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Fingertip ischemia following intralesional injection of *Candida albicans* antigen for treatment of a subungual wart

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Abstract

Subungual or periungual cutaneous warts are caused by the Human Papillomavirus (HPV). These lesions can be refractory to destructive therapy, necessitating the use of intralesional immunotherapies such as *Candida albicans* antigen. In this case report, we present a 23-year-old female who sustained distal fingertip soft tissue necrosis following intralesional injection of *Candida albicans* antigen for treatment of a refractory subungual wart. While this patient recovered appropriately with conservative bedside debridement and local wound care, intralesional injections to the digit, or hand are not without sequela. Care must be taken to inject intradermal and avoid the underlying digital vasculature. In this case, the radial digital vessels were traumatized upon injection, leading to digital ischemia and soft tissue necrosis. While isolated soft tissue ischemia without compromised perfusion can be treated conservatively, these injuries should be evaluated by a hand surgeon to determine the need for emergent revascularization, or future soft tissue reconstruction.

Introduction

Subungual or periungual cutaneous warts are a less common morphology of verruca vulgaris caused by the [Human Papillomavirus (HPV)].¹ These lesions are often located on the paronychium of the nail and can exhibit subungual extensions overlying the sterile matrix. Given their location in relation to the nail plate, periungual wart subtypes are challenging to treat, with poor accessibility for therapeutic agents.² While these lesions are benign in nature, if left untreated, they can become painful and create cosmetic nail deformities.

A variety of destructive therapeutic options are available for treatment of periungual cutaneous warts. These modalities including topical agents such as salicylic acid and 5-fluorouracil, as well as cryotherapy, electrocautery, and laser therapy. While these therapies are effective in resolving many subtypes of cutaneous warts, periungual warts have demonstrated higher rates of recurrence, as well as only partial resolution following treatment.²

Recently, intralesional immunotherapy agents have been used in the treatment of refractory cutaneous warts. These agents work by utilizing the body's natural immune response to target HPV at the administered site. While a variety of immunotherapies exist, [Measles Mumps and Rubella (MMR)] and *Candida albicans* antigen tests are commonly used as intradermal injections to mount an inflammatory response within cutaneous warts.³ While the exact mechanism is unknown, it is believed that the immune system's recognition of the injected antigen activates a cellular response that identifies and destroy HPV infected cells.¹⁻³

In this article, we present a case report of a patient who developed fingertip ischemia after receiving intralesional *Candida albicans* antigen for treatment of a refractory subungual cutaneous wart. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Case Report

A 23-year-old female was transferred to our institution with left index finger distal tip ischemia isolated to the radial soft tissue. Twelve hours prior to presentation the patient received an intralesional *Candida albicans* antigen injection for treatment of a refractory subungual wart along the radial paronychium. The patient noted immediate discomfort, and ecchymosis following injection, at which time the administering physician performed a stab incision and drainage along the radial paronychium, and the patient was discharged.

Four hours following injection the patient noted worsening discomfort and ischemic changes to the left index finger and presented to the emergency department for evaluation. The patient was subsequently started on a 500units/hour heparin drip for vascular patency and transferred to our institution for higher level of care.

Upon presentation, ischemic changes were noted to the radial aspect of the left index finger distal pulp (Figure 1). The patient was insensate to two-point discrimination and pin prick over the demarcated tissue. Handheld-doppler was notable for loss of digital artery signal over the demarcated tissue. Pulse oximetry reading was 96% SpO₂. Full range of motion of the distal, proximal, and metacarpophalangeal joints was noted. Given the concern for digital vessel thrombosis, the patient was maintained on a heparin drip for vascular patency and nitroglycerin paste was applied to the distal fingertip for vasodilatory effects.

On hospital day 1 the left index finger radial soft tissue was noted to be non-viable. A bedside debridement was performed with ischemic changes to the soft tissue noted deep (Figure 2). The left index finger was dressed in Xeroform, and the heparin drip was maintained for an additional 24 hours.

