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Beuerlein, Katherine G  
Strowd, Lindsay C

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# Multidermatomal herpes zoster: a pain in the neck?

Katherine G Beuerlein<sup>1</sup>, Lindsay C Strowd<sup>2</sup> MD

Affiliations: <sup>1</sup>Wake Forest School of Medicine, Winston-Salem, North Carolina, USA, <sup>2</sup>Department of Dermatology, Wake Forest Baptist Health, Winston-Salem, North Carolina, USA

Corresponding Author: Lindsay C. Strowd MD, Medical Center Boulevard, Winston-Salem, NC 27157, Tel: 336-716-3926, Email: [lchaney@wakehealth.edu](mailto:lchaney@wakehealth.edu)

## Abstract

Herpes zoster classically presents as a vesicular eruption along a single dermatome that correlates with the dorsal root ganglion in which varicella zoster virus reactivates. Such cases most commonly involve a single thoracic dermatome, but other rare presentations of herpes zoster have been reported including multidermatomal herpes zoster. This letter reports a case of multidermatomal herpes zoster affecting cervical dermatomes C2-C5 and presents all previously published cases of multidermatomal herpes zoster in which involved dermatomes were reported to determine if this condition has a predilection for cervical dermatomes. A total of eight other cases were reviewed and involvement of cervical dermatomes was observed in 6 of 9 cases (66.7%). This suggests a propensity for multidermatomal involvement to affect cervical dermatomes beyond that encountered in classic herpes zoster. Clinicians should be aware of this presentation of herpes zoster especially in the head and neck region where the classic vesicular eruption may not be confined to a single dermatome.

*Keywords: varicella-zoster virus, multidermatomal, herpes zoster, cervical*

## Introduction

Herpes zoster infection, also known as shingles, has an annual incidence of 8.46/1000 people over

the age of fifty [1]. This common infection is the result of reactivation of the varicella-zoster virus (VZV) to which many are exposed in childhood [2]. Following the initial acute infection with VZV, the virus establishes latency in sensory dorsal root or cranial nerve ganglia via alterations in viral transcripts [3]. T-cell mediated immunity typically prevents the virus from reactivating, but factors such as waning T-cell populations such as seen in older individuals or temporary disruptions in normal T-cell function such as is possible in periods of acute physiologic stress or immunosuppression provides the opportunity for VZV to reactivate from a single dorsal root ganglion, resulting in the classic dermatomal vesicular eruption associated with herpes zoster [4]. In addition to this typical presentation, less common variants of herpes zoster have been reported including herpes zoster multiplex, disseminated herpes zoster, and multidermatomal herpes zoster — all of which are predominantly seen in immunocompromised or elderly patients [4]. Diagnosis of herpes zoster duplex or multiplex requires VZV reactivation in two or more noncontiguous dermatomes, respectively [5]. Disseminated herpes zoster is diagnosed when there is VZV reactivation with at least 20 vesicles distributed outside of the primary affected or adjacent dermatomes [6], or evidence of dissemination to visceral organs such as varicella pneumonitis, hepatitis, or

meningoencephalitis [7]. Multidermatomal herpes zoster is characterized by the presence of vesicles distributed in two or more contiguous dermatomes unilaterally without evidence of disseminated disease.

### Case Synopsis

A 64-year-old woman presented to the emergency department with a fever of 38.4 C and acute onset of a vesicular rash covering the posterior scalp and the right ear, neck, jawline, and chest (**Figure 1**). The patient had a recent history of lingual squamous cell carcinoma (AJCC T2N0M0) and received radiation to the right neck and face ten days prior — a total of 6800cGy for high-risk sites and 5000cGy to the areas at risk for occult disease. The skin eruption began two days following cessation of the radiation and progressively worsened in clinical appearance and pain sensation over the next eight days. The patient was diagnosed with herpes zoster in the C2-C5 region after a positive VZV PCR was obtained from a vesicle and was admitted for



**Figure 1:** Clinical image of patient with herpes zoster affecting dermatomes C2-C5.

treatment with 1000mg oral valacyclovir three times daily and observation. After two days she was discharged home to complete a two-week course of valacyclovir along with pain medications including acetaminophen, gabapentin, and lidocaine mouthwash.

