정상 면역 소아에서 발생한 수두대상포진 뇌수막염

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Varicella Zoster Meningitis in an Immunocompetent Child

Neurologic complications associated with varicella zoster virus (VZV) are rare in children. A 13-year-old boy was hospitalized due to headache, fever, and vomiting. Aseptic viral meningitis was strongly suspicious based on findings on physical exam, cerebrospinal fluid examination, and brain magnetic resonance imaging. On the second day of hospitalization, typical zosteriform rashes developed on his left chest wall across the T7-T8 dermatome. Tzanck test of the skin lesion was positive and polymerase chain reaction test for VZV was positive on the second cerebrospinal fluid examination. Serum immunoglobulin levels were within normal range. Intravenous acyclovir was started and symptoms and signs of meningitis gradually improved and the patient was discharged without any complications. In immunocompetent children, VZV meningitis is rare and requires rapid diagnosis and treatment. Therefore, it is necessary to prompt diagnosis and treatment thorough medical history, physical examination and laboratory examination.

Key Words: Varicella zoster virus, Herpes zoster, Meningitis, Immunocompetent

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Introduction

Herpes zoster is a disease due to viral reactivation of varicella zoster virus (VZV) which remains dormant in the dorsal root and trigeminal ganglia after primary infection. VZV reactivation is deeply related to waning of the immune system, especially cell-mediated immunity, which results in zosteriform skin rash and other complications. While a decline in immunity is a natural phenomenon in the elderly and thus herpes zoster is relatively common in this age group¹⁾, it has been reported that the incidence of herpes zoster is rather low in children and adolescents comprising only 5.7% of the total age group²⁾.

After the introduction of varicella vaccine, complications of VZV in children have decreased dramatically. However, complications can still occur, and are more frequent and severe in immunocompromised patients than normal hosts. Neurologic complications associated with VZV are reported to occur even less frequently in immunocompetent patients³⁾. We report a rare case of VZV meningitis in an immunocompetent child.

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Case report

A 13-year-old boy was hospitalized due to headache, fever, and vomiting. He had developed symptoms of headache three days before, which gradually aggravated. His headache was especially severe on both occipital areas characterized by a squeezing pain, which aggravated with rotation. Fever had also developed three days before peaking up to a maximum 38.7°C. Vomiting was also first noted two days before and recurrent events had occurred thereafter. Past medical history was unremarkable, and vaccination was performed up to date according to the national immunization program.

On admission, he was fully conscious and oriented. Vital signs showed a blood pressure of 112/68 mmHg, heart rate of 72 beats/min, respiratory rate of 24 breaths/min, and body temperature of 38.0°C. His abdomen was soft and flat with a normoactive bowel sound. The liver and spleen were not palpable, and abdominal tenderness was negative. No skin lesions were detectable on the entire body. On neurologic examination, neck stiffness was noted with a positive Kernig's sign. Physical examination of other systems was unremarkable. Laboratory exams conducted on the day of admission showed a hemoglobin of 14.5 g/dL, hematocrit 41.9%, white blood cell (WBC) count of 5,780/ μ L, comprising 77.5% neutrophils, 14.2% lymphocytes, and 6.7% monocytes, and platelet count of 711,000/ μ L. C-reactive protein was 0.03 mg/dL. Analysis of the patient's cerebrospinal fluid (CSF) showed a WBC count of 610/ μ L (94% lymphocytes), glucose concentration of 56 mg/dL, and protein concentration of 78.1 mg/dL. Brain magnetic resonance imaging revealed leptomeningeal enhancement in both cerebral hemisphere on T1-weighted images.

On the second day of hospitalization, painful erythematous papules with grouped vesicles associated developed on his left chest across the T7-T8 dermatome (Fig. 1). Tzanck test of the skin lesion was conducted showing positive results. A second CSF exam was performed showing a WBC count of 342/ μ L (88% lymphocytes), glucose concentration of 49 mg/dL, and protein concentration of 93.0 mg/dL. VZV meningitis was strongly suspected and acyclovir was initiated intravenously with doses of 10 mg/kg every 8 hours. Fever was no further detected from the third day after starting acyclovir, and his headache subsided two days later. His skin lesion also gradually improved.