On hospital day 2 demarcation appeared stable to the left index finger soft tissue. The heparin drip was discontinued, the patient was subsequently discharged on a 1-week course of Cefalexin for prophylaxis, and twice a day silver sulfadiazine cream dressing changes.

At 2-week follow-up the left index finger distal pulp was noted to be granulating appropriately, approximately 3mmx4mm in size, with some fibrinous exudate and peri-wound epidermolysis. The finger was further debrided under local anesthetic, with plans for 1-week of enzymatic debridement with SANTYL Collagenase.

At 4-week follow-up, the radial wound over the left index finger continued to progress appropriately, now measuring 2mmx3mm in size with scant fibrinous debris within the wound bed and peri-wound reactive erythema. The collagenase was discontinued, and the wound was allowed to heal secondarily. The patient had return of overall sensation, albeit diminished over the immediate wound.

At 8-week follow-up the patient's finger had completely healed via secondary intention with notable tissue loss (Figure 3). The patient's sensation was decreased in comparison to the ulnar side of the digit, but light touch was preserved.

Discussion

Isolated thrombosis of a digital vessel is rare in occurrence.⁴ These injuries are often secondary to trauma and commonly observed in crush injuries. This patient received an intralesional injection of *Candida albicans* antigen for treatment of a subungual wart, and subsequently developed distal fingertip ischemia of her radial soft tissue. The distribution pattern of the patient's ischemia suggests vascular compromise adjacent to the injection site, along the radial aspect of the digit. While the patient's injection was intended to be intradermal, we postulate that the underlying digital vessel was traumatized upon injection, resulting in ischemia.

As the digital vessels travel distally their lumens narrow in diameter. The tunica media of the digital artery remains protective to collapse, while the venous system becomes increasingly sensitive to trauma at the fingertip.⁵ The venous drainage system of the digit is further divided into both superficial and deep drainage systems, which are interconnected through arcades.^{5,6} The volar superficial system is notably smaller than the dorsal system, and contains more valves.⁵ The deep venous system is anatomically more consistent than the superficial system and consists of the vena comitans that accompany the digital artery.^{5,6} Injury to either the superficial or deep system can lead to digital ischemia and potential tissue loss.

We hypothesize that upon injection the patient sustained an iatrogenic cannulation of the digital vein. The injury to the vessel induced a hematoma that collapsed the radial venous drainage system, and subsequently prevented inflow of the radial digital artery. The remainder of the distal fingertip remained well perfused due to preservation of the ulnar vasculature and its arborization with the radial circulation.

Given the vessel size and the overall perfusion of the digit, surgical exploration with microvascular repair was not indicated. While there is limited literature regarding the management of digital vein thrombosis, conservative management remains the preferred treatment algorithm in the setting of a well perfused digit.^{4,7} We elected to monitor the patient in an inpatient setting for

tissue demarcation. In the interim, the patient was maintained on a heparin drip to ameliorate the risk for possible progression of proximal thrombus formation, as well as nitroglycerin paste to promote venous dilation.

The patient's soft tissue loss healed appropriately via secondary intention, which was closely monitored via outpatient clinic follow-up. In patients with large soft tissue deficits of the fingertip following ischemic changes, reconstructive options can include homo-digital island flaps, cross-finger flaps, and the thenar flap.

Conclusions

Subungual and periungual cutaneous warts are infrequent in nature.² While multiple therapeutic options demonstrate efficacy in treatment, intralesional immunotherapy injections may be indicated for refractory lesions.¹⁻³ Although these injections are intended for intra-dermal administration, they are not without sequela. We present an interesting case of distal necrosis of index finger soft tissue. While this injury was ultimately treated conservatively and healed via secondary intention, ischemic changes to the hand or digits should always be evaluated by a hand surgeon for appropriate management.

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Figure 1:

12-hours following injection of *Candida albicans* antigen to radial subungual wart. Ischemic changes and discoloration overlying the radial soft tissue of the distal left index finger.



Figure 2:

Following bedside debridement of distal index finger non-viable tissue. Underlying soft tissue with ischemic changes concerning for further demarcation.



Figure 3:

8-week follow-up: Healed wound overlying the distal pulp of the index finger with notable volume loss radially.

