

### Case Report

## Allergic contact cheilitis due to lipstick

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### ABSTRACT

**Background:** Cheilitis is a common problem of unknown etiology. A possible cause of cheilitis is contact allergy. Drugs, lipsticks, sunblock and toothpaste are the most common implicated allergens. Allergic contact cheilitis is a chronic superficial inflammatory disorder of the vermilion borders characterized by desquamation due to delayed-type hypersensitivity reaction. **Purpose:** We report a management of Allergic contact cheilitis due to lipsticks. **Case:** A 21-year-old woman had a history of atopic allergy to eggs, milk, and chicken presented with sore, dry, fissured, scaled and sometimes bleeding lip, over a 3-month period after application of a lipstick. Her symptoms persisted despite treatments with hydrocortisone cream. The patient provided a detailed history and underwent physical examination and patch tests to cosmetic components and patch test to her own lipstick. The patient had strongly-positive result to the tested lipstick. A diagnosis of allergic contact cheilitis was made based on the history and clinical findings. **Case management:** Patient was advised to avoid wearing lipstick. To relieve symptoms, treatment was initiated with combined topical corticosteroid, antibiotic, and moisturizer. **Conclusion:** Contact allergy patients should be tested for both cosmetic component series and their own lipsticks to exclude exfoliative cheilitis, infection, or light actinic cheilitis as causal agents.

**Keywords:** allergic contact cheilitis; delayed-type hypersensitivity; lipstick allergen

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### INTRODUCTION

In normal circumstances, body's defense mechanism, both humoral and cellular, is dependent on the activation of B cells and T cells. However, the excessive activation by antigens or interruption of this mechanism will trigger undesirable immunopathology condition since it can cause tissue damage to fatal circumstances, such as death called hypersensitivity reaction.<sup>1</sup> Hypersensitivity reaction, first introduced by Von Pirquet in 1906, is a change in immune activity induced by antigens.<sup>2</sup> Hypersensitivity reaction outlined by Gell and Coombs can be divided into four types based on speed and immune mechanism of hypersensitivity reaction. Hypersensitivity reaction may occur through one type of reaction, but clinically two or more types of these reactions may occur in the same time.<sup>3</sup>

Allergic contact cheilitis is one of allergy types classified into delayed hypersensitivity arising after

mucosal contact with certain substances and 24-72 hours after exposure to antigens. Those substances, for example, are drugs, cosmetics, metal, and other substances. At the time of first contact with the skin, mucous substances will penetrate into the bottom layer of the epidermis, then bind to protein carriers, and change into immunogenic. After that, it will trigger a hypersensitivity reaction characterized by the presence of erythema and edema. This manifestation sometimes is followed with the presence of vesicles on more severe condition.<sup>1,4</sup> Delayed hypersensitivity does not involve antibodies, but involves T lymphocytes. This reaction occurs because T lymphocytes synthesized will react specifically with a certain antigen, leading to an immune reaction.<sup>3,5</sup>

Cheilitis is a term commonly used to describe an inflammation in the vermilion border of the lips. Vermilion border is the boundary between mucosa and skin. In this area, there is a thin layer of the epithelium and quite a

lot capillaries supplying blood in order to give red color in lips.<sup>3,6</sup> Cheilitis can be considered as an inflammatory reaction that occurs in the mouth caused by exogenous and endogenous factors. Exogenous factors, for instance, are lipstick, lip balm, sunscreen material, and dental materials. Contact cheilitis can be classified into several types, namely allergic contact cheilitis, irritant contact cheilitis, and atopic cheilitis.<sup>6,7</sup>

15-20% of allergic contact cheilitis cases are caused by cosmetics, especially lipstick and powder beauty, and mostly occur in women. Lipstick is made of various substances, such as lanolin, perfume, and some metals (metal cadmium, lead, and nickel) needed to make the color more resistant and to make the packaging of the lipstick. Patch test examination on 196 cases of allergic contact cheilitis showed that 16% of positive relation to cosmetic products used by the patients.<sup>5,6</sup> We report a management of allergic contact cheilitis due to lipsticks.

## CASE

This case was about a female student aged 21 years who visited the clinic of mouth disease, Faculty of Dental Medicine, Universitas Airlangga on June 4, 2015 with complaints of pain, stiff, dry, cracked, and bleeding easily on the upper and bottom lips since 3 months earlier. Those complaints arose after using a new lipstick obtained from friends. This patient had never worn this brand of lipstick before.

