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A Case of Herpes Zoster in an Immunocompetent 19-year-old Female

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ABSTRACT

This case report describes the unusual presentation of herpes zoster in a fully vaccinated teenage patient and highlights management considerations. The patient is a 19-year-old female who presented with pain in her left lower back, side, and upper thigh for approximately 3 days, which was then followed by the eruption of a vesicular rash along the L2 dermatome consistent with herpes zoster. Herpes zoster is predominantly observed only in elderly and immunocompromised individuals, primarily due to the widespread use of the varicella-zoster virus vaccine for children since 1995, when it became part of the routine immunization schedule. However, this case serves as a noteworthy reminder for clinicians that herpes zoster should still be considered in immunocompetent and fully vaccinated younger patients.

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KEYWORDS

herpes zoster; shingles; postherpetic neuralgia; immunocompetent; varicella; corticosteroids

INTRODUCTION

Herpes zoster (HZ) is a reactivation of the varicella-zoster virus (VZV), which, after initial exposure, primarily remains dormant in the dorsal root ganglia. VZV presents as varicella (chickenpox) in primary infection and HZ when reactivated. A single dermatome is typically involved, and the skin lesions often do not cross the midline.[1] HZ can be diagnosed based on a typical history and a characteristic vesicular rash.[2] The management of HZ that does not involve the eyes typically involves antiviral medications and acute pain management, while the involvement of the eyes necessitates immediate referral to an ophthalmologist.

CASE REPORT

A 19-year-old female presented to the clinic with her mother, reporting a 3-day history of a unilateral rash on her lower back. Initially, she believed it was due to bug bites and attempted self-treatment with hydrocortisone, ibuprofen, witch hazel, and athlete's foot cream (clotrimazole 1%) without notable improvement. The rash continued to spread around her back onto her left lateral thigh. The rash was extremely painful and was rated 10/10 by the patient. She stated, "It hurts to let anything touch it." She denied pruritus or the presence of weeping from the lesions.

The patient had the varicella vaccine at 19 months of age and at 9 years of age but still developed a case of chickenpox. The patient's past medical history was significant for global developmental delay. The patient did not have any known exposure to sexually transmitted diseases or other infectious diseases, including COVID-19. There was no recent weight loss or a history of recurrent infections. She used cetirizine occasionally for seasonal allergies. No recent travel was documented. Family history was noncontributory. A year ago, the patient had a positive test for COVID-19 but

remained asymptomatic. She is current with all the recommended vaccines except influenza and COVID-19.

Physical examination revealed an erythematous vesicular rash following a band-like pattern along the L2 dermatome on the left side of the body (Figure 1). Her weight was 71 kg (85th percentile), and her height was 162.6 cm (45th percentile). Her BMI was 26.9 kg/m2 (87th percentile). Her vital signs were in the normal range, and she was in mild distress from pain associated with her rash. Cardiopulmonary and abdominal exams were unremarkable. There was no lymphadenopathy in the axillary or groin regions, and no organomegaly was observed.

Laboratory tests were obtained to rule out the possibility of an underlying immune deficiency. A complete blood count revealed a hemoglobin of 15.0 g/dL and a white blood cell count of 14.6 x 109/L with a normal differential. Immunoglobin levels were within normal range. The HIV Ag/Ab test was negative.

The patient was treated with valacyclovir 1 gram twice daily for 10 days, prednisone starting at 40 mg on the first day, gradually tapering down over 10 days, and ibuprofen 800 mg (3 times a day) as needed for 10 days.

The patient followed up 1 week after presentation and indicated that the lesions were drying up and that the pain had subsided significantly. The rash was resolving on physical exam, and there were no remaining vesicular lesions (Figure 2).

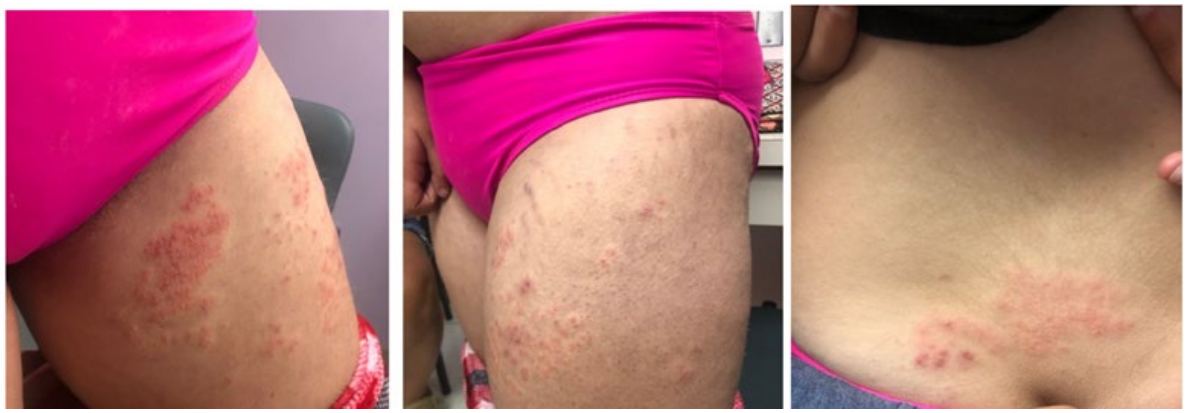

FIGURE 1. Herpes zoster lesion distribution along L2 dermatome.

