

# Occupational Dermatitis Treated with Alitretinoin

Antonella Tammaro <sup>1,\*</sup> , Camilla Chello <sup>1</sup>, Francesca Romana Parisella <sup>2</sup> and Ganiyat Adenike Ralitsa Adebajo <sup>1</sup>

<sup>1</sup> NESMOS Dermatology Department, Sapienza University of Rome, 00139 Rome, Italy; camilla.chello@gmail.com (C.C.); g.adenikeadebanjo@gmail.com (G.A.R.A.)

<sup>2</sup> Department of Medicine, The University of Queensland, Brisbane, QLD 4072, Australia; francy.rp@gmail.com

\* Correspondence: tammaroantonella@gmail.com

**Abstract:** Occupational allergic contact dermatitis is an occupational skin condition which is characterized by a delayed cell-mediated hypersensitivity reaction triggered by one or more work-related substances. In this article, we describe a hairdresser who presented with occupational allergic contact dermatitis and was treated with alitretinoin. It is important to emphasize the value of early diagnosis and treatment of occupational contact dermatitis as this allows us to tackle the physical, psychosocial and cost-related burdens that this disorder brings.

**Keywords:** occupational contact dermatitis; alitretinoin; hairdresser

## 1. Introduction

Occupational allergic contact dermatitis is an occupational skin condition which is characterized by a delayed cell-mediated hypersensitivity reaction triggered by one or more work-related substances [1]. Data extracted from major clinical pooled patch test databases show that the most prevalent workplace allergens are epoxy resin, formaldehyde, nickel sulfate, rubber chemicals and preservatives [1]. The lesions associated with this condition can have a variable morphology which includes erythema, vesiculopapular lesions, fissuring, pustules and lichenification [2].

In the following article we describe a hairdresser who presented with occupational allergic contact dermatitis and was treated with alitretinoin.

## 2. Case Report

A 35-year-old man presented with multiple fissured lesions on his hands which were pruritic (Figure 1). His medical history was negative for atopy and he reported that he had been working as a hairdresser for 14 years and was a salon owner. The patient reported that the hand lesions had been bothering him for years and that he had been previously prescribed topical corticosteroids without any clinical improvement. Moreover, the patient was a daily user of hand emollient creams.

A patch test (potassium dichromate, colophony, epoxy resin 1%, formaldehyde resin 1%, imidazolidine urea 1%, neomycin sulphate, fragrance mix 14%, nickel sulphate 5%, mercaptobenzothiazole, paraphenylenediamine 1%, cobalt chloride, balsam of Peru, thiuram mix, benzocaine, lanolin alcohols, paraben mix, disperse yellow, disperse blue, petrolatum and hydroquinone) was performed and the patient was positive (++) for cobalt chloride, nickel sulfate and paraphenylenediamine at 48 and 72 h.

Moreover, we decided to carry out a patch test using a special professional series for hairdressers (ammonium persulfate 2.5%, ammonium thioglycolate 2%, disperse orange 3 1%, glyceryl monothioglycolate 1%, 3-aminophenol 1%, 4-nitro-o-phenylenediamine 1%, 4-aminophenol 1%, p-toluenediamine sulfate 1%, and white petrolatum 100%). The patient was positive for 4-nitro-o-phenylenediamine 1% (+), ammonium persulfate 2.5% (+), p-toluenediamine sulfate 1% (+++), 4-aminophenol 1% (+) and 3-aminophenol 1% (++) at 48 and 72 h.



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**Figure 1.** Occupational allergic contact dermatitis on the hand of a 35-year-old hairdresser.

Given the results of the patch tests (Figure 2) and the constellation of symptoms of the patient, a diagnosis of occupational contact dermatitis was made.



**Figure 2.** Positive patch tests in a 35-year-old hairdresser.

The patient was advised to limit wet working and to use disposable gloves whenever possible.

Since the past medical history of this patient had highlighted the repeated use of topical corticosteroids without any clinical benefit and he expressed his inability to leave his job, systemic treatment with alitretinoin 30 mg/day was initiated. After 1 month the patient experienced a dramatic improvement of the eczematous lesions. The patient did not report any adverse effects.

### 3. Discussion

Studies conducted in the past decade have highlighted a significant prevalence of allergic contact dermatitis among hairdressers which has been linked to the nature of their

job [2,3]. This skin condition is diagnosed with patch testing and it appears to be more common as an irritant counterpart in this category of workers. Furthermore, women appear to be affected more than men, probably because of their tendency to seek medical attention more frequently [4].

Notably, occupational contact dermatitis is linked to poor quality-of-life outcomes which can be thwarted by timely detection and early treatment [5].