She actually had ever visited a dermatologist since her lips was getting hot and sore. She was then asked to take hydrocortisone ointment regularly twice a day for 2 weeks. During using the ointment, she felt more comfortable since her complaints reduced. When the ointment was up, she felt her lips more dried, cracked, sores, and bleeding easily. Since her lips were dried and chapped, she started to try to peel them and given lip balm. In addition, she also tried to smear her lips with honey, but the condition of her lips did not change. Based on her medical history, she had allergies to chicken, eggs, milk, and shrimp. She also suffers from asthma and gastritis. Drugs that had been undertaken were Cetrizin®, but only when allergy recurrence. Her sister also has allergies to dust

The results of clinical examination conducted were multiple fissure, easy bleeding, exfoliative condition, pain

in the vermillion border of the upper lip, and multiple minor erosion on the vermillion border of the lower lip as shown in Figure 1.

## CASE MANAGEMENT

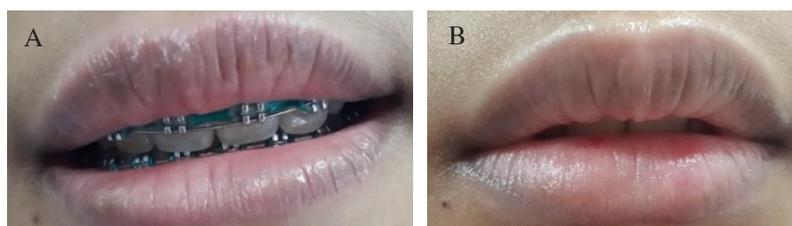
In the first visit, the patient was given Oxyfresh and ascribed to have complete hematological laboratory examination, total IgE, and patch test. The patient was encouraged to use the drug regularly, avoid using lipstick brands that cause allergies and other brands, avoid eating foods that can trigger allergies, and control after obtaining the examination results.

In the second visit, on the fourth day after the first visit, the patient felt better since her complaints diminished, but she still felt her lips little stiff, dry, and fissure bleeding easily. The last dose of the drug recommended was taken in that morning. However, she admitted that she ate chicken two days earlier despite knowing she has allergy to chicken. She then took Cetrizin® since she felt itchy after eating chicken. During clinical examination, there were red areas, multiple fissures bleeding easily, and desquamation at the vermillion border of the upper and lower lips found. She came with the results of the laboratory tests. The results showed that her neutrophil count was low as well as her lymphocytes, monocytes, and reticulocytes, but her erythrocyte sedimentation rate was higher than the normal one.

During this second visit, she was given compounded prescription, including hydrocortisone 0.125 g, kemicetine 0.125 gr, lanolin 0.25 g, and 5 g of petroleum jelly in the



**Figure 1.** The condition of the patient's mouth, namely multiple fissure, easy bleeding, exfoliative condition in the vermillion border of the upper lip, and multiple minor erosion on the vermillion border of the lower lip.



**Figure 2.** (a) The condition of the patient's lips in the second visit on day 4; (b) the condition of the patient's lips in the third visit on day 11.



**Figure 3.** The condition of the patient's lips in the fourth visit on the 14<sup>th</sup> day. There was no abnormality in her upper and lower lips. The patient was declared cured.

form of a topical drug applied to the lips four times a day. She was also encouraged to use the drugs on a regular basis, and avoid using all brands of lipstick either causing allergies or not. She was stressed to avoid eating foods triggering allergies and asked to come to control seven days later.

In the third visit on the eleventh day, the patient felt better without any complaints of pain in her upper and lower lips. Her lips were not dry anymore, yet still little stiff. She had taken the drugs on a regular basis in accordance with the doctor's instructions. She also had avoided eating food causing allergens and using any brand of lipstick. During clinical examination, her upper lip did not seem to have any abnormalities, but her lower lip seemed to have multiple minor erosion. She was then instructed to continue the treatment and avoid eating foods considered as the originator of her allergy. She was also encouraged to use the drug on a regular basis, and avoid using all brands of lipstick, lip gloss, or lip cosmetic products.

In the fourth visit on the fourteenth day, she had no complaints. She felt comfortable and had no pain anymore on her lips. The topical drug concoction was up, and the last one was used in that morning. During clinical examination, there was no abnormality on her upper and lower lips (Figure 3).

The patient was instructed to discontinue using topical medication concoction. She also asked to avoid eating foods triggering allergies and also using any brand of lipstick. She was then referred to do a patch test in dermatology section of Hospital RS. Dr Sutomo, Surabaya to determine the cause of the allergy. She came again without any complaints with the results of the patch test. She had not used any brand of lipstick and not eaten food causing allergy two weeks before the allergy test. She followed those instructions well. Based on the results of the patch test, it was concluded that the patient was allergic to lipstick. On this visit, the treatment was complete, and the patient was advised to maintain oral hygiene and avoid consuming certain ingredients triggering allergies. She was also advised to avoid using of lipstick causing allergens and to perform a skin test on a new lipstick that will be used.