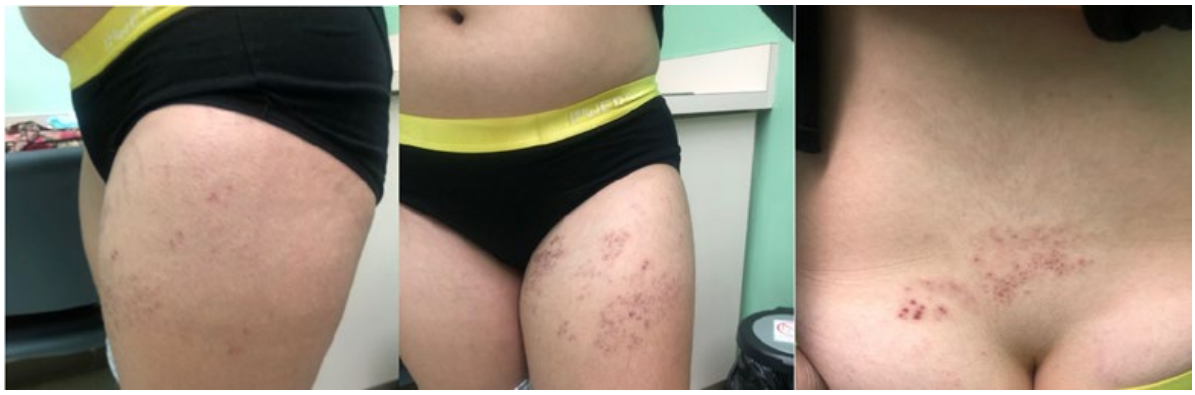

FIGURE 2. Herpes zoster lesions after 7-day treatment with valacyclovir and prednisone.

DISCUSSION

Epidemiology and Pathophysiology

Varicella zoster virus (VZV) is the cause of 2 distinct clinical syndromes: varicella zoster (chickenpox) and herpes zoster (HZ).2 Varicella, occurring as the primary infection, is mainly a childhood disease and is extremely contagious. After primary infection, VZV remains latent in the dorsal root ganglia. HZ, also known as shingles, results from the reactivation of VZV and its spread from a single ganglion to the corresponding dermatome.[3] Varicella is often self-limiting, while HZ tends to have more severe pain, with postherpetic neuralgia (PHN) being the most debilitating complication.[4] HZ typically occurs in older individuals or those with suppressed cell-mediated immunity.[3,5] When HZ occurs in younger patients, it is likely to be less severe. HZ incidence increases significantly with age. In a study by Yawn et al.,[6] the incidence of HZ per 1000 person-years was 2.1 for people aged 40-49 years, 6.0 for 60-69, and 10.7 for 80 and older. Moreover, the lifetime risk of getting HZ in the US may be as high as 30%.[7] In a systematic review including 130 studies from 26 countries, Kawai et al.[8] reported that the incidence rate of HZ in North America, Europe, and Asia-Pacific ranged from 3-5/1,000 person-years, and the hospitalization rate was 2-25/100,000 person-years, with higher rates among elderly populations. In the younger adult group (22-39 years old), it was shown that the incidence rate ranged from 1.6-1.9/1,000 people/year.9 Regarding the immunocompetent population in the United States, the annual incidence rate per 1,000 person-years of HZ ranged from 0.86 (95% CI 0.84-0.88) for those aged ≤19 to 12.78 (95% CI 12.49-13.07) for those aged 80 or older.[10]

