

BRIEF ARTICLE

A Case of Shiitake Mushroom Dermatitis in a 21-year-old Female

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INTRODUCTION

Shiitake mushroom dermatitis is a phenomenon that was first described in Japanese literature in 1977.¹ Cases have now been reported throughout Europe, North America, and South America.² It is a rare cutaneous reaction caused by consumption of raw or undercooked shiitake mushrooms (*Lentinula edodes*). Lentinan, a heat-inactivated β -glucan polysaccharide, is proposed to cause this dermatitis.³ Heat alters its structure, which is why this dermatitis is not seen with cooked shiitake mushrooms. To the authors' knowledge, there have been few cases describing histologic findings of shiitake mushroom dermatitis. Here we present a case of shiitake mushroom dermatitis with correlation of histologic findings.

CASE PRESENTATION

A 21-year-old female presented with a five-day history of an extremely pruritic diffuse rash. She reported no new medications, products, preceding illness, or other notable positive review of systems, but did note cooking with shiitake mushrooms the day before onset of the rash. On physical examination, she had flagellate erythema on the posterior neck, arms, abdomen, bilateral

flanks, and lower back, as well as scattered papules and vesicles (Figures 1-2).



Figure 1. Shiitake mushroom dermatitis. Flagellate erythema of the right flank, where punch biopsy was performed.



Figure 2. Shiitake mushroom dermatitis. Flagellate erythema of the neck, shoulders, and upper back.

A punch biopsy from the right flank was performed. Histopathologic evaluation revealed an interface dermatitis with focal parakeratosis, mild basal layer vacuolization, and a mild superficial perivascular lymphocytic infiltrate (Figures 3A and 3B). She noted improvement at two-week phone follow-up with use of triamcinolone 0.1% cream and shiitake mushroom avoidance.

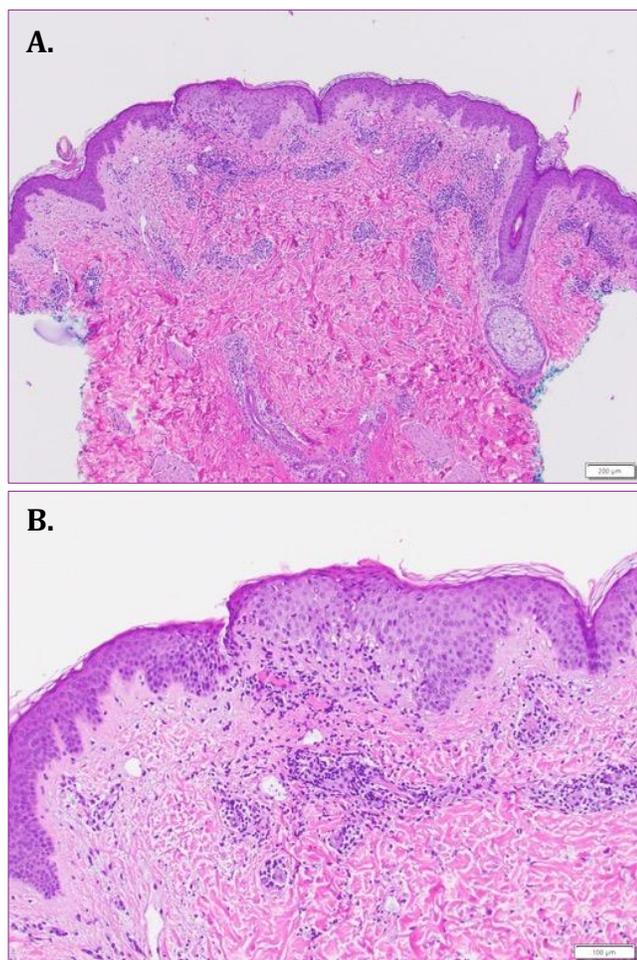


Figure 3. (A) Punch biopsy. Superficial perivascular lymphocytic infiltrate with mild basal layer vacuolization (H&E, 40x). (B) Punch biopsy. Higher magnification showing parakeratosis in an area of possible erosion with mild vacuolar alteration of basal keratinocytes and a superficial perivascular lymphocytic infiltrate (H&E, 100x).

