

## Allergy-related stomatitis: a rare case in dental practice

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### ABSTRACT

**Background:** Oral mucosa is the first gate of food and water to enter the body. This area, including the lips, is more frequent in contact with various food substances containing flavoring agents; therefore, it is very susceptible to allergy-related stomatitis. This study aims to report the case of allergy-related stomatitis due to food intake.

**Case:** We present a case report of 31 year-old-woman complaining of an uncomfortable and burning sensation in the tongue, hard palate, and lips. The clinical examination showed an erythematous lesion along the mucosal lip. The history revealed that the patient had an atopic allergy to seafood and cold air. She reported that three days before she visited the dentist, she ate seafood with very spicy seasoning. According to the complete blood test, it was revealed that eosinophil and total IgE were high. We diagnose allergy-related stomatitis based on the history, clinical features, and blood test examination. The patient was advised not to eat seafood or spicy food and eliminate the precipitating factors

**Conclusion:** Diagnosis of allergy-related stomatitis can be obtained by anamnesis, clinical examination, and other laboratory testing.

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## INTRODUCTION

Allergy-related stomatitis is defined as an inflammatory reaction in the oral mouth due to contact with an allergen.<sup>1</sup> Some agents reported inducing allergy-related stomatitis are medications, food, acrylic dental material, implants dental material, orthodontics material, dental restorative materials, foods-containing flavoring agents, cosmetics and preservatives. The clinical appearance of allergy-related stomatitis is characterized by erythematous plaques, vesiculation, ulceration, hyperkeratosis, pain, burning sensation, or itchiness.<sup>2,3</sup>

The case of allergy-related stomatitis is still rare; therefore, it has not met the diagnosis needs in dental practice. The disease itself is questionable between allergic and non-allergic reactions. No immunological mechanism will be involved if the causal factor is irritant or toxic.<sup>4</sup> The mechanism of allergy-related stomatitis is mediated by immunological mechanisms.<sup>5</sup> There are 4 types of hypersensitivity: type I (immediate), type II, type III, and type IV (delayed hypersensitivity). In general, the contact of allergen in oral mucosa stimulates the reactivity of Th1 lymphocytes.<sup>6,7</sup> Food allergies often involve type 1 and type 4 reactions or a combination of both.<sup>8</sup>

This disease has broad signs and symptoms. The patient might experience discomfort, such as burning and paresthesia. However, the clinical signs vary among the patient. Some of them may appear as lesions or without clinical lesions. It is difficult to distinguish between irritative contact dermatitis or other stomatitis with this disease.<sup>4</sup> The diagnosis of food allergy is based on anamnesis of symptoms experienced, possible allergens, extra and intra-oral clinical examinations to investigate visible signs and symptoms of allergy, and supporting examinations.<sup>9</sup> Investigations commonly used to diagnose allergic lesions are

total eosinophil count, total IgE count, specific IgE count, skin test (prick test, patch test), and provocation test.<sup>8</sup> This study aims to report the case of allergy-related stomatitis due to food intake.

## CASE

A 31-year-old woman complained about discomfort, burning sensation, paresthesia of the tongue, hard palate and lip for the last three days. She did not feel any pain but experienced roughness, especially in her hard palate and lip. After two days of discomfort, she checked her lip in the mirror and found an erythematous lesion along her mucosal lip. The lesion might have appeared since the first day of onset; unfortunately, she did not check. She did not take any medicine to reduce her symptom.

Subjective examination revealed she did not use oral hygiene products, a new brand of cosmetic or lipstick, dental treatment, or intake medicine these days. The patient reported that she ate seafood with very spicy seasoning three days ago before the lesions appeared. This patient's medical history revealed that she had an atopic allergy to seafood and cold air. She experienced itchy after eating shrimp in her oral mucosa. Atopic dermatitis also reported being contacted with cold air, especially in the morning. Rhinitis allergic with runny nose was also reported when the air was too cold and dusty. The patient did not experienced any prodromal symptoms or having drug allergies.

Intraoral examination revealed diffuse erythema along her mucosal upper lip appeared without any extension in the buccal or vestibulum (Fig. 1). The lesion was only seen on the upper inner labial mucosa, and there were no lesions on the other oral mucosa. Since no additional medical history the patient provided was pertinent to the problem, it was assumed that the food she was eating was the cause of her allergy.



Figure 1. Upper lip mucosa 3 days after food intake. Erythema appeared along the mucosal lip (black arrow).

