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Letter

Chemical burn caused by topical application of garlic under occlusion

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Abstract

Allium sativum (garlic) can cause an irritant contact dermatitis, secondary to naturopathic practices. We report an unusually severe case of chemical burn following garlic applied under occlusion.

Keywords: irritant contact dermatitis, chemical burn, allium sativum

Introduction

The use of garlic as a naturopathic remedy has a long history, particularly in Eastern medicine [1]. The diallyl disulfide present in garlic is a potent skin irritant as well a cause of allergic contact dermatitis [2]. Severe irritant reactions following topical application of garlic can result in chemical burns; partial and full thickness dermal injuries in patients with negative allergen sensitivity tests have been reported [3]. Factors such as the freshness of the garlic, concentration, duration of exposure, and individual skin sensitivity contribute to the injury severity [4].

Case Synopsis

A 41-year old man was referred to dermatology for evaluation of chronic pruritus on the left shin. His clinical examination was consistent with lichen simplex chronicus and he was prescribed topical fluocinonide ointment. Four weeks later, he presented to the emergency room with painful erythema and bullae in the same location. Three days prior to presentation, he had noted improvement in his rash but became increasingly bothered by persistent itching. He created a paste of fresh garlic and salt, which he applied to the area and wrapped tightly with plastic wrap for 3 hours. The following day the area grew increasingly dusky and painful. Several small vesicles developed over the area of garlic paste application. He visited his primary care physician who prescribed cefazolin for presumed cellulitis. The pain continued to worsen and he presented to the emergency department for evaluation.

His physical examination was notable for a 5 cm x 10 cm erythematous, well-demarcated, violaceous geographic plaque with a faintly pink border. Within the plaque, there were focal areas containing tense blisters filled with clear serous fluid (**Figure 1A-1B**). The plaque was exquisitely tender to palpation. There was mild lower extremity edema without surrounding warmth.

The patient was counseled to refrain from use of topical preparations containing garlic. The patient discontinued taking systemic antibiotics and was discharged home with instructions to use topical mupirocin to the affected area. He reported resolution of the chemical burn within one week after presentation.



Figure 1A. Well-demarcated plaque on anterior shin with focal areas of tense blister formation after application of topical garlic and salt paste.

Figure 1B. Violaceous and hemorrhagic crusted vesicles overlying the erythematous plaque.

Discussion

For centuries, garlic has been used extensively as a naturopathic remedy, particularly in the treatment of warts [5]. A recent article reported efficacy in the treatment of warts and corns over a 2 to 3 week period using a lipid garlic extract. The authors of the study suggested garlic's fibrinolytic properties as the underlying mechanism of action [6]. However, improper use of garlic as a home remedy has led to significant skin injury; excessive topical application has resulted in cutaneous burns [7].

Garlic can act as both a potent irritant and an allergic agent. The main allergens in garlic are thought to be mono, di and tri-sulfides [1]. Diallyl disulfide elicits the most potent response given that its oxidated derivative, allicin (an organosulfur compound) has the ability to cause acantholysis *in vitro* [8]. Furthermore, allicin has been shown to participate in the metabolism of cysteine in proteins [9], likely explaining garlic's potential to disrupt the epidermal junction and cause coagulative necrosis [10]. Sensitivity to garlic is multifactorial, resulting from a combination of genetic predisposition to a more robust allergic response, pre-existing skin conditions (e.g. eczema), and occupational exposure factors (e.g. high incidence among food preparation workers) [11]. It is difficult to discern chemical burn from true Type IV allergic reaction because the clinical appearance can be identical. In this case, the patient was not known to have prior topical exposure to garlic. There have been reported cases of garlic-induced chemical burns with subsequent negative allergy testing [12]. This patient was not patch tested.

Although chemical burns owing to garlic are recognized, there have been a limited number of published reports, particularly in cases complicated by occlusive application. Although prior cases suggest exposure times greater than 8 hours are required to induce garlic burns [7], our patient's clinical findings developed after a shorter duration, likely because of the placement of the garlic-salt paste under occlusion. Resolution is typically seen within 2 weeks [5]. This case should raise clinician awareness regarding potential complications of garlic-related naturopathic remedies and the potential for injury severity secondary to an

irritant under occlusion. Patients should be counseled on the potential deleterious effects of naturopathic remedies containing garlic and exercise caution when using such treatments.

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