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# Skin necrosis following digital wart intralesional injection of cantharidin

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## Abstract

A right-hand-dominant female presented 5 weeks following a right middle finger intralesional cantharidin injection for a common wart by a dermatologist. The patient experienced progressive stiffness, blistering, swelling, pain, and ultimately, full-thickness skin necrosis surrounding the injection site. Careful debridement followed by a full-thickness skin graft was performed with no evidence of involvement of the germinal matrix or terminal extensor tendon. At the 7-month postoperative mark, the patient's graft exhibited favorable healing and improved functionality that did not require further follow-up. Intralesional injection of cantharidin solutions for digital warts leads to progressive skin necrosis. Our case required prompt debridement and defect coverage. Involvement of the underlying anatomical structures was also a concern. Dermatologists and hand surgeons should be familiar with this complication as intralesional cantharidin injections are contraindicated.

*Keywords: cantharidin, hand, injection, intralesional, necrosis, wart*

## Introduction

Warts are benign lesions of the skin that are caused by the human papillomavirus (HPV), [1]. They affect approximately 10% of the world's population with a prevalence ranging from 10-20% in children [1]. Many patients opt for additional intervention given the psychological distress and physical discomfort

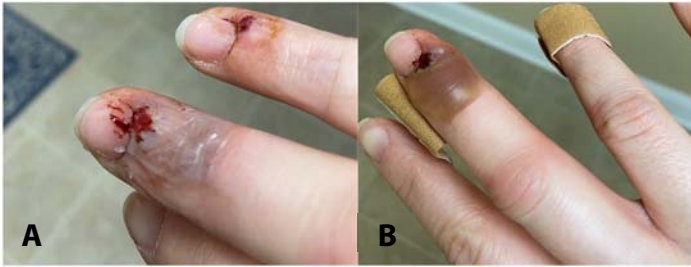
associated with some lesions [2]. None of the current treatment options, however, are approved by the U.S. Food and Drug Administration (FDA) and limited treatment guidelines exist [3].

Cantharidin is a vesicant produced by Coleoptera beetles and has been used as an off-label topical treatment of digital warts since the 1950s [3-6]. Topical cantharidin has historically been applied to warts for a period of 2-6 hours to control the amount of blistering that can result, at which point the vesicant is washed off [6]. Studies have shown 51-87% success with topical cantharidin with mild-to-moderate skin reactions reported that are well-tolerated by patients [3,5].

Although recent randomized controlled trials have shown promise with intralesional injections for the treatment of common warts via immune stimulation [1,7], intralesional injection of cantharidin has not been described to our knowledge. We present a case of skin necrosis requiring surgical intervention following an accidental intralesional injection of cantharidin for a digital wart.

## Case Synopsis

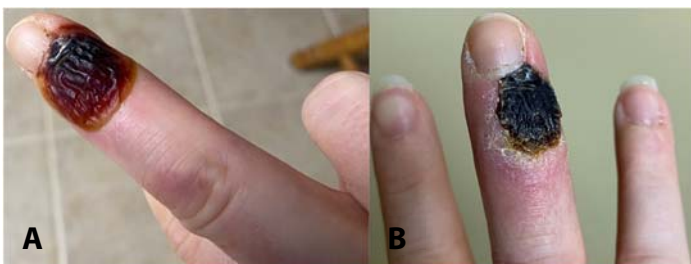
A healthy right-hand-dominant female presented to a hand surgery clinic as a referral from a dermatologist for evaluation of right middle finger skin necrosis. Five weeks prior to presentation, the patient underwent cryotherapy for treatment of common warts located over the dorsal-ulnar aspect of the distal phalanx of the middle finger and ring



**Figure 1.** A) Photographs of the right ring finger and middle finger immediately following cryotherapy and the cantharidin injection over the dorsal-ulnar aspect of the distal phalanx of the middle finger. B) Within the next 24 hours the initial blistering progresses and a central necrotic zone develops at the injection site over the eponychium.

finger. The patient also received an intralesional injection of cantharidin to the middle finger at the same time, which was believed to be a *Candida albicans* antigen injection. Over the next 24 hours, the patient's middle finger developed erythema, swelling, and blistering (**Figure 1**). The patient returned to her dermatologist where the wound was monitored with dressing changes and topical bacitracin ointment. The patient did not receive oral antibiotics. The blister progressed to a necrotic eschar and the patient was subsequently referred to our office. The patient works a desk job and denies alcohol or tobacco use. She had no significant medical or surgical history.

Physical examination demonstrated a thickened, 1.5cm×1.5cm eschar over the dorsal-ulnar aspect of the distal phalanx (**Figure 2**). The eschar encompassed the distal phalanx from the distal interphalangeal joint to the eponychium with surrounding erythema. The nail plate was intact without deformity. She had 0-85° of active motion at the metacarpophalangeal joint, 0-90° at the proximal interphalangeal joint, and 0-45° at the distal



**Figure 2.** Photographs demonstrating the evolution of the injection site from a A) decompressed area of nonviable tissue, B) to a 1.5cm×1.5cm eschar at 5 weeks following the injection.



