

Pustular flagellate dermatitis after consumption of shiitake mushrooms

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INTRODUCTION

Lentinula edodes, or shiitake mushroom (SM), is typically grown in Eastern Asia and used in traditional Asian medicine and cuisine. Recently, SM became popular in Western culture and is now the second most commonly consumed mushroom in the world.^{1,2} Although rare, adverse reactions to SM have been previously reported. In mushroom farm workers, contact dermatitis, contact urticaria, rhinitis, and hypersensitivity pneumonitis have been described. In the general population, oral intake of raw SM has been associated with a typical flagellate eruption, known as shiitake dermatitis (SD).³

Shiitake dermatitis, also termed *shiitake toxicoderma* or *flagellate mushroom dermatitis*, classically manifests 12 hours to 5 days after the ingestion of SM.^{1,4} Since its first description in 1977, SD has been described in approximately 100 patients, predominantly Japanese.^{3,5} Recently, a few cases were reported in Europe and in the United States.¹ The mechanism underlying SD has not been fully elucidated. Although the eruption is usually considered nonallergic,⁶ 5 cases of SD resulted in positive delayed skin prick testing, suggesting that delayed-type systemic hypersensitivity may be important in its pathogenesis.^{2-4,7-9}

We report the first case of SD in Canada and, to our knowledge, the first case of pustular SD. In our patient, positive delayed skin prick testing to SM was documented.

CASE REPORT

A 31-year-old, nonatopic, healthy man presented to the emergency department with the

Abbreviations used:

SD: Shiitake dermatitis
SM: Shiitake mushroom

sudden onset of an extensive pruritic skin eruption. He denied any systemic symptoms or exposure to medication. On physical examination, he displayed pruritic erythematous to violaceous streaks distributed in a flagellate pattern symmetrically over his limbs, becoming confluent over his chest and scalp. Discrete pustules were noted on the trunk and in most intertriginous areas (Fig 1, A and B). There was no mucosal involvement. The patient had purchased large amounts of SM. He consumed the first portion of partially cooked mushrooms 10 days before his visit and the rest raw 6 days later. The eruption started 24 hours after the second exposure. Results of routine testing for complete blood count and liver and renal function tests were within normal limits. The histopathologic examination found follicular sterile pustules with mild mixed perivascular infiltrate. The eruption resolved 2 weeks later with mid-potency topical steroids and oral antihistamines (Fig 2). Skin prick testing with uncooked SM was performed using histamine 1% and saline as positive and negative controls, respectively. Briefly, fresh mushrooms (Fig 3, A) were immersed in saline (dilution ratio, 1:10), and this infusion was used for prick testing. Fresh mushrooms were also directly applied to the skin and pricked through. Although no reaction occurred after 20 minutes, 24 hours later an eczematous

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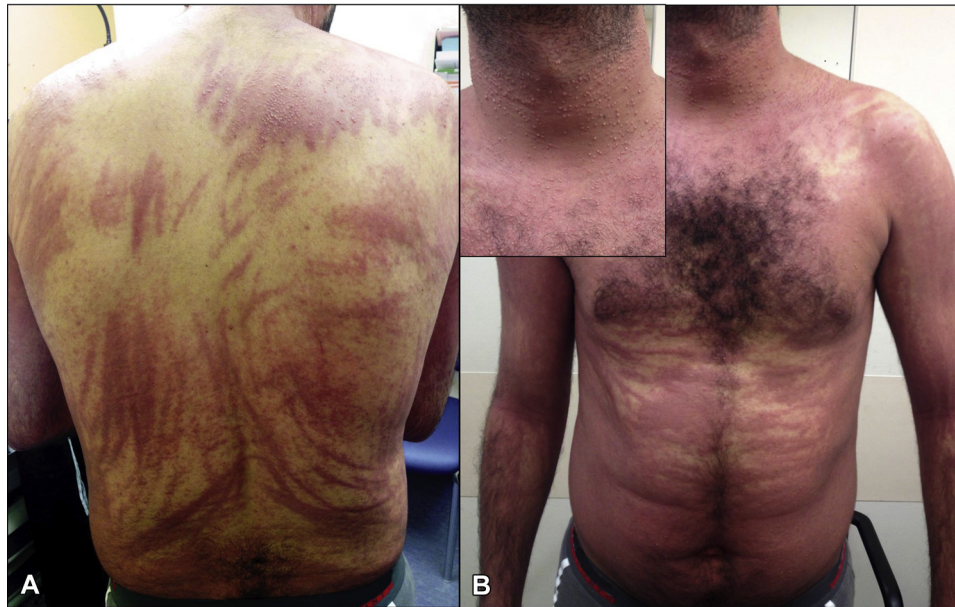


Fig 1. Pustular Shiitake dermatitis. Clinical appearance of eruption on presentation. Erythematous to violaceous papules distributed in a flagellate pattern symmetrically over the back (**A**) and confluent over the chest (**B**). Minute pustules can be seen on the neck (inset).



