

Flagellate erythema as manifestation of food hypersensitivity

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Abstract

Food hypersensitivity can present in myriad forms leaving the physician baffled. Here we present a case of flagellate dermatitis in an elderly female with bronchial asthma on omalizumab injections, after ingestion of canned shiitake mushrooms. Knowledge about shiitake mushroom dermatitis is important due to increasing prevalence worldwide because of changing culinary preferences.

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1. Introduction

Food hypersensitivity often go unnoticed as a cause for skin symptoms. At this era of globalization, culinary experimenting with new exotic food has become the new norm and physicians are left baffled by food-induced reactions uncommon to their location. We present a case where a new variety of canned mushroom cooked at home caused an unusual rash in our patient.

2. Case report

A 59-year-old woman presented to our clinic with complaints of itchy rash on trunk of two days duration. She was a known case of bronchial asthma on inhalation steroids, bronchodilators, montelukast and omalizumab

injections since 6 months. She was taking etoracoxib, baclofen, pantoprazole, topiramate, and amitriptyline as well for other complaints. However, she neither had history of prior drug allergies nor a change in medications in the last one month. She was also being treated for chronic eczema from a dermatology clinic. The only significant history obtained was of ingesting a new type of mushroom cooked in gravy one day prior to the onset of rash. The other family members who ate the dish were asymptomatic. On examination, the patient was obese with stable vital signs. She was afebrile and there was no significant lymphadenopathy.

Skin examination showed erythematous linear plaques and excoriations on trunk and proximal limbs (Fig. 1). There were also erythematous edematous papules and plaques on face and ears. We diagnosed the case as flagellate dermatitis, probably mushroom induced. We treated her with antihistamine and topical steroid. Due to persistence of rash and pruritus, she was given oral prednisolone at 30 mg for 10 days. On review, her rash had completely resolved. She brought the used can of mushrooms to our clinic, which turned out to contain shiitake mushrooms. She was advised against consuming it in future and at 3 months follow-up the rash had not recurred.

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Figure 1. Back of trunk of the patient shows excoriations and linear erythematous plaques, some studded with small papules.

3. Discussion

Since centuries, shiitake mushrooms (*Lentinula edodes*) have been in use as food and medicine in Japan and China. It was called aptly the 'King or monarch of mushrooms' (Jones, 1995) due to its delicate taste and caramel like odor. With cultivation, the use of shiitake mushrooms became more and in recent times, it has found a place in international cuisine to such an extent that it has become the second commonest mushroom in use today after button mushrooms. It is available as fresh, canned or in dried form. Fresh shiitake mushrooms are white to cream in color and dried ones have cracks on the surface resembling brown leather. In addition, this mushroom also turns up incognito in oriental cuisine as soups, sauces, seasoning, noodle stocks, food supplements, carbonated drinks and even candies (Ade et al., 2015). It is also used as medicine for its immunological properties and even as chemotherapeutic agent for some cancers in oriental alternative medicine. The first reports of flagellate dermatitis due to shiitake mushrooms came from Japanese literature (Nakamura, 1992). Since then numerous cases have been reported from all over the world including China, European countries (especially France), and even in the US under the titles 'shiitake mushroom dermatitis', 'flagellate mushroom dermatitis' or 'shiitake induced toxicoderma' (Boels et al., 2014).

The reaction after ingesting shiitake mushroom seems to follow a biphasic pattern. When susceptible individuals consume large amounts of raw or partially cooked shiitake mushrooms, after a latent period of 12 h to 5 days, they experience intense generalized pruritus and edematous papules of

face, trunk & extremities. Later this progress to erythematous edematous linear streaks (flagellate erythema) over trunk and extremities (Adler and Larsen, 2011; Boels et al., 2014; Nguyen et al., 2017). Systemic symptoms like fever, diarrhea, and mucosal ulcers, and rarely paresthesia, dysphagia, and conjunctivitis may accompany the rash. The picture of initial rash may vary from petechiae, plaques, vesicles, morbilliform rash, or pustular lesions (Nguyen et al., 2017; Netchiporouk et al., 2015) to even photo-exacerbated lesions. However, the later appearance of linear flagellate lesion is typical in almost all cases. Prognosis seems good and the rash resolves with or without treatment with post-inflammatory linear gray-brown hyperpigmentation (flagellate pigmentation) in 1–3 weeks.