During the first appointment, the patient was not prescribed any medicine. The patient instructed not to eat any seafood with spicy seasoning, regarding of weather it caused allergies. A laboratory test was also performed to confirm the involvement of immunological reactions in this case. The results of the laboratory test indicated that the eosinophil count was high, which was 7% of the blood. It was reported that the normal range was 0.5-5% of the

blood. The total IgE was also checked to elucidate the involvement of hypersensitivity reactions. The result showed that the total IgE test was 102 IU/ml. This result was slightly higher than the normal value, which was less than 100 U/ml. Complete blood tests were also checked to support the diagnosis of the disease and to confirm the possibility of any infection (Table 1).

Table 1. Complete Blood Test

Blood examination	Result	Unit	Level
Hemoglobin	13	g/dl	N
Hematocrit	39.4	%	N
Leukocytes	9.05	$10^3/\mu\text{l}$	N
Thrombocytes	263	$10^3/\mu\text{l}$	N
Erythrocytes	5.27	$10^6/\mu\text{l}$	H
Mean Platelet Volume	10	fL	N
Platelet Distribution Width	16.7		N
Neutrophil	44.8	%	L
Lymphocytes	40.9	%	H
Monocytes	1.3	%	L
Eosinophil	13.6	%	H
Basophil	0	%	N
Total IgE	102	IU/ml	H

N: Normal; H: High; L: Low

According to the history of clinical examination and laboratory tests, allergy-related stomatitis is defined as a provisional diagnosis. The patient has not been prescribed any medication to alleviate her symptom. She was advised not to eat seafood and spicy food within these coming days.

In the second visit, she was recalled for follow-up, and all erythematous lesions had healed without scars. She reported that the lesions gradually disappeared and healed on day four after the initial lesions or day seven after food intake (Figure 4). The patient was also feel comfortable to eat and no stiffness.



Figure 4. Upper lip mucosa 7 days after food. The lesion disappeared.

## DISCUSSION

Allergy-related stomatitis is inflammation in oral mucosa due to contact allergy reactions from substances or agents entering the oral cavity. The characteristics of this disease include erythema, edema, vesicles, bullae, erosions, and ulcerations. The substances that can trigger this reaction are medications, food, preservatives, acrylic dental material, implants dental material, orthodontics material, and dental restorative materials. Allergy-related stomatitis can be associated with allergy-contact cheilitis, geographic tongue, oral lichenoid reactions, and burning mouth syndrome.<sup>4,10</sup>

Oral mucosa is less susceptible to contact allergic reactions compared to skin. There are at least two factors; 1) the saliva in the oral cavity can be solvent that can dilute and digest the potential allergens, therefore, limiting the duration and number of molecules that contact the mucosa; 2) the capacity of faster epithelial renewal and higher

vascularization prevent the allergen from contacting longer in the oral mucosa.<sup>11</sup>

Allergy-related stomatitis is one of the clinical manifestations of a type 1 hypersensitivity reaction that occurs in the body.<sup>11</sup> Type I hypersensitivity, also known as immediate type, occurs immediately after the allergen enters the body. Allergic reactions will occur when there is contact with the same material or allergen for the second or more time. Allergens that enter the body will be captured by dendritic cells, processed, and then presented to Th2 cells. Activated Th2 cells will release cytokines to activate B cells which will then turn into plasma cells producing IgE. The IgE will be bound by cells with receptors for IgE (Fce-R), such as mast cells and basophils. When the body is re-exposed to the same allergen, the allergen will be bound by specific IgE on the surface of mast cells, causing mast cell degranulation. The degranulation

releases various mediators, including vasoactive amines, enzymes, and proteoglycans.<sup>12</sup>

Mast cells also secrete lipid mediators (phospholipids) from arachidonic acid and platelet-activating factor (PAF). Arachidonic acid will activate leukotrienes, especially C4 and D4, which can increase vascular permeability and bronchial smooth muscle contraction. At the same time, B4 will increase the chemotaxis of neutrophils, eosinophils, and monocytes. Apart from providing a fast type 1 hypersensitivity response, these leukotrienes also contribute to a delayed type 1 hypersensitivity reaction. Arachidonic acid also activates prostaglandins that cause bronchospasm and increased mucus secretion. At the same time, PAF is a mediator produced by mast cells, but not arachidonic acid derivatives, which will cause

platelet aggregation, histamine release, bronchospasm, increased vascular permeability, and vasodilation. The mediators mentioned above cause a rapid type 1 hypersensitivity reaction. In the second pathway, the hypersensitivity reaction occurs in type 1 (2-24 hours after exposure to the allergen). When the allergen binds to antigen presenting cell (APC) through the Fc Epsilon (FcεRI) receptor, the activated Th1 will activate IFN-γ. Allergen binding to APC will also activate Th2, activating IL-5 and eosinophils. Eosinophils are what cause epithelial damage. This delayed type 1 hypersensitivity reaction is also influenced by cytokines and chemokines released by mast cells.<sup>13,14</sup> Type 1 hypersensitivity fast and slow reactions shown in figure 5.

