

Case Report: Lip And Perioral Inflammatory Lesion Related To Allergic Reaction

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Abstract

Background: Inflammation of the lips and vermillion border is commonly associated with allergic reactions. This condition occurs as a result of a type IV hypersensitivity reaction following contact with allergens. Sources of allergens include dental materials, cosmetics, food products, and other substances.

Case Presentation: A 7-year-old boy, presented with complaints of lip thickening, burning sensation, itching, pain, and dryness for three days. The patient had previously sought treatment from a nearby healthcare provider without improvement. There was no previous history of allergy. The patient denied consumption of fish, chicken, eggs, or fruits before the onset of symptoms. He brushed his teeth twice daily using toothpaste. Extraoral examination showed edematous lips with erythema, ill-defined borders, and thickened texture. The perioral area showed erosions with desquamation, erythema, thickening, clear margins, and was dry, hot, itchy, and painful. Intraoral examination revealed a round ulcer measuring 2 mm with a white center and erythematous margins, without pain.

Conclusion: Allergic Contact Cheilitis (ACC) is a form of allergic contact dermatitis of the lips caused by a type IV hypersensitivity reaction. This condition is commonly triggered by allergens from dental materials, cosmetics, metals, and natural products.

Keywords: lip, perioral inflammation, hypersensitivity

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I. Introduction

Cheilitis is an inflammatory condition of the lips that may involve the vermillion border or perioral skin. Clinically, it may present as lesions on the lips and perioral area such as desquamation, fissures, erosions, edema, and erythema, accompanied by burning sensation, dryness, heat, pain, and itching that affect patient comfort and oral function.¹⁻³ The etiology of cheilitis is broad, including irritative, infectious, allergic, nutritional, and systemic factors. Some cases of cheilitis clinically resemble herpes labialis; therefore, accurate diagnosis requires careful history-taking regarding environmental exposures and patient habits.⁴⁻⁶

Allergic Contact Cheilitis (ACC) is a form of allergic contact dermatitis of the lips caused by exposure to allergens. Sources allergens include dental materials, cosmetics, food products, and other substances. This condition is mediated by a type IV (delayed-type) hypersensitivity reaction involving activation of T lymphocytes against haptens bound to host proteins.^{5,7}

Clinical manifestations of ACC often resemble other types of cheilitis, leading to delayed diagnosis if the triggering factors are not identified. Studies report that approximately 25–30% of cheilitis cases are related to allergic reactions to cosmetics or oral hygiene products, particularly with long-term use.^{6,8,9} In children, the most common triggers originate from oral hygiene products such as toothpaste, especially surfactants like sodium lauryl sulfate (SLS), which are known to cause irritation and allergic reactions of the mucosa. SLS acts as a foaming agent but can reduce epithelial barrier integrity and increase permeability to allergens.^{1,9,10}

Because the lips are an area with high external exposure and a relatively thin skin barrier, sensitivity to chemical substances is more easily triggered than in other skin areas. Identification of triggering factors through elimination of suspected substances plays an important role in therapeutic success and prevention of recurrence.^{8,11,12}

This case report presents a pediatric patient with clinical features of ACC strongly suspected to be triggered by SLS-containing toothpaste, who showed good therapeutic response after allergen elimination.

II. Case Presentation

A 7-year-old boy presented with complaints of lip thickening, pain, dryness, burning sensation, and itching in the perioral area for three days. History taking revealed no previous history of allergy and no consumption of fish, chicken, eggs, or fruits prior to symptom onset.

