

Herpes Zoster Misdiagnosed as *Mycobacterium marinum* Infection: A Case Report

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Abstract

The herpes zoster rash is characteristically unilateral and consists of clustered vesicles. Nonetheless, its first manifestation is frequently aberrant, resulting in misdiagnosis before the emergence of blisters, potentially postponing treatment. The trunk is the predominant location of onset, with a reduced prevalence in the extremities. A retrospective investigation revealed that merely 9% of herpes zoster cases manifested in the upper extremities^[1]. We present a case of linear papules and vesicles on the upper extremities subsequent to a minor puncture injury inflicted by frozen shrimp. The illness was initially misdiagnosed as Nontuberculous mycobacteria (NTM) because of the unusual early rash; nevertheless, it was ultimately identified as herpes zoster.

Keywords herpes zoster; misdiagnosis; *Mycobacterium marinum*; case report; NTM

1 Introduction

The herpes zoster rash is characteristically unilateral and primarily consists of clustered vesicles, typically presenting on the trunk. However, atypical manifestations—such as early aberrant rashes on the extremities—are relatively uncommon and frequently result in delayed or inaccurate diagnoses. Retrospective investigations indicate that only a small subset (merely 9%) of herpes zoster cases typically manifest in the upper extremities^[1]. In addition to age and systemic immunosuppression, mechanical trauma has been identified as a potential, albeit rare, local trigger for viral reactivation. Here, we present an unusual case of localized herpes zoster manifesting as linear papules and vesicles on the upper extremity following a minor puncture injury from a frozen shrimp, which was initially misdiagnosed as a Nontuberculous mycobacteria (NTM) infection due to its highly atypical presentation.

2 Case Report

A 37-year-old male, previously healthy and physically fit, denied any known exposure to individuals with varicella or herpes zoster. No underlying immunosuppressive diseases were identified throughout the clinical examination and assessment. He sustained a stab wound to the middle finger of his right hand while processing frozen shrimp nine days prior. A small, crimson papule emerged at the location of the stab wound, tender upon palpation, with a minor amount of blood evident following self-puncture with a needle. Subsequently, the rash progressed to blisters the size of mung beans, and two crimson papules

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resembling those on the fingers emerged on the palms. Furthermore, dispersed red papules emerged on the right upper limb, advancing from distal to proximal over a span of 3 days. These papules and scabs were arranged in a linear pattern, accompanied by mild itching. The condition did not improve with the application of fusidic acid cream and cefuroxime.

Type II infection caused by *Mycobacterium marinum* can exhibit a sporotrichoid distribution pattern, propagating linearly along the lymphatic channels from distal to proximal toward the heart. The rash may present as solitary papules, nodules, ulcers, or scabs, accompanied by pain^[2]. Considering the patient's history of being pricked by frozen shrimp, the rash resembled that associated with *M. marinum* infection, and the ineffectiveness of cephalosporin antibiotics led us to initially suspect an NTM infection. Subsequently, we performed other assays, including the T-cell spot test (T-SPOT), pathology, and metagenomic next-generation sequencing (mNGS). The test results indicated negative T-SPOT findings, histology revealed intraepidermal blisters, and mNGS detected VZV. The patient was ultimately diagnosed with herpes zoster and underwent a week-long regimen of antiviral therapy with valacyclovir. The treatment proved beneficial, resulting in the gradual subsidence of the rash and alleviation of pain. A subsequent examination one year later revealed that the rash had not reappeared.



Figure 1: There are three mung bean-sized blisters on the palm and fingers. On the right upper limb, there are scabs, papulovesicles, and red papules scattered in a roughly linear pattern.