Clinical Features of Herpes Zoster

Although the presentation of pain in HZ varies case-by-case, the patients often have a prodrome, which may include headache, photophobia, malaise, and localized pain. This prodromal period typically lasts about 5 days and precedes a characteristic unilateral rash.[2] Itching, pain, and paresthesia persist throughout the disease course.[5] PHN can follow after a resolved episode and may last several months to indefinitely.[11] Affected dermatomes most commonly occur in the thoracic region, accounting for 50%-70% of all HZ cases.[3] The rash does not cross the midline, and the involvement of multiple levels of different noncontiguous dermatomes rarely occurs in immunocompetent individuals.[2] The rash typically becomes vesicular after a few days, with scab loss and complete recovery occurring within 2-4 weeks.[12] In some cases, there may be scarring and permanent hyperpigmentation changes.[2] The pain may be described as burning, itching, aching, or stabbing.[3,5] Acute pain is widespread in patients older than 50 and often causes severe impairment in functional status as well as quality of life.[2,13] In a prospective, observational study including 160 HZ patients older than 60, Schmader et al.[13] investigated the impact of HZ pain on activities of daily living (ADLs). The patients were asked to complete 5 pain scores, including Zoster Brief Pain Inventory (ZBPI), Zoster Impact Questionnaire (ZIQ), McGill Pain Questionnaire, EuroQoL, and SF-12 questionnaires. The results showed that HZ pain affected all ADLs, especially enjoyment of life, sleep, general activity, leisure activities, getting out of the house, and shopping.[13] Approximately 40% of patients experienced severe pain, and 60%-70% of patients older than 50 have prolonged pain. PHN is variably defined as the persisting of sensory symptoms 1 month, 2 months, 3 months, or 6 months after the onset of HZ.14 Its incidence and duration are associated with patient age, with older patients having significantly increased risk.[14] In a study comprising 821 cases of HZ, Choo et al.[14] found that the prevalence of PHN was 8% (95% CI 6.3%-10.1%) and 4.5% (95% CI 3.2%-6.2%) 30 days and 60 days after disease onset, respectively. Compared to patients younger than 50, individuals older than 50 had a 27.4-fold higher prevalence of PHN (95% CI, 8.8-85.4) at 60 days after HZ developed.[14]

The elderly and immunocompromised patients have an elevated risk of complications from HZ3. Complications include neurologic, cutaneous, ophthalmologic, and visceral manifestations. Neurologic complications may include cranial polyneuritis, transverse myelitis, stroke, and meningoencephalitis[3]. About 15% of cases would involve the ophthalmic division of the trigeminal nerve, leading to potential complications such as keratitis, uveitis, glaucoma, and potential visual loss[3,5,15]. Therefore, timely medical intervention is crucial in such cases.

Diagnosis and Treatment

The rash in HZ is characteristic enough to enable an accurate diagnosis in most cases. However, in immunocompromised patients, the location or appearance of skin lesions may appear atypical.[2] Herpes simplex infection should be included in the differential diagnoses for recurrent vesicular lesions in the mouth or genital regions. Laboratory tests are typically unnecessary unless the patient presents with an atypical rash. Among laboratory tests, no specific modality is preferred. However, in suspicious cases, polymerase chain reaction (PCR) testing may be done on samples of lesions (e.g., blisters, scrapings) to detect VZV DNA with high sensitivity and specificity, both exceeding 90%.[16]

The main goals of medical management for adults include reducing pain severity and duration while limiting the risk of complications.[2] Three currently FDA-approved drugs include acyclovir, valacyclovir, and famciclovir, all of which are ideally initiated within 72 hours of lesion onset. In a meta-analysis with a total of 5579 patients from 17 randomized controlled trials (RCTs), Liu et al.[17] concluded that, among oral agents, famciclovir was the most effective for treating acute pain. However, there was no significant difference between oral antivirals regarding adverse events.[17] In general, due to their ease of administration (3 times per day), valacyclovir and famciclovir are preferred over acyclovir (5 times per day) for the treatment of HZ.[2]

A combination of corticosteroids may help cutaneous healing, but its effects on PHN have not been established.[18] However, some authors suggested that the benefits of corticosteroid therapy may outweigh the associated risks.[18] Corticosteroids improve quality-of-life measurements, including decreased analgesic use, uninterrupted sleep, and shortened time to return to normal activities.[18] The optimal dose of corticosteroids remains elusive, but one reasonable approach is to start prednisone at 60 mg/day and then taper the dose over 10-14 days.

This patient's diagnosis of HZ was made based on the clinical presentation. She was considered immunocompetent based on medical history (no recurrent infections or recent weight loss) and physical examination (absence of lymphadenopathy or organomegaly). However, confirmatory laboratory tests (normal immunoglobulin levels, negative HIV Ag/Ab test) were obtained. A successful response to valacyclovir reinforced confirmation of the diagnosis. A standard dose of valacyclovir combined with prednisone was given due to her pain severity.

The patient demonstrated substantial improvement after 1-week treatment, and the patient and family were reassured that there was no need for further follow-up.

CONCLUSION

Since the introduction of the varicella vaccine almost 3 decades ago, the incidence of varicella has decreased in all age groups, thanks to the effects of herd immunity. The biggest decline was observed among young children. Moreover, HZ appears to be less severe in vaccinated individuals than in those infected with wild-type strains. Hospitalizations for varicella infections have also decreased sharply by approximately 70-80%, compared to the pre-vaccine era.

While clinicians may commonly suspect HZ in immunocompromised patients, it is crucial to recognize that HZ can still occur in immunocompetent adults, including those with a history of immunity to VZV. In suspected cases with atypical symptoms, laboratory tests, including viral culture, serology, and viral PCR, can assist in achieving a correct diagnosis and determining an appropriate treatment. Furthermore, pain management is mandatory in all cases.

INFORMED CONSENT

Informed consent was obtained from the patient.

CONFLICTS OF INTEREST

The authors declare there are no conflicts of interest.

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