



Original Article

Clinical Profile, Dermatomal Patterns, and Complications of Herpes Zoster in Immunocompetent Patients: A Hospital-Based Observational Study

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ABSTRACT

Background: Herpes zoster (HZ) results from reactivation of varicella zoster virus (VZV) that persists in latent form within sensory ganglia following primary varicella infection. Although classically associated with advancing age and immunosuppression, the disease poses a significant clinical burden even in immunocompetent hosts. Data characterizing the disease course in this population from South Indian tertiary care settings remain limited.

Objectives: To describe the clinical profile, dermatomal distribution, morphological patterns, complications, and disease course of herpes zoster among HIV-seronegative patients attending a tertiary dermatology unit.

Methods: This observational study was conducted in the Department of Dermatology, Venereology and Leprosy, GGH/GMC Guntur from January 2019 to December 2020. One hundred and five HIV-seronegative patients with a clinical diagnosis of herpes zoster were enrolled. Clinical parameters including age, sex, dermatomes involved, morphology of lesions, pre-eruptive symptoms, duration of zoster-associated pain, time to cessation of new vesicle formation, healing of crusted lesions, and complications were systematically recorded.

Results: The study enrolled 105 HIV-negative patients. A slight female preponderance was noted (52.3% female). Herpes zoster was predominantly a disease of the older age group, with 67.6% of cases occurring above 40 years (mean age 45.3 years). Thoracic dermatome was the most commonly affected site (48.5%). The majority (75.2%) presented with vesicular morphology. Multidermatomal involvement was observed in 9.5% of cases, with one patient developing disseminated zoster on a background of chemotherapy for colorectal carcinoma. Complications included secondary bacterial infection (n=4), Ramsay Hunt syndrome (n=1), and ulcerative lesions (n=3). Mean time to cessation of new vesicle formation was 46.8 hours, and mean time to resolution of crusted lesions was 8.5 days. No seasonal variation in disease occurrence was observed.

Conclusions: Herpes zoster in immunocompetent patients follows a predictable course with age as a principal risk factor. Atypical presentations, while uncommon, can occur even in immunocompetent individuals. Thorough clinical assessment and follow-up remain essential to detect and manage complications early.

Keywords: Herpes zoster, varicella zoster virus, immunocompetent, dermatome, postherpetic neuralgia, dermatomal distribution.

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INTRODUCTION

Herpes zoster, colloquially known as shingles, is a neurocutaneous disease arising from reactivation of varicella zoster virus (VZV) a double-stranded DNA herpesvirus that establishes latency within dorsal root ganglia following primary

varicella infection in childhood.¹ The term “zoster” derives from the Greek word for girdle, aptly describing the belt-like distribution of the eruption that wraps around the trunk in thoracic involvement.²

The annual incidence of herpes zoster in the general population is approximately 2–4 per 1000 person-years, with a marked increase among those aged above 60 years.^{3,4} Advancing age is the single most important risk factor in immunocompetent individuals, attributed to the progressive decline in VZV-specific cell-mediated immunity (VZV-CMI) that parallels the broader immunosenescence of aging.⁵ While the disease is frequently associated with immunocompromised states such as HIV infection, malignancy, and immunosuppressive therapy, a substantial proportion of cases arises in otherwise healthy individuals.

The clinical spectrum of herpes zoster in immunocompetent hosts encompasses a prodromal phase of radicular pain and constitutional symptoms, followed by a characteristic unilateral vesicular eruption confined to one or two dermatomes.⁶ Complications most notably postherpetic neuralgia (PHN), herpes zoster ophthalmicus, and Ramsay Hunt syndrome may significantly diminish quality of life.⁷ Despite the clinical importance of the disease in immunocompetent patients, regional epidemiological data from South Indian tertiary settings are sparse.

This study was designed to systematically characterize the clinical profile, dermatomal patterns, morphology, disease course, and complications of herpes zoster exclusively in HIV-seronegative patients attending a government tertiary care hospital in Andhra Pradesh, India.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective, hospital-based observational study conducted in the Department of Dermatology, Venereology and Leprosy (DVL), Government General Hospital and Government Medical College (GGH/GMC), Guntur, Andhra Pradesh, India over a two-year period from January 2019 to December 2020.

Participants

Patients presenting to the outpatient department with painful fluid-filled lesions in a dermatomal distribution were assessed for eligibility. The diagnosis of herpes zoster was established clinically based on the presence of prodromal radicular pain and grouped vesicles or bullae in a dermatomal distribution, with or without constitutional symptoms such as fever, headache, and malaise. Tzanck smear was performed in diagnostically uncertain cases.