3 Discussion

Herpes zoster results from the reactivation of the varicella-zoster virus (VZV). Subsequent to the initial infection, the virus persists in a latent state within the ganglia for an extended duration. When the immune system deteriorates, dormant viruses reactivate, proliferate extensively, and then disseminate via the axons of sensory neurons to the skin, resulting in herpes zoster, which predominantly impacts individuals with weakened immune systems or the elderly. Our patient was a healthy adult male whose rash manifested as dispersed linear papules and vesicles on one upper limb rather than the usual clustered vesicles, and the pain was not significant, leading to an initial misdiagnosis.

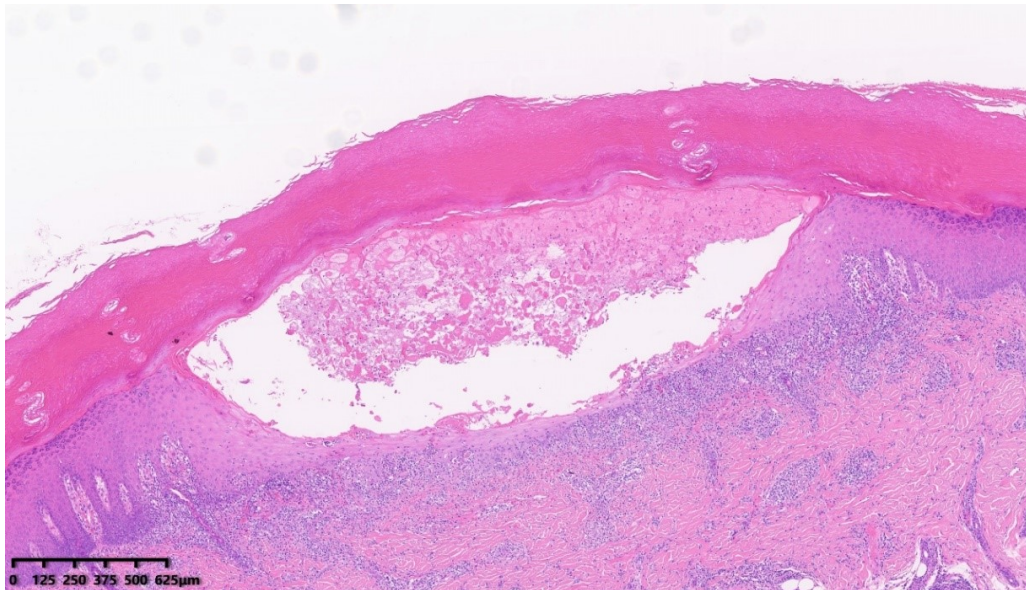


Figure 2: The histological analysis of the skin biopsy indicated a blister in the epidermis, with the superficial dermis showing a substantial number of lymphocytes and a small number of neutrophils. Additionally, special stains (PAS, GMS, and AF) exhibited negative results.

Numerous causes exist for herpes zoster, with mechanical trauma being among the rarer ones. A case-control study indicated that trauma to the affected area within one month prior to the onset of the rash was linked to an approximately 12-fold elevated risk of herpes zoster (OR 12.07)^[3]. Prior reports of herpes zoster following mechanical trauma have typically involved medical procedures, surgeries, or significant injuries such as burns and fractures from automobile accidents^[4-7]. However, this incident transpired immediately following a minor injury inflicted by a frozen shrimp, and the underlying mechanism merits further investigation. The direct stimulation from trauma may reactivate VZV, or local tissue injury may trigger localized cytokine release and oxidative stress, resulting in a temporary suppression of local T-cell function, thereby creating an opportunity for immune evasion by the virus and facilitating the resurgence of VZV^[8]. Recognizing the significance of local physiological conditions in the establishment of herpes zoster is potentially crucial.

4 Conclusion

This case illustrates that when herpes zoster presents with atypical triggers, lesion forms, and locations, identification becomes challenging and necessitates a combination of clinical evaluation and test results. Clinicians must acknowledge the correlation between herpes zoster and mechanical trauma, identify early manifestations of herpes zoster with atypical rashes, and administer timely treatment to prevent the loss of the ideal therapeutic window.

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