Medical > In Vivo > Inflammatory Disease Research

42 Application of leukotriene B4 and reflectance confocal microscopy as a noninvasive in vivo model to study the dynamics of skin inflammation.

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ABSTRACT

BACKGROUND: Application of leukotriene B4 (LTB4) is an established in vivo model that locally induces skin inflammation. Currently in this model, a biopsy is inevitable. In vivo reflectance confocal microscopy (RCM), a noninvasive imaging technique, could overcome this limitation. To find out to what extent RCM may be an in vivo investigative and diagnostic tool in neutrophilic conditions, we studied the dynamics of polymorphonuclear leukocytes (PMN) migration from dermis to stratum corneum using an established LTB4 model. METHODS: Leukotriene B4 was topically applied on the skin of the lower back of seven volunteers. The skin sites were evaluated by RCM for three consecutive days with a 24 h time interval. For histological correlation, 3-mm punch biopsies were obtained. The tissue sections were hematoxylin-eosin and immunohistochemical stained. Minimal and average epidermal thickness was measured. RESULTS: Reflectance confocal microscopy imaging showed highly reflective ill-defined particles with a granular content throughout the epidermis 24 h after application of LTB4. Over time, the appearance of these cells changed throughout the epidermis. Epidermal thickness increased over time, and the measurements based on the RCM images corresponded very well with the histological images. CONCLUSIONS: Reflectance confocal microscopy was able to visualize PMN migration, accumulation, and degeneration over time in the used LTB4 model. The noninvasive character and the possibility to obtain multiple in vivo images from the same location over time make that RCM in combination with this model a useful tool to study the dynamics and function of PMN in inflammatory processes in the skin. © 2014 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd. Keywords: leukotriene B4; models; polymorphonuclear leukocytes; reflectance confocal microscopy; skin inflammation PMID: 25156913