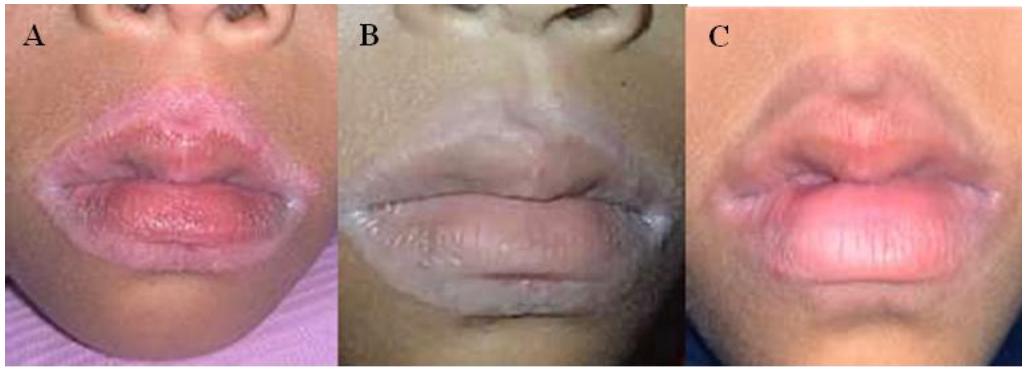


Figure 1. Lesions of the lips and perioral area: (A) first visit, (B) second visit, (C) third visit.

The patient brushed his teeth using toothpaste containing SLS. Toothbrushing was performed irregularly and technique was inadequate. Extraoral examination revealed edematous, erythematous lips with ill-defined margins and a thickened sensation. The perioral area showed erosions with desquamation, erythema, thickening, well-defined margins, pain, burning sensation, and itching. Intraoral examination revealed a round 2 mm ulcer with a white center and erythematous margins, without pain. The patient had previously sought treatment at a nearby healthcare facility, but the lesions did not improve.

III. Discussion

Allergic contact cheilitis can affect both males and females; however, females have a higher risk and adults are more frequently affected than children. In women, triggers are commonly lipsticks, while in men, toothpaste is the most frequent cause. In older individuals, medications can also be contributing factors.^{1,13} Dental materials and oral hygiene products can affect all age groups. Several case reports have described that sodium lauryl sulfate (SLS) in toothpaste, when used continuously, can cause allergic and toxic reactions. Systemic consumption of SLS has also been associated with carcinogenic effects.^{10,13}

Common allergens that may induce cheilitis include metals such as nickel, fragrances/flavorings, and preservatives. Other allergens frequently reported to trigger ACC include fragrance and flavoring agents commonly found in lipstick and lip balm.^{1,8,9} Balsam of Peru and aromatic resins are widely used in cosmetics and toothpaste. Natural products such as propolis, increasingly popular in organic cosmetics, have also been reported as emerging causes of ACC. Additionally, food allergens such as milk, eggs, meat, nuts, fruits, and vegetables may contribute.^{1,14}

ACC is characterized by subjective complaints of itching, burning, and dryness of the lips. Clinically, allergic contact cheilitis presents as inflammation of the vermilion border or adjacent skin, which may involve the upper lip, lower lip, or both, and may extend to the lip commissures. The vermilion typically appears erythematous, dry, with desquamation and fissures.^{9,10,13}

ACC involves a type IV hypersensitivity reaction mediated by T cells. This condition can occur at any age, including in children, although most cases are seen in adults and women due to exposure to cosmetics such as lipstick or lip balm.^{10,14,15} In males and children, allergens are commonly derived from toothpaste, mouth rinses, or dental materials.^{5,13,14}

The pathogenesis of allergic contact cheilitis involves cellular immune mechanisms. Small haptens from cosmetics or dental products penetrate the lip epithelium and bind to host proteins to form antigen complexes. These are presented by Langerhans cells to CD4⁺ T cells in regional lymph nodes, leading to a sensitization phase. Upon re-exposure, memory T cells are activated and release pro-inflammatory cytokines such as IFN- γ and IL-17, resulting in lymphocytic infiltration and tissue edema. Predisposing factors such as impaired skin barrier (e.g., in patients with atopic dermatitis) facilitate hapten penetration.^{5,7,11} Type IV hypersensitivity reactions are also known as delayed hypersensitivity reactions, as clinical manifestations appear 24–72 hours after exposure. Oral manifestations of this reaction include cheilitis, gingivitis, stomatitis, perioral dermatitis, burning mouth syndrome, lichenoid reactions, and orofacial granulomatosis.^{4,11} Type IV hypersensitivity reactions can occur in patients who have previously been exposed to a specific antigen, leading to sensitization. Studies show that after the sensitization phase, CD4⁺ cells secrete various cytokines, including TNF- α and TNF- β , which influence the expression of adhesion molecules (E-selectin, ICAM-1, VCAM-1) on the endothelial cells of blood vessels in the skin that come into contact with the allergen.^{4,7,11} Management principles include elimination of allergens, medication, and patient education to discontinue causative products. Reading cosmetic and dental product labels is essential to prevent recurrence. Anti-inflammatory therapy using low- to mid-potency topical corticosteroids is recommended for short-term use in the acute phase. Non-steroidal anti-inflammatory and topical antihistamine preparations containing chlorine dioxide, zinc, and aloe vera may