Results of polymerase chain reaction (PCR) tests reported later was negative for tuberculosis, enterovirus, herpes simplex virus 1 and 2 were negative on the first CSF exam, while PCR of the second CSF sample revealed positive results for VZV. Serum immunoglobulin test was performed to screen for all potential im-

munodeficiency disorders. Laboratory test showed IgG 1,167 (normal range: 570-1,570) mg/dL, IgA 175 (normal range: 86-544) mg/dL, IgM 71 (normal range: 33-135) mg/dL. The patient was discharged on the eighth day of hospitalization without any complications, and acyclovir was prescribed for five more days orally.

Discussion

VZV exists in a dormant state in the dorsal root and trigeminal ganglia after vaccination. However, when cell-mediated immunity is weakened it is capable of reactivation causing herpes zoster. Herpes zoster occurs more frequently in elder people whose cell-mediated immune function is decreased. In children, an immunocompromised state is a risk factor for VZV reactivation, and the severity and duration of complications are higher compared to adults. Park et al, complications of herpes zoster infection were observed in 27.7% of children younger than 18 years of age. Meningitis (8.3%) and conjunctivitis (8.3%) were the most common complications²⁾. Meanwhile, neurologic complications associated with herpes zoster have been observed in only 0.5% of adult patients with herpes zoster⁴⁾.

Several case reports of VZV meningitis in immunocompetent children have been previously reported. Most of these cases reported children with a positive meningeal irritation sign and with or without rash. Zosteriform rashes had developed before any symptoms of meningitis in some patients, easily leading to the suspicion of VZV meningitis⁵⁻⁷⁾. According to a recent retrospective study of 24 patients with meningitis and meningoencephalitis who showed typical zosteriform skin rashes, CSF tests and intra-

Fig. 1. Painful erythematous papules with grouped vesicles developed on his left chest wall across the T7-T8 dermatome on the second day of hospitalization.

venous acyclovir treatment had been conducted significantly faster in patients who revealed zosteriform skin rashes at initial presentation compared to those without rashes at initial presentation³⁾.

Typical zosteriform rashes luckily developed on the second day of admission in the present case. Accordingly, we were able to suspect VZV as the cause of meningitis and conduct a swift Tzank test and CSF exam for VZV. Based on the positive findings of Tzank test, VZV meningitis was strongly suspected and we were able to initiate treatment with acyclovir early in the disease course. VZV meningitis was later confirmed by PCR test of the second CSF sample.

VZV meningitis without rash has been reported in several studies and diagnosed by CSF PCR. In a recent epidemiological study of aseptic meningitis and encephalitis in adults, VZV was found in 5–29%^{8,9)}. In patients without clinical manifestations of VZV infection, diagnosis will be very difficult and delayed if CSF PCR is not performed.

In conclusion, we report a rare case of VZV meningitis occurring in an immunocompetent child. As skin rashes in VZV meningitis are capable of occurring later during the course of meningitis, it should be kept in mind that cautious inspection for newly developing skin lesions should be conducted in children with viral meningitis whose etiology have not been confirmed, even in previously healthy children without underlying diseases or frequent infection histories. VZV PCR in the CSF may be helpful in patients who do not know the exact cause of viral meningitis or encephalitis.

요약

수두 예방접종이 시행된 이 후 수두대상포진 바이러스의 합병증은 감소하고 있다. 하지만 면역저하환자의 합병증은 더욱 심한 양상으로 발현되기도 한다. 저자들은 13세 정상 면역 환자에서 수두대상포진 바이러스에 의한 뇌수막염 증례를 보고하고자 한다. 환아는 3일전부터 발생한 두통, 발열을 주소로 입원하였고, 뇌척수액 검사에서 바이

러스성 뇌수막염이 의심되었다. 입원 이틀째, 왼쪽 가슴(T7-8)에 발생한 피부 병변 및 뇌척수액 중합효소 연쇄반응을 통해 대상포진 바이러스에 의한 뇌수막염을 확진 하였고 정맥 내 acyclovir 투약 후 신경학적 증상 및 피부병변은 호전되었다. 환아의 혈청 면역글로불린 수치는 정상범위였고 기저 질환은 가지고 있지 않았다. 정상 면역 환자에서 수두대상포진바이러스의 재활성화는 피부 증상 이외에도 신경학적 합병증을 동반할 수 있기에 철저한 병력 청취, 신체 진찰 및 검사를 통해 빠른 진단 및 치료가 필요함을 본 증례를 통해 알 수 있었다.

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