All patients were screened for HIV by ELISA, with confirmation by Western blot as per institutional protocol. Only those returning HIV-seronegative results were included in the present analysis. Patients with pre-existing HIV infection on antiretroviral therapy (ART) were excluded. No other formal exclusion criteria were applied; all consenting patients with confirmed herpes zoster who were HIV-negative were enrolled.

Data Collection

Structured data were collected using a pre-designed proforma at enrollment and during follow-up visits on days 1, 6, 10, and 15, and until complete lesion healing where feasible. The following parameters were recorded: demographic data (age, sex), seasonal distribution, pre-eruptive symptoms, dermatomes involved, number of dermatomes affected, morphology of lesions, atypical features (hemorrhagic, disseminated, or midline-crossing lesions), time to cessation of new vesicle formation, time to healing of crusted lesions, duration of zoster-associated pain (ZAP), and any complications.

Statistical Analysis

Descriptive statistics were used to summarize continuous and categorical variables. Continuous data are presented as means. Categorical data are expressed as frequencies and percentages. Group comparisons relevant to subgroup analyses were performed using the chi-squared test, with $p < 0.05$ considered statistically significant.

Ethical Considerations

The study was approved by the Institutional Ethics Committee of GGH/GMC Guntur. Written informed consent was obtained from all participants prior to enrollment. Confidentiality was maintained throughout the study. No investigational interventions were performed beyond routine clinical care and standard diagnostic investigations.

RESULTS

Demographic Characteristics

A total of 105 HIV-seronegative patients with herpes zoster were enrolled over the two-year study period.

Sex Distribution: Fifty-five patients (52.3%) were female and 50 (47.6%) were male, indicating a modest female preponderance with no statistically significant sex-based difference (Table 1).

Table 1. Sex distribution among HIV-negative herpes zoster patients

Sex	n	%
Male	50	47.6
Female	55	52.3
Total	105	100

Age Distribution: The age of patients ranged from 9 to 75 years, with a mean age of 45.3 years. Herpes zoster was predominantly a disease of the older age group: 67.6% of cases (n=71) occurred in patients above 40 years. The distribution across decades is presented in Table 2.

Table 2. Age distribution of HIV-negative herpes zoster patients

Age Group (years)	n	%
0–9	1	0.9
10–19	9	8.5
20–29	14	13.3
30–39	10	9.5
40–49	22	20.9
50–59	21	20.0
60–69	19	18.0
70–79	9	8.5
Total	105	100

Seasonal Distribution

No significant seasonal clustering of herpes zoster cases was observed. Cases were distributed throughout all months of the study period without any seasonal preponderance. A large proportion of patients were from rural backgrounds, which may have influenced healthcare-seeking behavior and hospital attendance patterns.

Pre-eruptive Symptoms

Fifty-seven patients (54.2%) reported pre-eruptive pain preceding the skin eruption. One notable case presented to the emergency department with severe acute abdominal pain and was initially evaluated for appendicitis. Grouped vesicles in a dermatomal distribution appeared three days later, establishing the diagnosis of herpes zoster. Pre-eruptive pain in herpes zoster may simulate pleurisy, myocardial infarction, cholecystitis, renal colic, and intervertebral disc prolapse, depending on the dermatome involved, underscoring the potential for diagnostic error prior to skin eruption.

Dermatomal Distribution

The thoracic dermatome was the most commonly involved site, accounting for 48.5% of cases (n=51). This was followed by lumbar (n=20, 19.04%), cervical (n=15, 14.3%), trigeminal (n=13, 12.4%), sacral (n=5, 4.76%), and facial (n=1, 0.9%) involvement (Table 3).

Table 3. Dermatomal distribution in HIV-negative herpes zoster patients

Dermatome	n	%
Thoracic	51	48.5
Lumbar	20	19.0
Cervical	15	14.3
Trigeminal	13	12.4
Sacral	5	4.8
Facial	1	0.9
Total	105	100

Number of Dermatomes Involved

The majority of patients (n=94, 89.5%) had unidermatomal involvement. Multidermatomal involvement was recorded in 10 patients (9.5%), and one patient (0.9%) developed disseminated zoster (Table 4).

Among the 10 patients with multidermatomal involvement, five had involvement of adjacent cervical dermatomes. This can be explained by the intrinsic predisposition of herpes zoster to involve contiguous cervical segments beyond the classically affected dermatome. Two patients with lumbar multidermatomal involvement had a history of application of indigenous topical preparations, resulting in irritant contact dermatitis with overlying edema and bullae, which may have contributed to the apparent extension of dermatome involvement. One patient exhibited lumbar involvement with the eruption crossing the midline pattern termed herpes duplex occurring in an immunocompetent individual without any

identifiable underlying immunodeficiency or chronic illness. This finding is more prevalent in Asian populations than in Western cohorts.