The majority of cases of allergic contact dermatitis in hairdressers that have been published in the medical literature have been attributed to paraphenylenediamine, followed by nickel sulfate, formaldehyde, fragrances, resorcinol, ammonium persulfate, glyceryl monothioglycolate, thiurams and carbamates [6,7].

According to the recently published guidelines, the first step that should be taken to address occupational hand eczema is the avoidance of the causative exogenous factor whenever possible [8]. In the case of hairdressers that would mean limiting or completely giving up wet working, which is extremely challenging since prolonged contact with water and styling products is a big part of this profession. Unfortunately, the latter was not possible in our case because of the unwillingness of our patient to leave his profession. To limit direct contact with potential allergens we advised the implementation of disposable gloves during his working hours.

According to consensus-based recommendations, emollients and topical corticosteroids are recommended in the management of chronic hand eczema. The side effects of the latter, which are meant to be applied for a short period of time, are subordinate to the potency of the corticosteroid utilized. Notably, the most aggressive ones can impair the regeneration of the uppermost layers of the skin because of their action on filaggrin.

The use of systemic drugs can be conceived when topical measures are not effective and/or there is a strong desire and necessity to stay in the job, which was the case of our patient.

There are many systemic treatments, such as azathioprine, cyclosporin and methotrexate, which have been tested to tackle the burden of chronic hand eczema; however, alitretinoin is the only one which is licensed for the treatment of this condition (grade of recommendation: A).

Since our patient had already applied topical corticosteroids after a previous medical consultation without any significant clinical improvement, we prescribed him alitretinoin even though this is generally thought to be a second-line treatment.

Alitretinoin (9-cis retinoic acid) is an endogenous retinoid with anti-inflammatory, immunomodulatory and anti-proliferative effects [9]. Alitretinoin is used for the management of chronic hand eczema and promising preliminary results have been obtained in the treatment of psoriasis, Kaposi's sarcoma, lichen planus, atopic dermatitis, lichen simplex chronicus, cutaneous T cell lymphoma, keratitis-ichthyosis-deafness syndrome, Darier's disease, pyogenic granuloma and pityriasis rubra pilaris [9]. Chronic hand eczema is a condition that is characterized by the presence of inflammation and whose specific immune profile is dependent on the underlying mechanism of irritant contact dermatitis, allergic contact dermatitis or atopic dermatitis, which, in many instances, coexist in the same patient [10].

Although the mechanisms that underpin the effectiveness of alitretinoin remain poorly understood, Kislat et al. [11] endeavored to connect the dots pertaining its action on the skin affected by chronic hand eczema. The authors found that 9-cis retinoic acid halts CD83 and CD80, leading to altered dendritic cell-induced T lymphocyte activation [11]. Furthermore, alitretinoin lowers the expression of chemokines in keratinocytes, further impairing T cell activation [11]. Hence, alitretinoin may reduce the immune activation seen in chronic hand eczema which destroys keratinocytes and induces the formation of an inflammatory infiltrate, leading to symptom resolution [10]. Its immunomodulatory effects are enhanced by its ability to halt the production of nitric oxide, which is implicated in immune activation [6]. Additionally, alitretinoin is endowed with anti-proliferative and

pro-apoptotic properties which are exerted through the retinoic acid receptor (RAR) and the retinoid X receptor (RXR) (6).

Of note, patients appear to respond better when treated with higher dosages of alitretinoin (30 mg versus 10 mg) [12].

Headache and photosensitivity are the most common adverse events associated with alitretinoin which can easily be tackled with painkillers and sun protection [13]. Other findings such as dry lips and skin and psychiatric sequelae are exceedingly rare [13].

Oral corticosteroids are administered only for a limited amount of time in selected cases when another systemic therapy is planned.

Compellingly, studies are being conducted to test the efficacy of dupilumab (interleukin 4 and interleukin 13 monoclonal antibody) and delgocitinib (janus kinase inhibitor) to broaden the spectrum of drugs available to potentially treat occupational hand eczema.

#### 4. Conclusions

We decided to share our experience because we would like to highlight two main concepts: the first one is the pivotal role of prevention in the management of occupational hand eczema in hairdressers, either in the form of giving up wet work or wearing protective gloves. The second one is the use of alitretinoin in patients who have already undergone a cycle of topical corticosteroids with inconclusive results, even when the latter have been prescribed from a different medical consultation.

Moreover, it is important to emphasize the value of early diagnosis for the treatment of occupational contact dermatitis as this allows us to tackle the physical, psychosocial and cost-related burdens that this disorder brings.

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