**Figure 3.** Photograph of the dorsal aspect of the right middle finger at the first clinic visit following full thickness skin graft inset with chromic sutures.

interphalangeal joint. Sensation was intact to light touch in the radial and ulnar digital nerve distributions. Grip strength testing revealed 13.6kg on the right and 36.4kg on the left. Her Quick Disabilities of the Arm, Shoulder, and Hand (QuickDASH) score on presentation was 18 points.

The patient's presentation was concerning for full-thickness dermal necrosis with potential injury to the underlying germinal matrix and terminal extensor tendon, which could lead to nail plate deformities and a mallet finger if further damage occurred from the cantharidin. The patient elected to undergo surgical debridement and exploration of the underlying structures. The eschar was debrided to the level of paratenon of the terminal extensor tendon and the germinal matrix was found to be uninvolved. After adequate debridement, the exposed terminal extensor tendon required soft tissue coverage. The area was too large for a local rotational flap, so a full-thickness skin graft from the volar antebrachium was performed, which was inset with chromic sutures and a bolster dressing. The wound was clean and did not demonstrate any signs of infection, so no oral antibiotics were given postoperatively.

The bolster was removed at the two-week postoperative visit (**Figure 3**) and a cap splint applied to immobilize the distal interphalangeal joint until the full-thickness skin graft fully healed. By the four-week postoperative appointment, the skin



**Figure 4.** Photograph of the affected hand performing **A)** hook fist, and **B)** composite fist at a seven-month post-operative clinic follow-up. The images demonstrate a nail plate of reduced thickness, near-complete nail regrowth, and the absence of wart recurrence.

graft was healed. Therapy was initiated to regain motion. At the seven-month evaluation, the patient reported sustained improvement, despite some residual stiffness and cold sensitivity. Motion of the metacarpophalangeal joint was 0-100°; proximal interphalangeal joint was 0-95°; distal interphalangeal joint was 0-45° actively and 0-60° passively. Grip strength testing normalized (38.6 kg) and there was no evidence of wart recurrence. The nail plate was regrowing but appeared thinner with a slight ridge on the ulnar side (**Figure 4**). At final follow-up, patient-rated satisfaction was 9/10, the QuickDASH score improved to 0, and the numerical pain rating scale improved to 2/10 (primarily in cold weather). She was discharged from care and asked to follow-up on an as-needed basis.

## Case Discussion

Owing to the lack of FDA approval and clinical evidence to create treatment guidelines, dermatologists are left to devise new treatment strategies for common warts [3]. Although various treatment options are administered by intralesional injection [1,7], cantharidin is only meant to be used topically [6]. This case report details the potentially devastating effects of cantharidin when used as an intralesional injection, as the compound continues to damage the underlying tissues without the ability to wash it away.

Cantharidin-based treatments have been utilized for several years as topical formulations [2-5]. Various intralesional formulations for treatment of common warts may become more commonplace given the effectiveness of intralesional immunotherapy in

multiple randomized controlled clinical trials [7]. As a result, patients may be at an increased risk of mistakenly receiving injections of other compounds, such as cantharidin, that have not undergone rigorous testing for safety when delivered as an intralesional injection.

Exclusively formulated for surface application, swallowing cantharidin can have potentially lethal consequences [8]. A case report by Graham and Tosti [9] documented an immunologic reaction resulting in finger pulp necrosis as a complication of intralesional *Candida albicans* antigen. Cantharidin and immunotherapy with the *Candida albicans* antigen have different proposed mechanisms of action [8,9], but each may promote recruitment of immune factors to the area [3,10]. Other intralesional formulations containing methotrexate [11], 5-fluorouracil, and bleomycin [12] have shown promise for treating warts in recent studies. In any case, intralesional therapy is not without risk. Physicians must ensure that they are providing appropriate treatment and utilizing methods of application backed by data demonstrating safety in human subjects.

This case report details the inappropriate injection of a well-known topical treatment for common warts, resulting in skin necrosis and requiring operative intervention. In addition to having proper knowledge for safe application of such substances, adhering to the Universal Protocol detailed by the Joint Commission can help prevent medical errors and protect patients [13]. When encountering patients who underwent intralesional injection of cantharidin, prompt irrigation and debridement should be performed to prevent further soft tissue injury that can influence aesthetic and functional outcomes.

## Conclusion

Intralesional injection of cantharidin for digital warts leads to progressive skin necrosis that requires prompt debridement and defect coverage; there are concerning risks for involvement of the underlying anatomical structures. Dermatologists and hand surgeons should be familiar with this complication,

as intralesional cantharidin injections should be considered contraindicated.

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## Potential conflicts of interest

The authors declare no conflicts of interest.