The single case of disseminated zoster occurred in a patient with carcinoma of the colon on chemotherapy. Disseminated herpes zoster is defined as more than 20 vesicles outside the primary and immediately adjacent dermatomes and is well recognized in the context of chemotherapy-induced immunosuppression.

Table 4. Number of dermatomes involved in HIV-negative patients

Dermatome Involvement	n	%
Single	94	89.5
Multiple	10	9.5
Disseminated	1	0.9
Total	105	100

Morphology of Lesions

The predominant morphological pattern was vesicular (n=79, 75.2%), followed by papulovesicular (n=20, 19.04%) and pustular (n=6, 5.7%). Hemorrhagic bullae were not observed in any HIV-seronegative patient (Table 5).

Table 5. Morphology of lesions in HIV-negative herpes zoster patients

Morphology	n	%
Vesicular	79	75.2
Papulovesicular	20	19.1
Pustular	6	5.7
Hemorrhagic bullae	0	0
Total	105	100

Disease Course

Cessation of New Vesicle Formation: Among 105 patients, 99 (94.2%) achieved cessation of new vesicle formation within four days of presentation. Six patients (5.7%) required more than four days. The mean time to cessation of new vesicle formation was 46.8 hours (approximately 1.95 days).

Healing of Crusted Lesions: Ninety-six patients (91.4%) had complete resolution of crusted lesions within two weeks. Nine patients (8.5%) required two to three weeks. Notably, none of the HIV-negative patients required more than three weeks for crust resolution. The mean time to complete crust healing was 8.5 days (Table 6).

Table 6. Healing of crusted lesions in HIV-negative patients

Duration	n	%
Up to 2 weeks	96	91.4
2-3 weeks	9	8.6
> 3 weeks	0	0
Total	105	100

Zoster-Associated Pain: The duration of zoster-associated pain (ZAP) in the HIV-negative group was distributed as follows: less than one week in 14 patients (13.3%), one to two weeks in 40 (38.1%), two to three weeks in 49 (46.6%), and more than three weeks in 2 patients (1.9%). The mean duration of ZAP was 15.6 days.

Complications

Complications occurred in 8 patients among the HIV-negative cohort. Secondary bacterial infection was the most frequent complication (n=4, 3.8%). Ulcerative lesions were documented in three patients (2.8%). One patient (0.9%) developed Ramsay Hunt syndrome (Table 7).

The patient with Ramsay Hunt syndrome presented with ear pain, vesicles in the auditory canal and auricle, and complete lower motor neuron facial palsy with loss of nasolabial fold definition and deviation of the oral commissure. Bell's phenomenon was present on clinical examination. The patient was managed with oral acyclovir and prednisolone and achieved complete recovery.

No ocular complications or CNS involvement were recorded in the HIV-negative cohort.

Table 7. Complications in HIV-negative herpes zoster patients

Complication	n	%
Secondary bacterial infection	4	3.8
Ulcerative lesions	3	2.8
Ramsay Hunt syndrome	1	0.9
CNS involvement	0	0
Ocular complication	0	0
Total	8	7.6

Childhood Herpes Zoster

Five patients (4.7%) were aged below 12 years. Three had involvement of thoracic dermatomes, and two had ophthalmic division of the trigeminal nerve affected. None had received varicella vaccination. Only two had a documented prior history of varicella infection. Among the five, two had identifiable predisposing factors: one was on corticosteroid therapy for asthma, and one had no known immunosuppression. The remaining three appeared immunocompetent. One child developed secondary bacterial infection and PHN as a complication. Outcomes were otherwise favorable.

DISCUSSION

The present study characterizes the clinical profile of herpes zoster in 105 HIV-seronegative patients attending a South Indian tertiary referral center, providing epidemiologically relevant data from a resource-limited regional setting.

Demographic Features: A slight female preponderance (52.3%) was noted in this cohort. This finding aligns with population-based studies from Korea and the United Kingdom, where higher incidence rates in women have been attributed to differential immune responses to latent VZV.^{8,9} However, the sex distribution in herpes zoster is inconsistent across published literature: while some Indian, Nepali, and Pakistani studies report male predominance, large European studies have found no significant sex-based difference in incidence.^{10,11} The modest female predominance in the present study likely reflects healthcare-seeking patterns in the region, where women may access dermatology outpatient services more readily than men.¹²

The mean age of presentation was 45.3 years, with the majority of cases occurring above 40 years a pattern well-supported by the epidemiological literature. Age-related decline in VZV-specific cell-mediated immunity is a well-established mechanism underlying the surge in zoster incidence with advancing age.⁵ This progressive immunosenescence mirrors, in some respects, the immune deterioration associated with HIV infection, which explains the parallel heightened susceptibility in both populations.

