

# Contact dermatitis aggravated by other sensitivity in self-medication

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## ABSTRACT

Allergic contact dermatitis is an inflammatory, non-infectious skin disease. The treatment is based on the identification and elimination of the causal agent. Cocamidopropyl betaine is a surfactant widely used in products for personal use, especially capillary use. This substance is not present in the Brazilian baseline series. Neomycin is an antibiotic used in topical preparations. We aimed to show a patient who developed an allergy in the scalp and mistakenly self-medicated with a product that contained a substance to which it was even more sensitive. The case is of a woman, 36 years old, evolving for 2 months with pruritic eczema, in areas of capillary and nape implantation. She reported progressive worsening. When contact dermatitis was suspected, a contact test was performed using the Latin American baseline series. At 96 hours (D4) there was mild positivity (+) for cocamidopropyl betaine and strong (++) for neomycin. The positive result for neomycin was intriguing, since the observation of the label of products for personal use did not contain it. In view of the test result, after being questioned again, she confirmed the omission of daily self-medication with neomycin ointment. In conclusion, we showed the allergy to hair products. We reinforced the need for an updated baseline series patch test. Finally, we warned about the risk of self-medication.

**Keywords:** Allergic contact dermatitis, Cocamidopropyl betaine, Neomycin, Patch test.

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## INTRODUCTION

Contact dermatitis is a common skin condition affecting an average of 19.5% of the population and imposes significant suffering<sup>1</sup>. Perhaps this is one of the reasons patients eagerly seek resolution through a lifesaver drug, abusing self-medication. The disease is mainly preventable<sup>1</sup>, so the best course of treatment is to identify the cause and remove it. Symptomatic treatment is necessary, especially with topical anti-inflammatory drugs (topical corticosteroids), as a delayed inflammatory hypersensitivity reaction effectively characterizes the disease. We aimed to show a patient with eczema caused by cocamidopropyl betaine, a common component of shampoos and conditioners, who self-medicates with neomycin-based ointment, to which she has even greater sensitivity. The result is progressive worsening. This study was developed following Resolution 466/12 of the National Health Council and was approved by the Research Ethics Committee of the Health Sciences Education and Research Foundation under the number CAAE 22295219.9.0000.5553.

## CASE REPORT

We present a 36-year female bank clerk, who developed lesions with erythematous, eroded, excoriated, and scaly plaques on the scalp, bilateral cervical region (Figure 1), nape (Figure 2), and in capillary implantation on the temples (Figure 3) and some of them with a lichenification aspect, for two months. She reported intense pruritus and noticed a progressive worsening over time, seeking the emergency room that referred her case to our specialized service. She denied a history of allergies, use of medications or cosmetic procedures, except for dark hair coloring.

After a presumptive clinical diagnosis, the patient was submitted to the patch test, using a standard Latin American baseline series containing 40 allergens. The patch test was performed using four previously prepared containers with ten allergens and Alergochamber<sup>®</sup> hypoallergenic adhesive tapes (Neoflex Biotecnologia Ltda<sup>®</sup>). The allergens were handled, following their "CAS number", by the company IPI ASAC BRASIL<sup>®</sup>, according to the instructions of Colégio Ibero Latino-Americano de Dermatologia<sup>2</sup>. Readings were taken at 48 (D2) and 96 hours (D4). On D4 reading, a mild positive reaction (+) to 1% cocamidopropyl betaine in aqueous solution and a strong positive reaction (++) to 20% neomycin in petroleum jelly were observed (Figure 4).



Figure 1. Eczema with erosions and fissures on the lateral side of the neck.



