Aqueous cream damages the skin barrier

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This important paper provides further evidence that the application of aqueous cream BP to the skin of healthy volunteers damages their skin barrier. Following complaints from its members, the National Eczema Society first highlighted the adverse cutaneous reactions to aqueous cream 20 years ago. The negative effects of aqueous cream result, at least in part, from enhanced protease activity, which leads to the observed decrease in cornocyte surface area and maturity, and progressive thinning of the stratum corneum (SC). The authors highlight that aqueous cream BP first appeared as a preparation in the British Pharmacopoeia in 1958 and its formulation, containing sodium lauryl sulphate (SLS), remains largely unchanged to this day. The role of the SLS is to emulsify the oil into a cream formulation.

The negative effects of aqueous cream BP on the skin barrier are most likely associated with the presence of SLS (1% w/w). Aqueous solutions of SLS have been shown to cause cutaneous irritation and elevate transepidermal water loss at concentrations of 1% and less. SLS is thought to disrupt the skin barrier by several mechanisms including a direct action on cornocytes leading to their swelling in size, denaturation of keratin structures via direct binding, and elevation of SC pH. Elevated SC pH enhances the activity of degradatory, and proinflammatory, proteases and inhibits the activity of lipid-processing enzymes leading to skin barrier breakdown.

Atopic eczema/dermatitis (AD) arises as the result of gene–environment interactions leading to breakdown of the skin barrier. Strong association with mutations of the FLG gene encoding the structural protein filaggrin suggests that the skin barrier defect associated with AD is the primary cause of the disease. Negative environmental factors play an important role in facilitating further the deterioration of the skin barrier and thereby triggering the onset of AD. Soap and harsh surfactants, such as SLS, have been identified as negative environmental factors and their use is not recommended for patients with AD.

First-line therapy for patients with AD involves the intensive use of emollients including the replacement of soaps and harsh surfactant-based wash products with emollient alternatives including ointments and oils. The NICE guidance on the treatment of atopic eczema in children, 2007, recommended that aqueous cream should not be used as a leave-on emollient because of irritant reactions. Despite this aqueous cream is still the most frequently prescribed emollient cream, accounting for one in four NHS prescriptions issued in the community based on the most recent published figures for England.

Aqueous cream causes even more severe damage to the skin barrier in volunteers with a previous history of AD (Danby S, Al Enezi T, Sultan A et al. The effect of aqueous cream BP on the skin barrier in volunteers with a previous history of atopic dermatitis, in press) compared with volunteers with healthy skin assessed in this paper, and by Tsang and Guy in 2010. The evidence from these three studies suggests that aqueous cream BP, used as a leave-on emollient, is an important negative environmental factor contributing to skin barrier damage and the exacerbation of AD.

The aqueous cream formulation is ideally suited to damage rather than repair the defective skin barrier in AD. It is inconceivable that anyone designing a leave-on emollient would use SLS today. In contrast to aqueous cream, optimal emollient formulations produce an effective repair of the defective skin barrier in AD and, in a randomized controlled trial, have been shown to reduce the risk of a flare by 66% compared with no treatment. Using optimal emollient formulations in appropriate quantities could therefore be a cost-effective treatment.

Although comprehensive guidelines for the management of AD, recommending emollient therapy as a first-line treatment, were published in 2007, they have not been widely implemented in the community. We should learn another lesson from the management of asthma, where implementation of the Finnish Asthma Programme throughout the community in Finland resulted in 40% saving on the total cost to treat asthma in Finland between 1991 and 2007.

This paper further highlights the importance of not using emollients containing SLS, such as aqueous cream, because they exacerbate rather than reduce skin barrier damage.

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References