Shiitake mushrooms can also cause dermatitis as an occupational disease in farmers who cultivate shiitake mushrooms. In addition to cutaneous signs, these patients with 'mushroom worker disease' experience respiratory symptoms such as fever, chills & cough. It occurs due to allergic alveolitis from inhaled allergen of shiitake mushroom when working in the farms.

Topical steroids, and oral antihistamines and even systemic steroids have been tried in such cases, but their beneficial role in the resolution of rash is unclear. Future recurrences can be prevented by avoiding the mushroom altogether or by eating less quantity after thorough cooking. However, patients with respiratory or skin symptoms due to occupational exposure should completely avoid shiitake mushrooms. In our case due to initial non-response to topical steroids, we gave systemic steroids, which resulted in resolution by 19th day of rash. Despite her intake of multiple medications including omalizumab injections, the clinical course was unaltered and was comparable with other case reports.

Food hypersensitivity may be a true IgE or non-IgE mediated food allergy such as milk and egg allergy in atopic children; or it can be a non-allergic hypersensitivity reaction such as lactose intolerance, which is due to deficiency of enzymes. Shiitake mushroom dermatitis is believed to be due to either a toxic or allergic hypersensitivity reaction of the body to the polysaccharide called 'lentinan' found in its cell wall. Its thermolabile nature ensures it is inactivated at temperatures of 130–145 °C during adequate cooking. The causative toxin or allergen may be found in more than one species of mushroom since there are odd reports of other mushrooms like *Auricularia auricula-juda* (Jews ear mushroom) and *Boletus edulis* (penny bun mushroom) also causing similar flagellate rash after ingestion (Molin et al., 2015).

Histology is non-specific and generally show spongiosis, occasional hyperkeratosis or parakeratosis, dermal edema and perivascular infiltration with lymphocytes, eosinophils and occasionally neutrophils. Keratinocyte necrosis may be seen in a minority of cases. Allergy tests such as prick and patch tests using shiitake mushroom extract are unpredictable and oral re-challenge can be negative. Thus, diagnosis relies on clinical history and skin findings.

The flagellate morphology is consistent with lesions induced by scratching, but it has been speculated that other factors occurring after scratching may be contributory, like the Koebner phenomenon. Ade et al. (2015) experimentally reproduced lesions of shiitake dermatitis after trauma to the skin. They propose that the “trauma” of scratching during the initial pruritic phase when serum lentinan levels are high, may result in its local deposition in the skin and cause accentuated inflammatory response along the scratch lines (Ade et al., 2015; Adler and Larsen, 2011).

A close differential diagnosis for shiitake dermatitis is simple excoriations but temporal relationship with mushroom ingestion, association with edematous urticated papules, constitutional symptoms like fever and diarrhea, recurrence with re-ingestion of shiitake mushroom and post-inflammatory pigmentation are useful pointers for shiitake dermatitis. Other differential diagnosis for flagellate lesions are bleomycin induced flagellate pigmentation, rheumatologic diseases such as dermatomyositis, adult-onset Still's disease, ritual flogging, dermatitis artefacta, physical abuse especially in children, and phytophotodermatitis (Bhushan et al., 2014).

4. Conclusion

Food allergies can manifest in many forms and flagellate lesions in otherwise healthy person should prompt the physician to enquire about food history. Shiitake mushroom as a cause of flagellate dermatitis is becoming more common due to changing dietary patterns across the world.

The diagnosis of this entity continues to be based on clinical findings as laboratory and allergy tests are still non-specific and inconsistent.

Conflict of interest

The authors declared that there is no conflict of interest.

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