Dietary L-arginine and cutaneous wound healing

Masoud Naderpour¹, Jafar Soleimani Rad², Esmail Ayat¹, Mehran Mesgari³, Ramin M. Farahani³, Leila Roshangar², R. Shane Tubbs⁴ and Mohammadali M. Shoja⁵

¹ Department of Otolaryngology, Tabriz University (Medical Sciences), Tabriz, Iran.
² Department of Anatomical Sciences, Tabriz University of Medical Sciences, Tabriz, Iran.
³ Drug Applied Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.
⁴ Department of Cell Biology, University of Alabama at Birmingham, Alabama, USA
⁵ Tuberculosis and Lung Disease Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

Key words: Arginine, collagen, diet, healing, skin

Skin wound healing has been the subject of extensive studies and various drugs have been used in an attempt to improve wound healing. There are conflicting data regarding the effects of L-arginine, the substrate of nitric oxide, on wound healing. We examined the 1-week rate of cutaneous wound healing and collagen deposition in three groups of rats who received a (1) L-arginine (2% in drinking water)-supplemented diet from three days before until the seventh day following injury (Group 1), (2) L-arginine-supplemented diet for three days before injury (Group 2), and (3) a standard diet without L-arginine supplementation (Group 3). The wound length and width were measured each day and then the open wound area and cumulative percentage of open wound area reduction were calculated. Wound biopsy samples were examined with Trichrome-Masson stain in a subgroup of animals. Results showed that Group 1 rats had a significantly lower cumulative percentage of open wound area reduction on day 7 compared to other two groups (Mann-Whitney U test, P < 0.05). Relatively higher degrees of wound collagen deposit (day 7) were noted in groups 2 and 3. It may be concluded that L-arginine (2% in water) administered three days before until the seventh day following skin wound induction may diminish the rate of skin wound healing and collagen deposition.

INTRODUCTION

Cutaneous wound healing can be affected by several local and systemic factors, which alter collagen synthesis, neovascularization and epithelialization (Chi-quetti Júnior et al., 2007). The most significant histological changes occur during...