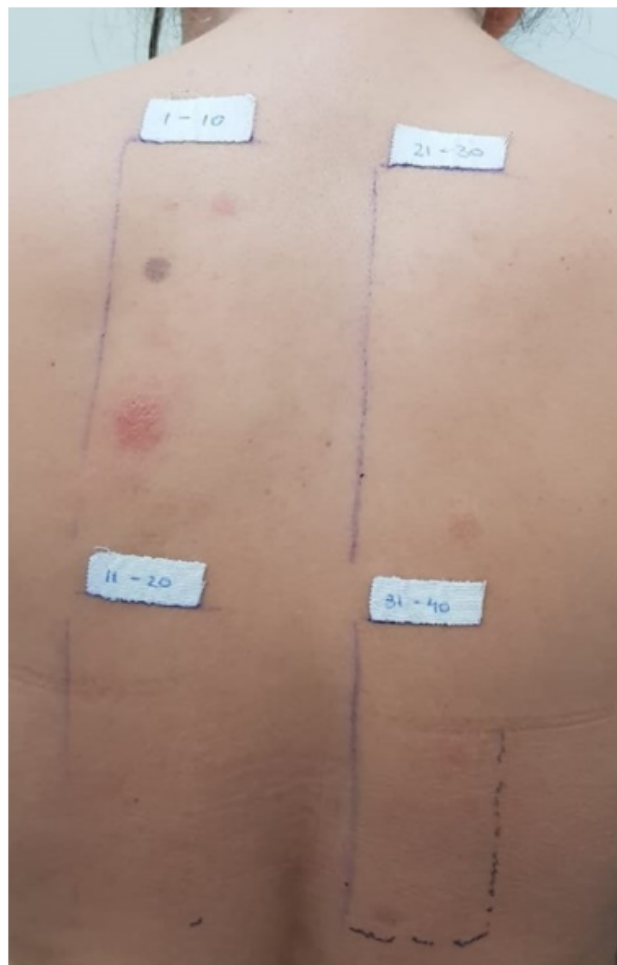
Figure 2. Erythematous plaque on the nape.

## DISCUSSION

Contact dermatitis is a common, non-infectious, inflammatory skin disease that occurs through direct or indirect contact with harmful substances to the skin. One of its main characteristics is that this disease is mainly preventable<sup>1</sup>. Thus, the mainstay of treatment is the identification and elimination of the eczema-generating



**Figure 3.** Macule on the hairline area.



**Figure 4.** D4 reading – Neomycin ++ and cocamidopropyl betaine +.

factor. We present a case where the patient, instead of trying to identify the cause, either empirically avoiding suspicious products or demonstrably through a patch test, preferred to self-medicate. Besides not being indicated itself, the self-medication was performed with an antimicrobial drug. As it was not an infectious disease, it did not improve. Furthermore, she clinically showed a progression of eczema precisely because she was allergic to the product she was using specifically for the treatment.

Emphasizing that even though the scalp is constantly exposed to various allergens daily, allergic contact dermatitis is uncommon in this location<sup>3</sup>. However, we observed the involvement in the pattern known as rinse-off hair products in the patients' clinical evaluation. In this pattern, there are eczematous plaques on the sides of the face and neck. Lesions are produced by the allergen running down the face. It is typical of shampoos, conditioners, and other products that are temporarily applied to the scalp and make brief but recurring contact with the skin on the face<sup>3</sup>. If she had gone to a specialist, this clinical observation would have already been made, changing the products in use even before performing a definitive patch test. A recent publication reinforces that regulatory T cells are concentrated in hair follicles, acting under normal conditions, promoting tolerance to resident organisms. This explains why eczema does not commonly occur in this region<sup>4</sup>.

Cocamidopropyl betaine is a synthetic detergent increasingly used in cosmetics and personal care products (i.e., shampoos, contact lens solutions, toothpaste, makeup removers, soaps, etc.) because it induces relatively minor skin irritation. However, delayed hypersensitivity reaction has been reported, and the prevalence of contact sensitivity is estimated to range from 3 to 7.2%. The increasing sensitization rate led to cocamidopropyl betaine being named "Allergen of the Year" in 2004<sup>5</sup>. As stated, in this case, the test result was slightly positive (+). In those events, positive reactions to the patch test should be carefully evaluated to infer their clinical relevance or any relationship between the positive reaction and the dermatitis found<sup>6</sup>. We observed that the relevance was present, as all shampoos and conditioners brought by the patient for label verification contained the substance. In other words, the test was related to the clinical symptoms that led the patient to seek dermatological care (she was exposed to the allergen that was positive in the test, thus co-responsible for current dermatitis)<sup>6</sup>.

