LETTER TO THE EDITOR

Emollient cream and topical glucocorticoid treatment of chronic hand dermatitis: influence on oxidative stress status of the skin

To the Editor

Exacerbation of skin inflammation is accompanied by excessive production of reactive oxygen species (ROS) like superoxide (O$_2^-$) and hydroxyl radical (OH$^-$) [1]. Besides damaging lipids, proteins and nucleic acids [2], some of ROS (e.g. superoxide anion) are capable of reducing transition metal ions, releasing iron from storage proteins, e.g. ferritin [1]. Excess of ‘free’ iron amplifies the formation of free radicals, especially those involved in lipid peroxidation (LP) [3].

Inside the cells, ROS are detoxified primarily by reduced glutathione (GSH) [4]. Removal of peroxides by this antioxidant results in generation of oxidized glutathione (GSSG) [5]. Therefore, the cellular redox status is best characterized by the glutathione redox ratio (GSSG/GSH).

The aim of our study was to determine how different treatment regimes influence the iron status, diene conjugate amount, and glutathione redox ratio in lesional skin of patients with exacerbated chronic hand dermatitis.

The study, approved by the local ethics committee, included twelve patients (11 women and a man, aged 21–63). Skin punch biopsies of 4 mm were obtained from involved hand skin and apparently healthy skin from the back prior to the study, and an additional biopsy was obtained from treated hand skin. Four healthy subjects’ skin (a man, and three women, aged 22–35) was also biopsied for comparison of skin iron levels.

One six-patient group was treated with Locobase® REPAIR cream 4–6 times/day, another with Fucicort cream (betamethasonum 0.1%, acidum fusidicum 2%) twice a day in combination with the emollient Locobase® fatty cream 4–6 times/day. The treatment period lasted from 6 to 10 weeks until improvement.

Biopsies were homogenized and used for assays. For determination of iron content and unsaturated iron binding capacity (UIBC) the Sigma 565 kit was used [6]. Total iron binding capacity (TIBC) was calculated as the sum of iron and UIBC values. The level of diene conjugates (DC) was determined as previously described [7]. Glutathione was measured by the method described earlier [8]. The glutathione redox ratio was expressed as GSSG/GSH.

Before treatment, the iron level in lesional skin of all 12 patients as compared to apparently healthy skin (585±736 and 405±446 μM/g skin, respectively) was non-significantly, DC level significantly (660±282 and 334±174 μM/g skin, P = 0.002), and GSSG/GSH also significantly (0.40±0.19 and 0.18±0.11, P = 0.002) increased. UIBC and TIBC values did not differ. After therapy, glutathione redox ratio decreased significantly (P = 0.0002) while iron and DC levels in lesional skin remained high as compared to clinically undamaged skin. The patients’ normal skin demonstrated approximately 2.5 times higher iron concentration than healthy individuals’ skin. As shown in Fig. 1, both selected treatment regimes equally improved the GSSG/GSH ratio but neither of them affected the iron level.

Although our investigation included a limited number of patients, we can assume that more intensive LP in the lesions of chronic hand dermatitis is due to ‘free’ iron as in patients’ skin the iron level was 2.5 times higher than in healthy control subjects. Furthermore, the iron level in normal skin was significantly associated with disease duration. Redox active iron could trigger additional LP. Skin barrier function is intimately associated with lipid metabolism. Intensive LP, besides damaging cell membranes may affect skin barrier lipids [9] that might lead to further damage of the skin barrier function.

Glutathione has been postulated to play an important role in inhibiting contact dermatitis [4]. Increase of GSSG/GSH before treatment and decrease after it confirms direct connection be-
between skin inflammation and glutathione redox status.

Topical glucocorticoids are the main remedies for acute and chronic dermatitis due to their anti-inflammatory effect. As our study demonstrated, emollient cream and combined topical glucocorticoid and emollient cream therapy both reduced glutathione redox status failing to affect the elevated iron level of lesional skin even after 6–10 weeks of treatment. Nevertheless, glucocorticoids shorten the period of acute inflammation accompanied by release of iron and LP. Emollients that improve skin barrier properties [10] are also needed. New strategies of chronic hand dermatitis treatment might include systemic or topical antioxidants and/or iron chelators.

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**References**


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