Expediting Wound Healing in Uncontrolled Diabetic Patients: Photobiomodulation Therapy as Adjunctive Therapy with Collagen and Chitosan Dressing: A Case Study

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INTRODUCTION

Hard-to-heal wounds pose a significant obstacle for both patients and healthcare professionals, as they require extended treatment and delayed recovery. Globally, delayed wound healing among diabetic patients is rising due to reduced capacity to metabolize glucose, leading to elevated blood sugar levels (Hyperglycaemia) and reduced oxygen supply to tissues. Several factors can hinder the healing of wounds, including the patient's underlying health conditions, the characteristics of the wound itself (such as its size, duration, and location), the type of clinical care provided, and various other physiological factors resulting in persistent chronic wounds. While the current treatment procedures involve systemic glycaemic control, debridement, revascularization, etc., the use of adjunctive therapy for wound management is limited.

OBJECTIVE

To study the effectiveness of an innovative approach involving adjunctive therapy to accelerate wound healing in uncontrolled diabetic patients.

METHODOLOGY

The case was followed from the first review on the 2nd of May 2023 till discharge on the 12th of July 2023, assessing treatment efficacy using wound size. The wound was continuously assessed via Tissue, Infection, Moisture and Edge of Wound (TIME) assessment, and the peri-wound skin was assessed using Harikrishna Periwound Skin Classification (HPSC). The wound bed was described, and any changes from baseline wound appearance were documented on every visit to allow determination of changes in healing rate and wound size. Comprehensive monitoring, tracing the process from inception to discharge, predominantly relied on wound size as the key efficacy metric. The digital photography method was adopted to monitor the wound progression.

RESULTS

Case Summary: A 62-year-old male with uncontrolled diabetes presented with a 0.5 cm partial skin tear accompanied by cellulitis. Blood investigation showed elevated ESR 67, fasting glucose of 19.5 mmol/L and HbA1C: 15.6%. An initial investigation of an infected diabetic wound indicated a skin tear, resulting in cellulitis. Initially, systemic treatment was initiated with Sultamicillin 375mg. The wound dressing with Calcium alginate with silver dressing was used as the primary dressing with non-absorbent secondary dressing. However, the development of a 2 cm by 0.5 cm tunnelling wound led to a referral to a tertiary wound unit, General Hospital - Kuala Lumpur. Despite granulation tissue formation without slough, wound size stagnated even after silver and subsequent collagen dressing intervention from the 23rd of May - the 12th of June.

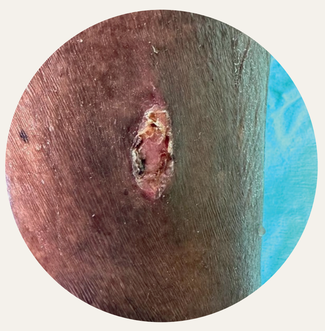

2nd May - 0.5x0.5 cm


12th May - 2.0x0.5 cm


23rd May - 2.0x3.0 cm


12th June - 2.0x3.0 cm


18th June - 2.0x0.5 cm


5th July

Breakthrough emerged with the introduction of blue light therapy alongside collagen and chitosan dressing. Within a mere fortnight, a remarkable transformation transpired—a substantial reduction in wound size and complete healing. The synergistic blend of collagen, chitosan, and photo biomodulation evidenced a significant advancement in wound healing, culminating in complete closure.

DISCUSSION

The utilization of photobiomodulation for various skin lesions has seen substantial growth in recent years. There is increasing evidence that shows the efficacy of blue light-emitting diode (LED) therapy in promoting wound healing. Nair et al. also reported in their case study that blue light therapy, when combined with collagen-based dressing, led to complete healing of a non-healing diabetic foot ulcer within ten weeks of treatment in a patient with a one-year history of the condition). Chitosan wound dressings with bioactive microfiber gelling (BMG) technology maintain a cohesive structure with enhanced fluid absorption capacity. They have been associated with significant healing, as evidenced by reduced wound surface area, improved peri-wound skin condition, and reduced pain perception.

CONCLUSION

Adjunctive therapy with the standard of care can be a potential strategic intervention for hard-to-heal wounds in uncontrolled diabetic patients.

LIMITATIONS

- The lack of an adequate control group to establish the efficacy of the effects.
- The heterogeneity of the variables may prove to be an important bias

FOR FURTHER REFERENCES

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