Herpes zoster recurrence within 1 month: A case report

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Abstract
Herpes zoster (HZ), caused by the varicella-zoster virus, is an infectious skin disease that rarely recurs after initial presentation. The mechanism underlying HZ recurrence is currently under investigation. In this article, we report a case of HZ relapse within 1 month. Analysis of patient’s clinical manifestations, histopathological features, and flow cytometry results indicated that the absolute and percentage values of B cells were below the lower limit. We hypothesized that the patient had abnormal humoral immune function, which may be one reason leading to the HZ relapse within 1 month. The findings of this case will serve as useful reference for HZ recurrence for clinicians. This case was impactful and added to the literature on HZ recurrence.

Keywords
case report, flow cytometry, herpes zoster, pathogenesis, recurrence

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Introduction
Herpes zoster (HZ) is caused by the varicella-zoster virus (VZV). After the initial infection with the virus, the manifestations are similar to the clinical symptoms of chickenpox or occult infection. Thereafter, VZV remains in its latent form in the neurons of the posterior root ganglion of the human spinal cord for an extended period, and the affected individual develops lasting immunity to VZV. Upon stimulation by multiple factors, latent VZV may be reactivated to cause HZ. HZ is generally considered to occur only once in the lifetime of an individual, with relapses being relatively rare and occurring only in individuals with low immunity. The differences in the observations, subject conditions, and time point may help explain the differences in the recurrence rates reported in literature.1 A recent study showed a 10-year recurrence risk of 10.26% in an immunocompetent and zoster vaccine live-unvaccinated population aged ≥50 years.2 The time and location of recurrence observed are uncertain. The reported recurrence intervals range from 3 months to several decades3; however, recurrence within 1 month is rare. Here, we report a patient showing HZ relapse within 1 month and analyze the possible reasons using flow cytometry data.

Case presentation
A 60-year-old Chinese woman was readmitted to our hospital owing to the reappearance of erythema

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and blisters on the right side of the neck and shoulder for 2 days. The patient had been diagnosed with disseminated HZ in the previous month. After 2 weeks of antiviral and neurotrophic treatment, the rash subsided and the pain eased. Two days prior to readmission, the erythema and blisters reappeared at the same site. The patient had a history of occasional spikes in blood glucose levels for 2 years, with a fasting blood glucose level of up to 8.0 mmol/L and a postprandial blood glucose level of 12 mmol/L. The patient measured their blood sugar level occasionally and regulated the same through dietary control. No other medication or treatment was administered to the patient. This patient had not been exposed to SARS-CoV-2 and was not vaccinated. The rest of her medical and family histories were unremarkable. No history of drug allergies was reported.

Dermatological examination revealed dark red patches on the right upper torso and arm and clusters of 2-4 mm-sized papules, papulovesicles, and vesicles on the right side of the neck, shoulder, and chest (Figure 1). No other obvious abnormalities were observed.

Blood routine: RBC 3.78 × 10¹²/L, MPV 6.7 fl, thrombocytocrit 0.148%. Biochemical items: albumin 37.8 g/L, total cholesterol 5.64 mmol/L, LDL 3.66 mmol/L. Complement assay: complement component 1q 132 mg/L. The results of flow cytometry were shown in Table 1; no other abnormalities were observed. Histopathology: mild hyperplasia observed in the epidermis, intercellular edema and cell release. Several inflammatory cells infiltrated the superficial dermis (Figures 2 and 3). Compared to that during the initial infection, the erythematous area was reduced during recurrence, and the number of blisters and pustules decreased. Diagnosis: recurrent HZ. Treatment: penciclovir (5 mg/kg, Q12H, for 7 days), ribonucleic acid and extracts from rabbit skin inflamed by vaccinia virus were administered intravenously. Oral administration of vitamin B1, mecobalamine, and gabapentin, and topical application of polymyxin B. Gabapentin was administered as follows: 0.3 g in a single dose on the first day, 0.6 g in two separate doses on the second day, and 0.9 g in three separate doses on the third day. Next, the dosage of gabapentin (0.3 g) was maintained at three times daily for 2 weeks. Semiconductor laser physiotherapy was initiated with treatment twice a day when inflammation was observed. Significant improvement was observed in the lesions after comprehensive treatment. No adverse event was reported.

**Discussion**

The body is considered to produce protective antibodies after HZ remission, which help establish lifelong immunity. However, cases of HZ recurrence have been reported in recent years.

Here, we reported a case of HZ recurrence after initial dissemination. The reappearance of erythema and blisters in the original site was observed within 1 month. The reduction in the erythematous
area and the number of blisters and pustules were consistent with the finding that the clinical symptoms of 50–79-year-old patients with recurrent HZ were less severe than that of patients with primary infection. No typical intraepithelial vesicles or ballooning cells were detected; however, the pathology was generally consistent with VZV infection. The clinical manifestations and histopathological evidences indicated HZ recurrence. However, the mechanism underlying HZ recurrence remains unclear. Old age and chronic disease are some of the main factors associated with HZ relapse. In this case report, the patient had a history of occasional spikes in blood glucose levels.

Total T cells, CD4^{+} T cells, and CD8^{+} T cells are indicators of cell-mediated immunity (CMI). T-CMI plays an important role in providing protection against VZV reactivation. Related studies have also shown that the loss of CD8^{+} T cells only increases disease severity marginally, whereas the loss of CD4^{+} T cells leads to the dissemination of chickenpox. CD4^{+} T cells can kill VZV-infected cells directly. However, the flow cytometry results for this patient showed that there were no significant abnormalities in the above three indicators. At the same time, the severity of the skin lesions at the time of recurrence was less than before. Previous studies have shown a negative correlation between CMI to VZV and the severity of skin lesions. Therefore, we hypothesized that the skin lesions observed in this patient with a lower severity than before may be related to a stronger CMI in the relapse stage. Furthermore, the absolute value of B cell reduction may lead to antibody insufficiency and increase the risk of infection, which may be one of the reasons for recurrence. CMI-related recurrences have been mostly reported in previous studies, but the humoral immunity of our case was abnormal, which may be another important reason for the short-term recurrence of HZ.

Lastly, the alterations in the levels of IL-4, IL-6, IL-10, and the complement factors can decrease the recognition rate and elimination of VZV-containing cells and cause the escape of the virus, which may be another reason for relapse.

**Conclusion**

The various reasons discussed herein may have reduced the VZV-infected-cell recognition rate and the destruction of cells, thereby preventing the escape of the virus. In summary, we reported a case of HZ relapse within a very short period. Such cases should be actively treated at the initial stage, along with measures to improve immunity and reduce pain.

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Ethics approval
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Informed consent
Written informed consent was obtained from all subjects before the study.

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