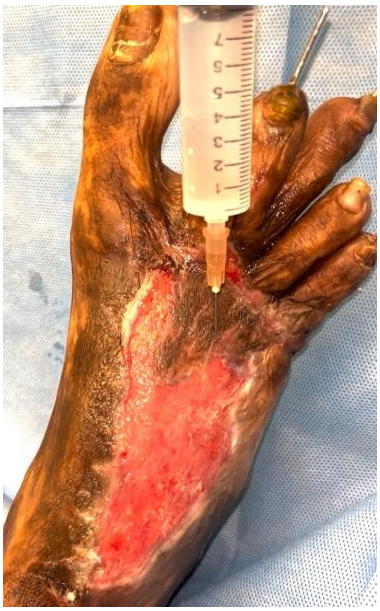

Figure 2: Application of phenytoin solution over the wound

Discussion

In 1938, Meritt and Putnam published significant findings on the use of phenytoin for treating major seizures, absence seizures, and psychic equivalent seizures. The following year, Kimball and Horan made the first observation of gingival hyperplasia in some patients receiving phenytoin treatment. The earliest clinical trial, conducted in 1958, indicated that patients with surgical wounds who received oral phenytoin prior to surgery experienced reduced inflammation, less pain, and faster healing compared to those in the control group.[1]

Phenytoin was first launched as an antiseizure drug in 1937. For more than six decades, researchers have explored the potential of topical phenytoin for enhancing wound healing in various chronic wounds.

This stimulatory effect on connective tissue raises the intriguing possibility of using phenytoin in wound healing causing gum hypertrophy and thickening of skull and skin which raises the intriguing possibility of using phenytoin in wound healing.

Topical phenytoin sodium promotes wound healing through several mechanisms: it boosts fibroblast proliferation, inhibits collagenase activity, facilitates collagen deposition, enhances granulation tissue development, reduces bacterial contamination, minimizes wound exudate production, and increases the expression of growth factor receptors.[2]

DaCosta et al. found that phenytoin modifies the typical wound healing process and could be useful in clinical situations where inadequate collagen deposition contributes to poor healing, resulting in higher morbidity and mortality. Their study indicated increased fibroblast proliferation and neovascularization in phenytoin-treated wounds compared to controls at 3 days. By day 6, the inflammatory infiltrate in the treated wounds had nearly disappeared, but fibroblast infiltration and angiogenesis remained notably pronounced. [3-4]

Conclusion

Due to its clear effectiveness in enhancing wound healing, along with its accessibility, affordability, user-friendliness, and safety, we highly advocate for the use of phenytoin in treating non healing ulcers. A larger prospective study is needed to confirm these findings.

None

Declarations

Authors' contributions

All authors made contributions to the article

Availability of data and materials

Not applicable

Financial support and sponsorship

None

Consent for publication

Not applicable

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