Allergic Contact Dermatitis Induced by Prostaquinon

Arias Irigoyen J[1], Arias Talavera I[2]
[1]*Allergist, Private Medical Center, Huelva, Spain*
[2]*Family Physician, Private Medical Center, Huelva, Spain*

J Investig Allergol Clin Immunol 2022; Vol. 32(5): 412-413
doi: 10.18176/jiaci.0782

Key words: Allergic contact dermatitis. Nigella sativa oil. Patch test. t-Butylhydroquinone.

Palabras clave: Dermatitis de contacto. Aceite de *Nigella sativa*. Pruebas epicutáneas. t-butilhidroquinona.

Nigella sativa is a widely used medicinal plant throughout the world thanks to its immunomodulatory, analgesic, and antioxidant effects. Most of its biological activity is due to thymoquinone, the major component and one of the pharmacologically active compounds [1].

Prostaquinon is an extract of *N sativa* that inhibits the prostaglandin PGD2. Thus, it could be effective in patients with alopecia who undergo hair transplant on account of its anti-inflammatory and antioxidant effects in hair follicles [2]. It is normally applied topically at 0.4%-2.4% in essential oil.

Irritant and allergic contact dermatitis [3] have been described in treatments with herbal medicines.

We report a case of severe contact dermatitis induced by localized use of Prostaquinon in a patient who underwent hair follicle transplantation.

A 32-year-old man with no history of allergic or atopic skin disease presented with maculopapular eczema accompanied by severe itching, vesicles, and exudation along the frontal hairline that reached the neck and arms.

The patient had undergone a hair transplant 15 days before the onset of symptoms and had been using an oil containing Prostaquinon 2.4%, Trichooil, and Ginko Biloba 2.25%.

He was initially diagnosed with folliculitis and treated with oral antibiotics and corticosteroids, which improved his symptoms. When the treatment was discontinued, the patient's condition worsened because he still was using the oil. Therefore, we suspected contact dermatitis caused by a component of the oil.

Patch tests were performed using the standard series of the Spanish Contact Dermatitis and Skin Allergy Research Group (GEIDAC), a cosmetic and fragrance series including tert-butylhydroquinone (TBHQ) 1% pet (Chemotechnique Diagnostics), as well as the patient's own oil. The 3 components of the oil used by the patient (Prostaquinon 2.4%, Trichooil, and Ginko Biloba 2.25%) were tested "as is". Readings were carried out at 48, 72, and 96 hours. Given the irritant effect of Prostaquinon 2.4% in controls, the test was repeated in a dilution of 1:10 in olive oil. Patch tests with Prostaquinon diluted 1:10 in olive oil and TBHQ both yielded extremely positive readings (+++) at 48, 72, and 96 hours (Figure). However, negative results were recorded with the

Figure. Reaction to patch test with Prostaquinon diluted 1:10 in olive oil (A) and to patch test with tert-butylhydroquinone 1% pet (B) at 48 and 96 hours.

standard series (GEIDAC, cosmetic and fragrance series) and the remaining products tested (Trichooil and Ginkgo Biloba).

Patch testing of 10 controls (5 atopic and 5 nonatopic) with Prostaquinon diluted 1:10 in olive oil yielded no reactions.

N sativa is currently very popular because of its special properties. Consequently, many products used in alopecia and hair transplants contain essential oils derived from the seeds of this plant. However, several studies have shown a potential risk of developing allergic contact dermatitis after topical application of these essential oils in cosmetics and perfumes [4-6]. Moreover, severe systemic allergic dermatitis has been reported after ingestion [7].

While the trigger of the allergic reaction remains unidentified, some authors [8,9] strongly suggest that thymoquinone may be one of the main allergens involved in the pathophysiology of contact dermatitis to *N sativa* oil.

TBHQ is not a component of *N sativa*, although its chemical structure is similar to that of thymoquinone. Based on data from several published cases, Seiller et al [10] hypothesized that TBHQ could be a good marker of *N sativa* allergy. We can corroborate this hypothesis, because the patient reported in the present case developed extremely positive reactions to patch tests for both substances, *N sativa* oil, and TBHQ. Moreover, patch testing with Prostaquinon 2.4% caused irritation in controls, whereas Prostaquinon diluted 1:10 in olive oil was well tolerated.

Skin lesions appeared when the patient started to apply Prostaquinon on the scalp after hair transplantation. While these lesions were initially diagnosed as folliculitis, the reappearance of symptoms once treatment was interrupted pointed to contact dermatitis.

We should be aware of the possibility of allergic contact dermatitis to *N sativa* in patients who undergo hair transplantation and subsequently apply essential oils.

Funding

The authors declare that no funding was received for the present study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

1. Gholamnezhad Z, Havakhah S, Boskabady MH. Preclinical and clinical effects of Nigella sativa and its constituent, thymoquinone: a review. J Ethnopharmacol. 2016;190:372-86.
2. Prostaquinon (Extracto de Nigella sativa) - Albarelo Farmacia Laboratorio [Internet]. Albarelo Farmacia Laboratorio. 2021 [Accessed 29 June 2021]. Available from: https://albarelo.es/prostaquinon/.
3. Nosboum A, Vocanson M, Rozieres A, Hennino A, Nicolas J. Allergic and irritant contact dermatitis. Eur J Dermatol. 2009;19:325-32.
4. De Groot AC, Schmidt E. Essential Oils, Part IV: Contact Allergy. Dermatitis. 2016;27(4):170-5.
5. Steinman A, Schätzle M, Agathos M, Breit R. Allergic contact dermatitis from black cumin (Nigella sativa) oil after topical use. Contact Dermatitis. 1997;36:268-9.
6. Zedlitz S, Kaufmann R, Boehncke WH. Allergic contact dermatitis from black cumin (Nigella sativa) oil-containing ointment. Contact Dermatitis. 2002;46:188.
7. Dehavay F, Kolivras A, Scheers C. Local and systemic adverse skin reactions following the use of herbal products believed to contain Nigella sativa seeds and oil. Contact Dermatitis. 2019;80:176-7.
8. Kurihara F, Soria A, Lepoittevin J-P, Chasset F, Barbaud A, Pecquet C. Thymoquinone as a causative allergen in Nigella sativa oil contact dermatitis with cross-reactivity to tert-butylhydroquinone. Contact Dermatitis. 2020;83:132-4.
9. Gaudin O, Toukal F, Hua C, Ortonne N, Assier H, Jannic A, et al. Association between severe acute contact dermatitis due to Nigella sativa oil and epidermal apoptosis. JAMA Dermatol. 2018;154(9):1062-5.
10. Seiller H, Kurihara F, Chasset F, Soria A, Barbaud A. Tert-butylhydroquinone is a marker for sensitivity to Nigella sativa oil allergy: Five new cases. Contact Dermatitis. 2021;84:447-9.

Manuscript received October 18, 2021; accepted for publication January 14, 2022.

Jose Arias Irigoyen
C/ Palos, 15-17, 2º B
21003 Huelva, Spain
E-mail: josearias1965@gmail.com