Fig 2. Resolution of dermatitis with topical steroid treatment at 2 weeks of follow-up.

reaction was observed at both sites of SM exposure, which culminated by 72 hours (**Fig 3, B**). Results of skin prick testing were normal in 5 healthy volunteers. The patient declined patch testing because of time constraints.

Given the characteristic clinical presentation and positive skin prick results, the diagnosis of SD was made.

DISCUSSION

SD usually occurs 12 hours to 5 days after ingestion of uncooked or partially cooked SM in predisposed individuals. It is characterized by a distinctive eruption of erythematous papules and papulovesicles distributed on the trunk and extremities in a flagellate pattern.⁶ The linear shape of the lesions was previously postulated to result from Koebner phenomenon; however, these lesions cannot be elicited by scratching.^{5,6} The histopathologic findings are usually nonspecific.⁵ The differential diagnosis of flagellate dermatitis includes dermatomyositis, adult-onset Still's disease, and drug eruptions from docetaxel and bleomycin or its analogues.⁶ Distinguishing features of SD include a history of raw mushroom exposure, absence of systemic involvement, and rapid resolution with therapy. In contrast to bleomycin-induced dermatitis, SD does not usually result in hyperpigmentation.⁶

In our case, the clinical presentation of a pustular eruption, which on histology was confirmed to be sterile follicular pustules, was unique and differed from previously published cases.

The exact pathogenesis of SD remains unknown. A toxic reaction remains the most commonly accepted hypothesis.¹ Several components of the fungus were identified as probable triggers for SD. The polysaccharide Lentinan is considered the most important agent in SM. This idea is supported by its use in Japan and China as an adjuvant anticancer

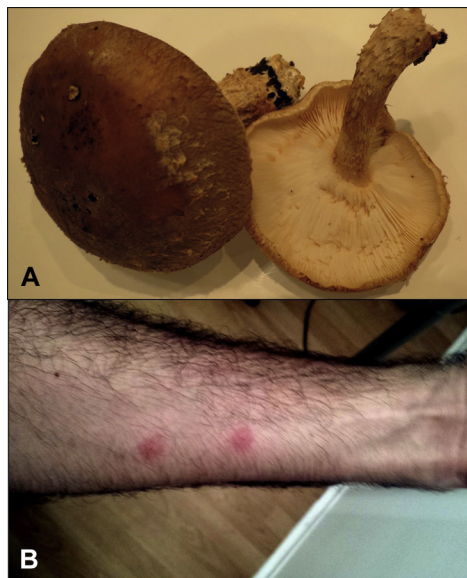


Fig 3. Skin prick testing. Fresh SM provided by patient for this test (A). Eczematous plaques at sites of contact with mushroom-infused saline and the mushroom itself 72 hours after skin prick testing (B).

treatment.^{10,11} In a cohort of 519 patients treated with Lentinan infusions, 9 had SD-like cutaneous side effects.⁵ Lentinan is known to promote interleukin-1–induced inflammation and vasodilatation, which may explain some of the clinical manifestations.¹² Lentinan is also thermolabile whereby at high temperatures of 130° to 145°C its hydrogen bonds are destroyed and its molecular structure becomes irreversibly altered. This thermolability may alter Lentinan’s toxic or allergenic potential and explain why cooked SM are generally not associated with adverse reactions.⁴ Another potential trigger for SD is a sulphur compound present in *L edodes*, which is structurally similar to bleomycin.¹

Evidence suggests that delayed-type systemic hypersensitivity also plays an important role in the pathogenesis of SD. Lentinan is a potential allergen that may cause this rash in patients.⁴ SD is an exceedingly rare phenomenon despite the widespread use of SM in cuisine and natural medicine. In our patient, the classic eruption developed 7 days after the first exposure and 24 hours after re-exposure to the mushroom, giving enough time for sensitization to occur. Skin-prick testing to raw SM produced a positive reaction on a delayed reading consistent with delayed hypersensitivity. A few cases of systemic SM allergic contact dermatitis have been documented in the past, all resulting in a

positive delayed skin prick result and usually negative patch test results presumably because of poor antigen penetration.^{2,3,7-9} Further, if patch tests are useful in detecting allergic contact dermatitis to foods, they are not consistently positive in other forms of delayed reactions to foods.¹³ Given that no standardized form of skin testing exists for food-induced delayed systemic reactions in nonatopic individuals, and given the positive delayed reading of skin prick results in our patient but not in controls, we suggest that delayed reading of prick results with raw food may be useful in confirming the diagnosis of SD.

Because of the rapidly growing consumption of exotic food in Western countries, it is not surprising that cases of SD are now appearing in North America and Europe. Health professionals should be aware of the risk associated with raw shiitake consumption.

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