DISCUSSION

The exact pathophysiology of shiitake mushroom dermatitis is not well understood. It is thought that lentinan causes this dermatitis by a toxic or hypersensitivity reaction through activation of interleukin-1, thereby causing vasodilation and a rash.^{3,4} For those who favor a toxic mechanism, it is proposed that lentinan induces vasodilation and subsequent inflammation through interleukin.^{5,6,8,9} For those who favor a hypersensitivity mechanism, it is proposed that lentinan may cause a Th1 skew over Th2.³ Although there have been cases of positive patch testing in shiitake mushroom dermatitis, patch tests are usually negative due to poor antigen penetration.^{10,11} Patch tests are also not consistently positive in delayed food reactions.¹² Because lentinan is thermolabile – inactivated at temperatures between 130 and 145 degrees Celsius due to irreversible molecular structure changes – shiitake mushroom dermatitis is not seen with well-cooked mushrooms.⁵

The histopathologic findings of flagellate erythema, specifically in shiitake mushroom dermatitis, are non-specific (Table 1). In a review of three flagellate erythema cases, histologic findings showed spongiosis and variable interface dermatitis with dermal lymphohistiocytic infiltrate.^{6,7} Eosinophils were prominent in two cases. In other case reports, histologic findings were variable and included hyperkeratosis, parakeratosis, dyskeratosis, spongiosis, and superficial mixed perivascular infiltrate with neutrophils, lymphocytes, and eosinophils.¹³⁻¹⁵

The clinical differential diagnosis in these cases should include bleomycin-induced flagellate hyperpigmentation, dermatomyositis, adult-onset Still disease, and acute contact dermatitis. ClinicalT

Table 1. Literature review of histopathologic findings in flagellate erythema

Case	Sex	Age (years)	Histopathology	Additional Findings	Exposure	Treatment
Chu et al 2013⁷	F	46	Superficial and mid-dermal perivascular mixed lymphocytic infiltrate with occasional eosinophils and neutrophils. Focal perivascular fibrin deposition.	Normal ALT/AST, CBC with differential (including eosinophils)	Chinese restaurant dish with reconstituted dried shiitake mushrooms	Self-resolved after 4 weeks
Chu et al 2013⁷	M	46	Small foci of epidermal spongiosis with lymphocyte exocytosis. Superficial and mid-dermal perivascular and interstitial infiltrate of neutrophils, eosinophils, and mononuclear cells.	--	Chinese restaurant dish with shiitake mushrooms	Self-resolved after 3 weeks
Corazza et al 2015⁸	M	30	Intact epidermis, papillary dermal edema, erythrocyte overflow, superficial and perivascular mononuclear infiltrate without vasculitis or pigment incontinence	--	Ate large amount of raw mushrooms five hours before onset of rash	Self-resolved after 3 days
Nakamura 1992⁶	M	25	--	--	Ate salad with raw shiitake mushrooms	Resolved in 10 days after treatment with antihistamine and topical steroids
Soo et al 2007¹⁵	M	58	Mild to moderate spongiosis with focal hyperkeratosis, mid-parakeratosis and minimal lymphocyte exocytosis. Mild perivascular lymphohistiocytic inflammatory infiltrate in superficial and mid-dermis.	Normal CBC (including eosinophils), serum CK	Chinese restaurant meal the night before	Antihistamines and topical corticosteroids
Hanada 1998¹³	M	44	Intercellular edema, individual cell death, dermal edema, lymphocytic infiltrate, dilation of capillary vessels	Negative ANA, normal porphyrins (urine, fecal, serum), normal CK, negative patch and photopatch tests	15-20 pieces of shiitake mushrooms daily for last 7 days	Resolved in 7 days with antihistamines and topical corticosteroids

M – Male; F-Female; ALT – alanine transaminase; AST – aspartate transaminase; CBC – complete blood count; CK – creatine kinase

presentation differs in that pigmentation or hyperpigmentation is the main cutaneous finding in bleomycin-induced cases. In dermatomyositis, the rash is more inflammatory with persistent erythema and may be accompanied by photodistributed poikiloderma.¹ Review of systems should include questions about myalgias,

dysphagia, dyspnea, arrhythmias, and arthritis.¹ In adult-onset Still disease, patients may report preceding sore throat, myalgias, or arthralgias, as well as recurrent fevers.¹ In shiitake mushroom dermatitis, there are flagellate streaks made up of erythematous papules or vesicles, which may resolve with post-inflammatory

hyperpigmentation.¹ Histopathology is not diagnostic and the diagnosis can be made clinically.

CONCLUSION

Shiitake mushroom dermatitis typically self-resolves in one to eight weeks with avoidance of mushrooms. Patients are advised to thoroughly cook shiitake mushrooms prior to future consumption, which typically prevents recurrence. Symptomatic treatments include topical corticosteroids and oral antihistamines. Our patient improved with topical corticosteroids and mushroom avoidance. We present this case to highlight the importance of detailed history taking and to describe rarely reported histologic findings of shiitake mushroom dermatitis.

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