The Use of Copper Oxide Impregnated Dressings in the Treatment of Hard to Heal Acute and Chronic Wounds

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Background

Wound healing is a complicated process with the wound progressing through precise stages before satisfactory healing is accomplished. These stages of healing can easily be interrupted by numerous problems with the wound being "stuck" in the inflammatory phase of healing. One of the common causes for this is the increased bioburden in the wound bed reducing the ability of the tissue to heal. This has resulted in a number of antiseptic and antimicrobial wound dressings being used to address this issue. Recently a copper oxide impregnated dressing has been found to be very effective in the treatment of hard to heal wounds because of its biocidal activity, low toxicity, and lack of resistance by most organisms. 1,2,3 In wounds with reduced blood supply, especially diabetic foot ulcers, healing is markedly reduced due to copper levels in the wound bed and periwound tissue. 4 Copper oxide can help to overcome this problem by increasing angiogenesis through its stimulation of vascular endothelial growth factor (VEGF). Copper oxide is known to increase skin regeneration and to stabilize extracellular proteins. 3,5 It has, also, been found to enhance expression of molecules in the extracellular matrix such as fibrinogen, collagen, and integrins in addition to enhancing cell attachment to the collagen matrix. 6,7 Copper has a complex role in numerous cells through its modulation of cytokines and growth factors. Copper is considered an "essential nutrient" in the body and plays a critical role in the normal function of all body tissues including the skin, is essential in all stages of wound healing, and is considered safe for use in human tissues. 1,8,9,10

Methods

In an attempt to determine the usefulness of this new copper oxide impregnated wound dressing, we are treating a series of 25 patients with acute and chronic hard to heal wounds with the dressing. The wounds being treated include non-healing postoperative wounds, chronic traumatic wounds, venous leg ulcers, and diabetic foot ulcers. All wounds had failed standard of care therapy for at least one month before being treated with the copper oxide impregnated dressings. The average age of the patients in this report was 68 years with a range of 63 to 71 years. The average size of the wounds and ulcers treated was 23.5 cm^2 with a range from 2.3 cm^2 to 68.7 cm^2. After appropriate debridement, the dressings were applied to the wound surface and were covered with the appropriate secondary dressing depending on the patient's diagnosis. The patients were evaluated and dressings were changed once per week.

Results

All patients have had significant improvement in wound healing compared to that achieved with the previous treatments even though all wounds and ulcers in this evaluation had stalled in the healing trajectory with initial therapy. There were no reported wound infections during the course of treatment. 68% of the patients treated with the copper oxide wound dressings healed 50% or greater after 4 weeks of therapy. 31% of the patients treated with the copper oxide wound dressings have healed during their course of therapy. 3 (12%) of the patients had the dressings discontinued due to local skin irritation. 14 patients continue being treated with the copper oxide wound dressings and are progressing to healing.

References

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Cases

Recurrent Skin Tear in Patient with Severe Chronic Venous Hypertension

Wound Healed at Week 4 After 3 Applications of Copper Dressings

Ischemic (Arterial) Ulcer of Ankle Unhealed After 1 Year of "Standard or Care" at Time of 1st Application of Copper Dressing

Healed After 25 Weeks of Treatment With Copper Dressings

Operative Wound of Foot After Drainage of Abscess in Patient with IDDM

Operative Wound of Foot at Time of 4th Application of Copper Dressing

Operative Wound of Foot at Time of 8th Application of Copper Dressing

Operative Wound of Foot Healed after 11 Weeks of Treatment With Copper Dressing

Unhealded Wound of Leg After 6 Months of "Standard of Care" at Time of 1st Copper Dressing Application

Unhealed Wound of Leg After 5 Applications of Copper Dressings

Wound Healed After 10 Weeks of Treatment With Copper Dressings