also be used.^{11,15}

In this case, there is a suspicion that the use of toothpaste containing Sodium Lauryl Sulfate (SLS) may be the cause. Sodium Lauryl Sulfate is one of the chemical additives in toothpaste formulations. Several studies have reported that the use of toothpaste can trigger allergic reactions or the appearance of oral lesions such as aphthous ulceration and inflammation of the gingiva or lips.^{10,13,14}

This assumption is based on the parents' and the patient's anamnesis, which revealed no contact with food substances or other materials prior to the appearance of the lesions. The most likely suspected cause is contact with the toothpaste used during tooth brushing. In this case, the patient and the parents refused to undergo allergy testing.

Sodium Lauryl Sulfate (SLS) is a surfactant detergent widely used in toothpaste because it can generate foam and enhance cleaning effectiveness. However, repeated exposure to SLS can impair the mucosal epithelial barrier, increase irritation, and in sensitive individuals, act as a hapten capable of triggering a type IV hypersensitivity reaction. Studies have shown that SLS may cause desquamation, stomatitis, ulceration, and allergic reactions affecting the lips and oral mucosa.^{7,10,13}

In the pathogenesis of type IV hypersensitivity reactions, SLS haptens penetrate the epithelium, bind to host proteins, and are subsequently presented by Langerhans cells to CD4+ T lymphocytes. Sensitization occurs after the initial contact, and upon re-exposure, memory T cells release cytokines such as TNF- α , IFN- γ , and IL-17, leading to erythema, edema, heat sensation, and itching within 24–72 hours. Clinical manifestations of type IV hypersensitivity in the oral cavity may include cheilitis, stomatitis, allergic gingivitis, burning sensation, and erosive lesions as observed in this case.^{1,4,7}

Other allergens commonly associated with allergic contact cheilitis include flavoring agents (cinnamon, peppermint), Balsam of Peru, fragrance mix, propolis, and metals such as nickel. However, in this case, the elimination of SLS-containing toothpaste and replacement with an SLS-free product resulted in significant improvement within two days, further supporting SLS as the triggering allergen.^{10,13,14}

At the first visit, the patient was prescribed a topical cream containing hydrocortisone, lanolin, vitamin E, and petroleum jelly, and given oral vitamins. The patient was instructed to discontinue the use of SLS-containing toothpaste and to use an SLS-free alternative. A follow-up visit was scheduled three days later.

At the second visit, after two days of topical therapy and toothpaste substitution, the lesions showed marked improvement. Lip edema had decreased, and lip color returned to normal. Perioral lesions improved clinically, with reduced erosion and erythema, and the absence of burning, itching, and pain, although a sensation of thickening remained. The patient was instructed to continue topical therapy, vitamin supplementation, and use of SLS-free toothpaste, and to return for follow-up after one week.

At the third visit, after 10 days of treatment, the lesions had completely healed, with no complaints involving the lips or perioral area. Management of ACC emphasizes identification and elimination of allergens through patient education regarding product labels, anti-inflammatory therapy such as topical corticosteroids, and restoration of mucosal barrier function with vitamins and emollients. The rapid healing response in this patient indicates a good prognosis as long as re-exposure to the triggering substance is avoided.

IV. Conclusion

Allergic Contact Cheilitis should be considered in cases of persistent lip inflammation, especially when there is a history of using products containing SLS or other irritant substances. Allergen elimination results in an excellent prognosis. Patient education regarding the ingredients in personal care products is essential to prevent recurrence.

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