Dermatomal Involvement: Thoracic dermatome predominance (48.5%) is consistent with the established literature, which reports thoracic involvement in approximately 50–53% of all herpes zoster cases.¹³ This predisposition likely reflects the relative density of sensory ganglia and the cumulative likelihood of viral reactivation along the thoracic nerve roots, which are the most numerous in the spinal cord.

Lumbar involvement was the second most common site in this cohort (19.04%), differing from reports where cervical or trigeminal involvement was more frequent. Trigeminal nerve involvement was noted in 12.4% of patients a proportion comparable to figures reported by Vora et al. in a rural Gujarat population (14.3%).¹⁴

The occurrence of 9.5% multidermatomal involvement in HIV-negative patients deserves attention. While multidermatomal zoster is more classically associated with immunocompromised states, it can arise even in immunocompetent hosts, possibly due to exuberant local viral replication or contiguous spread. The single case of midline-crossing herpes zoster (herpes duplex) in an immunocompetent patient, while uncommon, has been documented in the literature and is considered more prevalent among Asian populations, potentially reflecting viremic spread.

Disease Course: The mean time to cessation of new vesicle formation in the HIV-negative group was 46.8 hours, closely consistent with the 47.1 hours reported by Onunu et al. in a comparable cohort.¹⁵ Similarly, the mean time to crust healing of 8.5 days mirrors the 8.2 days reported in the same study, lending validity to our findings. The mean duration of ZAP was 15.6 days, which was appreciably shorter than the 27.6 days reported by Onunu et al. This difference may be attributable to greater treatment compliance, regular follow-up, and less reliance on over-the-counter or indigenous medications in the present cohort.

Complications: Although complications were uncommon in the HIV-seronegative group, their occurrence including Ramsay Hunt syndrome and secondary bacterial infection highlights that herpes zoster should not be regarded as a universally benign disease even in immunocompetent patients. Ramsay Hunt syndrome, resulting from VZV reactivation within the geniculate ganglion, carries a significant risk of permanent facial palsy; full spontaneous recovery occurs in only

approximately 20% of untreated patients.¹⁶ The complete recovery achieved in our patient with combined antiviral and corticosteroid therapy underscores the importance of prompt diagnosis and treatment initiation.

Childhood Herpes Zoster: Pediatric herpes zoster (age below 12 years) accounted for 4.7% of the HIV-negative cohort. Historically, childhood zoster was considered a marker of underlying malignancy particularly acute lymphoblastic leukemia, but contemporary data suggest no consistent increase in malignancy rates in children presenting with herpes zoster.¹⁷ The occurrence of zoster in otherwise apparently healthy children is increasingly recognized and is thought to reflect primary varicella acquisition during the fetal or early neonatal period, when immune competence is not yet fully established.¹⁷ None of the cases in this series had received varicella vaccination, and only two had a documented history of prior chickenpox, indicating that prior primary infection may go unrecognized or may present atypically in early life.

Limitations: The study is limited by its single-center design, which may restrict generalizability beyond the local region. The relatively small sample size and the observational design preclude causal inference. Additionally, CD4 counts were not assessed in HIV-negative patients, and other causes of subtle immunosuppression (e.g., diabetes mellitus, undiagnosed malignancy) may not have been systematically excluded in all patients. Long-term follow-up for PHN beyond the study period was not available.

CONCLUSIONS

Herpes zoster in HIV-seronegative individuals predominantly affects patients above 40 years of age, confirming the central role of age-related immunosenescence in disease reactivation. The thoracic dermatome was the most frequently involved, with vesicular morphology predominating. While the disease course was generally self-limiting in this cohort with faster healing and shorter pain duration compared to immunocompromised counterparts, complications including Ramsay Hunt syndrome and secondary bacterial infection were encountered. Atypical features such as multidermatomal involvement and midline crossing can occur even in immunocompetent individuals, warranting thorough clinical assessment in all patients. All herpes zoster cases should be evaluated for underlying immunosuppression, and early antiviral therapy should be initiated to minimize complications and morbidity.

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Conflict of Interest: The authors declare no conflict of interest.

Ethical Approval

The study was conducted in accordance with ethical standards and was approved by the Institutional Ethics Committee of Government General Hospital/Government Medical College, Guntur. Written informed consent was obtained from all participants.

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Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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