Microdermabrasion as a novel total to enhance drug delivery via the skin：An animal study.

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摘要

Abstract

BACKGROUND: Microdermabrasion is a widely performed skin rejuvenation procedure. It can partly ablate and homogenize the stratum corneum (SC) layers. OBJECTIVE: The effect of microdermabrasion treatment on the skin permeation of hydrophilic and lipophilic drugs was examined in this study. METHODS: 5-Fluorouracil (5-FU) and clobetasol 17-propionate were used as the hydrophilic and lipophilic permeants, respectively. In vitro skin delivery using porcine skin and in vivo topical application employing nude mouse as the animal model were both used to examine the effect of microdermabrasion. The vacuum pressures used in this study (15-25 cmHg) were much lower than those used for therapeutic purposes. RESULTS: The 5-FU permeation across microdermabrasion-treated skin was 8- to 24-fold higher than that across intact skin and depended on differences in treatment pressure and duration. An intensity of 15 cmHg for 10 seconds showed the greatest enhancement of 5-FU delivery via the skin. In contrast to the results for 5-FU, microdermabrasion reduced the skin permeation and deposition of topically applied clobetasol. The partitioning effect of clobetasol from the vehicle to the SC may have predominated this result. Microdermabrasion also enhanced the skin delivery of the hydrophilic 5-aminolevulinic acid (ALA). Confocal laser scanning microscopy (CLSM) of microdermabrasion-treated skin revealed intense red fluorescence of ALA-transformed protoporphyrin (PpIX) within the epidermis and upper dermis. CONCLUSIONS: Microdermabrasion can improve the skin permeation of hydrophilic molecules.