All patients with suspected allergic contact dermatitis should undergo testing with a standard baseline series<sup>7</sup>. If an allergen is found in above 1% of the population, this percentage justifies the inclusion of the allergen in the baseline series<sup>8</sup>. The Brazilian baseline series proposed by the Brazilian Group of Contact Dermatitis in 1996, whose guideline study was published 20 years ago, does not include cocamidopropyl betaine<sup>9</sup>. We did not find demographic studies to show the prevalence of sensitivity to this allergen in the Brazilian population. Only the use of an expanded and updated baseline series, such as the Latin American, proposed by the Latin American College of Dermatology in 2015, made the diagnosis of primary sensitivity possible<sup>2</sup>. In the United States, cocamidopropyl betaine is included in the baseline series, with a prevalence of 1.6% positivity in the population tested<sup>10</sup>.

Neomycin is an aminoglycoside antibiotic commonly used in topical medications such as creams, ointments, and eye and ear drops. Contact dermatitis related to neomycin is common in patients with lower extremity dermatitis, atopic dermatitis, genital eczema, and eyes or ears chronic inflammation. The incidence of neomycin allergy is around 3.6% in populations submitted to patch test and 1% in healthy individuals<sup>11</sup>. The drug was not found in any of the cosmetic products brought by the patient. It was misused as self-medication. In addition to not resolving eczema, it led to a progressive worsening, leading to severe eczema and uncontrollable pruritus. We emphasize that in the initial anamnesis, the patient did not reveal its use. Only after we showed the intensity of the reaction on her back, she confess to using the product containing neomycin daily and felt the worsening. In the practice of conducting patch tests for years, we often observe this habit of omitting the products in use, perhaps for fear of recrimination from the professional concerning self-medication.

In conclusion, we show the possibility of allergy to hair products such as shampoos and conditioners

and warn that this substance is not part of the current Brazilian baseline series. In addition, we reinforce the need to explain the risk of self-medication, and only an expanded and updated patch test made it possible to diagnose a strong sensitivity to neomycin (unexpected) and mild (but relevant) sensitivity to cocamidopropyl betaine, which generated the whole problem.

## REFERENCES

1. Nixon RL, Allnutt KJ, Diepgen TL. Contact Dermatitis. In: Adkinson NF. Middleton's Allergy Principle and Practice. 9<sup>th</sup> ed, Philadelphia: Elsevier; 2020. p. 553-61.
2. Consenso "Dermatitis por Contacto". Sociedad Argentina de Dermatología. Buenos Aires, 2015.
3. Rozas-Munoz E, Gamé D, Serra-Baldrich E. Dermatitis de contacto alérgica por regiones anatómicas. Claves diagnósticas. *Actas Dermosifiliogr.* 2018;109:485-507.
4. Ojo EO, Gowda A, Nedorost S. Scalp Dermatitis in Patients Sensitized to Components of Hair Products. *Dermatitis.* 2019;30(4):264-7.
5. Jacob SE, Amini S. Cocamidopropyl betaine. *Dermatitis.* 2008;19(3):157-60.
6. Nettis E, Angelini G. Evaluation of the clinical relevance of a positive patch test reaction. In: Nettis E, Angelini G, Practical Guide to Patch Testing. 1<sup>st</sup> ed, Cham: Springer Nature Switzerland; 2020. p. 33-40.
7. Pinto CC, Novell VS, Giménez-Arnau AM. Practical advice to correctly perform patch test. *Curr Treat Options Allergy.* 2019; 6:71-91.
8. Lachapelle JM. Baseline series of patch tests. In: Lachapelle JM, Maibach HI. Patch Testing and Prick Testing. 4<sup>th</sup> ed, Cham: Springer Nature Switzerland; 2020. p. 85-104.
9. Grupo Brasileiro de Estudos em Dermatite de Contato. Estudo multicêntrico para elaboração de uma bateria-padrão brasileira de teste de contato. *An Bras Dermatol.* 2000;75(2):147-56.
10. DeKoven JG, Warshaw EM, Belsito DV, et al. NACDG patch test results. *Dermatitis.* 2017;28(1):33-46.
11. McFadden J, Puangpet P, Pongpairaj K, Thaiwat S, Xian LS. Neomycin. In: McFadden J. Common Contact Allergens: A Practical Guide to Detecting Contact Dermatitis. 1<sup>st</sup> ed, John Wiley & Sons; 2020. p. 287-91.

**Conflicts of interest**

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