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Effect of acidified nitrite on wound healing in type 2 diabetic rats: A histological and stereological evaluation

Hamideh Afzali
Shahid Beheshti University of Medical Sciences, Iran

Statement of the Problem: Diabetic foot ulcer (DFU) is one of the most disabling complications of diabetes. Impaired skin nitric oxide production contributes to delayed wound healing in type 2 diabetes (T2D). This study aims to determine improved wound healing mechanisms by acidified nitrite (AN) in rats with T2D. Methodology & Theoretical Orientation: Male Wistar rats in control and diabetic groups were assigned to one of four subgroups: Untreated control, AN-treated control, untreated diabetes, and AN-treated diabetes. T2D was induced using high-fat diet followed by a low-dose of streptozotocin. Full thickness skin wound was made on the dorsum of rats 28 days after the induction of T2D. Application of A was done daily from day 3 to day 28 after wounding. On days 3, 7, 14, 21, and 28 after wounding, wound levels of vascular endothelial growth factor (VEGF) were measured as well as histological and stereological examinations were done. Conclusion & Significance: The numerical density of basal cells (1070□15.2 vs. 936.6□37.5 basal cell/mm3, P=0.025) and epidermal thickness (58.5□3.5 vs. 44.3□3.4 μm, P=0.009) were higher in AN-treated diabetic rats than in untreated ones, at day 28 after wounding. AN application in diabetic rats significantly increased total volume of the dermis, numerical density of fibroblasts at days 14, 21 and 28 after wounding (all P□0.05) compared to the untreated ones. The VEGF levels were increased in the treated diabetic wounds at days 7 and 14, as was the total volume of fibrous tissue and hydroxyproline content at days 14 and 21 (all $p < 0.05$). AN accelerates wound healing in type 2 diabetic rats by rapid reconstruction of the dermis, augmentation of neo-vascularization, and acceleration of collagen deposition in wound tissue.

Biography

Hamideh Afzali studies the molecular and cellular mechanisms of tissue repair, with particular emphasis on the roles of Nitric Oxide (NO). In particular, she is very interested in the parallels between wound healing and diabetes at the cellular and molecular level.

Hamide_afzali@yahoo.com