Abstract

Increasing evidence showed the important role of nitric oxide (NO) in skin repair and reconstruction. In this report, we investigated the effects of NO on 2nd degree burn wound of mice with a newly developed topical NO-gel. Using regular hematoxylin & eosin staining and immunohistochemistry, we determined the effects of NO on wound closure, hair follicle regeneration, collagen deposition, angiogenesis, and inflammatory cell infiltration in the wound of mice during wound healing. NO treatment significantly accelerated re-epithelialization by 50%, which has resulted in a markedly faster wound closure than that in control group. NO significantly promoted follicle stem cell recruitment, a key player in re-epithelialization. In addition, hair follicle regeneration also was enhanced by NO treatment in mice. As we have reported with rat model, NO treatment significantly increased the number of procollagen-expressing fibroblasts, which peaked by day 10 after burn wound. We also demonstrated an increase of angiogenesis in NO treated wounds compared with that in the control group during wound healing. Finally, we found that the NO gel promoted wound bed infiltration and retention of inflammatory cells that are a major source of growth factors and cytokines during the healing processes. These observations suggest that NO released from a topical preparation has the potential to enhance burn wound healing by regulation of many cellular processes in the skin.

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