## DISCUSSION

Lipstick is one of the most frequent cosmetics that can cause allergic contact cheilitis, and often occurs in women. Allergic contact cheilitis is usually caused by the use of lipstick because of materials contained in lipstick. The main materials composed of the lipstick are metal, dyes, and fragrances, and patients are often allergic to one or three ingredients.<sup>5,7</sup> Patch test was performed on the materials contained in any lipstick and the lipstick worn by the patient because the patient might also not be allergic to the ingredients composing the lipsticks, but allergic to the lipstick used.

Chemical substances contained in lipstick can bind to carrier proteins in the body in order to be immunogenic. Immediately after contacting with the mucosa, the carrier proteins will bind these ions and become immunogenic antigens. The protein molecules will then become phagocyte by macrophage functioning as a cellular immune response and as antigen presenting cells (APC). Through major histocompatibility complex (MHC), the class 2 proteins were presented on the cell surface of the APC in the form of fragments in order to be recognized by T lymphocytes and activate T-helper and Tc memory lymphocytes. On the next contact, T memory cells will recognize antigens and activate Th1 and Th2, known as CD4 + and CD8 + T considered as cytotoxic T set. Lymphocytes activated will then secrete cytokines including interleukin-2 (IL-2) and interferon-gamma (IFN- $\gamma$ ) which are signaling proteins that have strong chemotraction to attract eosinophils, basophils, and macrophages that can cause inflammatory responses and tissue damage manifesting on lips.<sup>1,2,7</sup>

Based on history, clinical examination, and patch test, the patient was diagnosed with allergic contact cheilitis because of inflammation in mouth after contacting with materials suspected to trigger allergic reactions. Allergic contact cheilitis is a contact allergic reaction on lips. In this case, it was caused by chemical substances contained in the lipstick worn by the patient. This reaction had caused inflammation in the lip area. The symptoms, however, depend on the frequency and duration of contact with allergens. Contact allergies can be classified into type 4 hypersensitivity reactions or delayed-type hypersensitivity. This reaction occurs in 24-72 hours after exposed to an allergen lasting until the next 2-3 days. In this type, there is no involvement of immunoglobulin and T-cell mediation (Tcell-mediated hypersensitivity). This type of allergic reaction can only take place if no prior contact with allergens, and also become sensitized. Subsequent exposure to the allergens will cause several symptoms, such as: exzema-like lesions, fissures, erythema, burning sensation, as well as itching, and in more severe conditions it can trigger vesicles and crusting.<sup>2,4,7,8</sup>

Patients are treated with topical hydrocortisone lips, lanolin, kemicitine, and vaseline. Hydrocortisone is classified into the group of corticosteroids that are anti-inflammatory to reduce inflammation of the lips. Kemicitine is a broad-spectrum antibiotic with another name, chloramphenicol. Kemicitine is sensitive against gram positive negative bacteria, thus, additional administration of antibiotics in these patients is aimed to prevent secondary infection because of their open wounds, such as deep fissure and bleeding easily. Lanolin is added as a natural moisturizer needed to alleviate the symptoms of dry mouth. Vaseline is an additional material as an ointment base.<sup>9</sup> In this visit, the administration of those drugs was aimed to deliver treatment in order to immediately reduce complaints in patient.

Patch test only could be performed after the patient had been declared cured since to perform this test, the patient should be free from the use of medications, especially corticosteroids, and also free of lesions that may increase due to a hypersensitivity reaction and can interfere with the reading of the results of the patch test. Reading was taken at 48 hours, 72 hours and 7 days after the test. Based on the results of the patch test, the patient was allergic to the lipstick worn.

Management in this case consisted of tracing the history of allergy on the patient and her family, and conducting patch test procedure to determine definitely allergens contacting with the patient and causing allergic reactions. Avoiding allergens is the key to the success of the treatment in addition to the use of drugs needed to suppress inflammation and reduce the patient's complaints.<sup>10,11</sup>

In this case management, the patient was then diagnosed with allergic contact cheilitis with lipstick as contributing factors. Diagnosis was made based on the history of

allergies and clinical features paired with the patch test as a primary screening contact allergy. Differential diagnosis was exfoliative cheilitis because it clinically had desquamation description on the vermilion borders of the lips. The main treatment was to avoid the cause and the use of steroid drugs to suppress inflammation.

In conclusion, patients with allergic contact cheilitis against cosmetic products are advised to be more careful in choosing and using cosmetics, especially lipstick. Finally, it is recommended for skin testing prior to cosmetic use.

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