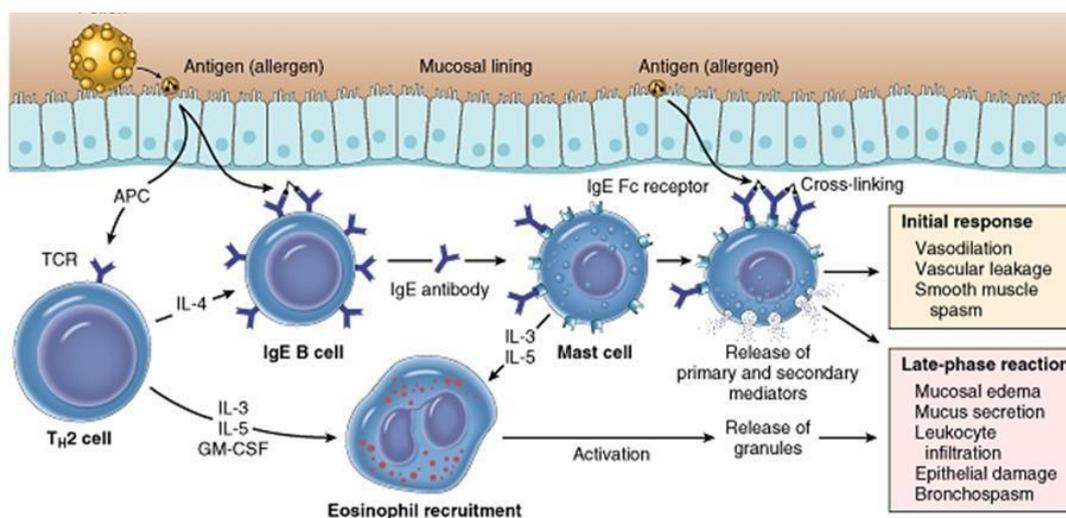


Figure 5. Type 1 hypersensitivity, fast and slow reactions.<sup>13</sup>

The reaction of allergy-related stomatitis can be both acute and chronic. The acute reaction is easy to diagnose since acute lesions immediately appear after contact with the causal factor. The clinical presentation of the lesions may be redness with a burning sensation. Other symptoms are edema, itching, or stinging sensation. Meanwhile,

chronic lesions may be difficult to define compared to other lesions, such as stomatitis, because the presentation time may occur 24-72 hours after contact with the allergen. The characteristics of this lesion are erythema, edema, desquamation, and occasional ulceration or erosions with rough and irregular borders.<sup>11</sup> Sensitivity reaction of T cell

antibody has occurred towards antigen caused by direct contact with oral mucosa. The delayed reaction occurs after primary exposure. It takes 12-72 hours for allergy-related stomatitis to appear. However, the mechanism of allergen-induced T cells remains unclear.<sup>15</sup>

Defining this disease's diagnosis is essential to manage this condition properly. Appropriate anamnesis is important to figure out the patient's past medical history. The experience of dermatitis contact allergy or any other allergic symptoms may relate to this condition. In this case, the patient was not prescribed any medication, and the symptoms could finally heal. In the case of a patient with pain or disturbances of functional oral activity, they can be prescribed antihistamines, topical anesthetics, and topical corticosteroids. Patch testing is also recommended to achieve diagnostic workup for the delayed type of contact allergy.<sup>16</sup> Unfortunately, in the case of this study, the patient was not advised to take patch testing. This test is required to identify type IV hypersensitivity.

In relation to this case, communication, education, and information to the patient are important to open the patient's awareness in the future when experiencing the same condition. Prevention of the occurrence of this disease can be achieved by advising the patient not to eat seafood or spicy food.

The presence of this disease in dental practice is still rare; therefore, the dentist's experience in distinguishing between the lesion caused by allergy or irritation and other stomatitis is ambiguous. The clinical appearance has not been specific. The patient history, clinical examination, and supportive examination need to be performed to provide a precise diagnosis. Furthermore, communication, information, and education to the

patient are also required to prevent recurrences in the future.

## CONCLUSION

The presence of this disease in dental practice is still rare; therefore, the dentist's experience in distinguishing between the lesion caused by allergy or irritation and other stomatitis is ambiguous. The clinical appearance has not been specific. The patient history, clinical examination, and supportive examination need to be performed to provide a precise diagnosis. Furthermore, communication, information, and education to the patient are also required to prevent recurrences in the future.

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