Ultrasound Debridement in Chronic Wound Healing: A Review of Current Evidence

Chang YR[1], Cross K

[1]School of Medicine, University College Cork, Cork, Ireland

Introduction

The initial step of wound management, debridement, is thought to be critical in promoting healing (Wolcott et al, 2009). Of the numerous debridement modalities, ultrasound seems to hold promise especially in chronic wounds. A systematic review of current evidence is conducted on the use of low-frequency (20-30kHz) ultrasound as a debridement tool.

Methods

Searches were performed in Ovid MEDLINE, Ovid EMBASE, and the Cochrane Central Register of Controlled Trials (CENTRAL). Included studies were published in English with the following keywords ultrasound, debridement, wound healing, and biofilm.

Results

Of the 965 relevant articles found, 26 records met the selection criteria. These were then summarized under the following categories:

Healing was promoted through the reduction of wound area, increased in granulation tissue, decreased in inflammatory markers, and accelerated wound closure when compared to standardized care. This was seen in surgical wounds, pressure ulcers, arterial insufficiency ulcers, cutaneous systemic sclerosis, and Hay-Wells Syndrome. Level of evidence supporting the healing mechanism ranged from levels 2-5.

Anti-microbial was observed through decreased exudate, decreased clinical evidence of infection, and reduction of macrophage when compared to standardized care. This was evident in diabetic foot ulcers, venous insufficiency ulcers, surgical wounds, pressure ulcers, and mixed-thickness burns. Level of evidence supporting the anti-microbial mechanism ranged from levels 3-5.

Pain Control was scored on the visual analogue score. A reduction in pain as reported by patients was seen in venous leg ulcers, cutaneous systemic sclerosis, vascular ischemia, split thickness donor sites, mixed-thickness burns, pressure ulcers, surgery related wounds, and trauma related wounds. Level of evidence supporting the pain control ranged from levels 4-5.

Conclusion

A summary of mechanism that promote wound healing through the use of ultrasound debridement were identified. However generalizability of the findings are limited due to heterogeneity in wound etiology, study design, and levels of evidence. In order to develop systematic guidelines, studies of higher quality with clinical applicability is needed in the future to produce more generalizable evidence to inform chronic wound care.

Reference

Wolcott, R. D., Gontcharova, V., Sun, Y., Zischakau, A., & Dowd, S. E. (2009). Bacterial diversity in surgical site infections: not just aerobic cocci any more. J Wound Care, 18(8), 317-323.