Multidermatomal herpes zoster such as seen in the case presented here has been infrequently reported in the literature. Eight prior published cases were available at time of manuscript preparation. All reported cases are summarized, including our case (**Table 1**).

### Case Discussion

A striking observation in the above reported cases is the involvement of the cervical dermatomes in over two-thirds of the cases (6/9). This is of particular interest given the substantial propensity of classic herpes zoster for thoracic dermatomes with cervical cases being relatively few in comparison [15, 16]. Although reported cases of multidermatomal herpes zoster in thoracic dermatomes exist, this observation of increased prevalence in the cervical region beyond what is seen in single dermatome cases may suggest a differential ability for VZV to span multiple dermatomes in the cervical region.

There are several proposed mechanisms to explain the propensity of multidermatomal VZV infections for cervical dermatomes. It may be that reactivation of the zoster virus in one dorsal root ganglion allows direct spread to neighbouring ganglia in a distance-dependent fashion such that ganglia that are closer in proximity such as those in the cervical region given differences in vertebral anatomy [17] are more susceptible to contiguous spread. However, this theory does not directly explain the involvement of the trigeminal nerve as seen in three of the cited case reports. Another potential mechanism of spread is from peripheral nerve to peripheral nerve rather than ganglion to

ganglion. Given rich innervation of cervical dermatomes covering the head and neck [18] and associated increased opportunity for overlap in these peripheral nerve territories, there is potential for observed multidermatomal involvement to result from continued migration of the virus down branches of nearby peripheral nerves. Whether VZV spreads across adjacent ganglia or to neighbouring peripheral nerves is unclear, but the likelihood of location of spread in the cervical region with either of these proposed mechanisms may be further enhanced by differences in nerve lengths. The shorter length of the sensory nerves of the trigeminal and cervical dermatomes may allow easier transit of the virus to the skin, whereas axonal travel down longer nerves of thoracic and lumbar regions may be less successful in producing a multidermatomal skin

manifestation when those nerves are secondarily infected.

## Conclusion

Although the mechanism by which reactivated VZV spreads to contiguous dermatomes to result in multidermatomal herpes zoster is speculative, the cases noted above suggest a prevalence of affected cervical dermatomes in multidermatomal herpes zoster. Clinicians should be aware of these rarer variants of herpes zoster infection and be diligent in assessing for the presence of herpes zoster infection even when multiple dermatomes are affected.

## Potential conflicts of interest

The authors declare no conflicts of interest.

**Table 1:** Summary of published cases of multidermatomal herpes zoster infection. HIV is human immunodeficiency virus, DM is diabetes mellitus, and AIDS is acquired immunodeficiency syndrome.

Citation	Patient age/sex	Affected dermatomes with herpes zoster	Other comorbidities
Gupta LK, Kuldeep CM, Mittal A, Singhal H [8]	25/F	C2-C5	None reported
Dube S, Ranjan P, Rajshekhar V [9]	55/M	CN V1-3, C2-C4	None reported
"Two Cases of Herpes Zoster in Multiple Adjacent Dermatomes" [10]	74/F	CN V3, C1-C8, T1-T3	None reported
"Two Cases of Herpes Zoster in Multiple Adjacent Dermatomes" [10]	65/M	CN V3, C1-C8, T1-T3	None reported
Sundriyal D, Kapoor R, Kumar N, Walia M [11]	39/M	C2-C8, T1-T3	Acute myeloid leukemia
Bhattacharyya PC, Potpelwer A, Bhardwaj LM [12]	43/M	T1-T3	HIV, type 2 DM
Edelstein H [13]	59/M	T4-T12	AIDS
Ganjoo S, Sawhney MPS, and Chawla D [14]	85/M	T12, L1-L4, S2	Hypertension
Current case	64/F	C2-C5	Squamous cell carcinoma tongue

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