

CASE REPORT

Parvovirus Infection in a Child Presenting with Erythema Multiforme and Vasculitis after a Yellow Jacket Bee Sting

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ABSTRACT

Parvovirus B19 has a wide spectrum of clinical manifestations. Erythema multiforme and vasculitis are rarely reported with parvovirus B19 infections. Reactions to insect stings can range from local swelling to life-threatening systemic reactions. There have been rare reports of unusual reactions, such as vasculitis, occurring in a temporal relationship with insect stings. We report an 8-year-old patient having Parvovirus B-19-related erythema multiforme and vasculitis after a yellow jacket bee sting.

KEYWORDS: bee sting, erythema multiforme, parvovirus B19, vasculitis, yellow jacket

INTRODUCTION

Discovered in 1975, human Parvovirus B19 has a wide spectrum of clinical manifestations ranging from benign to life-threatening. The five classic syndromes associated with parvovirus B19 infection are erythema infectiosum, arthropathy, transient aplastic crisis, fetal infection and pure red blood cell aplasia in immunocompromised individuals. The clinical presentation is influenced by the age, hematologic and immunologic status of the patient [1].

Reactions to insect stings can range from local swelling to life-threatening systemic reactions.

Delayed or toxic reactions can also occur. There have been rare reports of unusual reactions such as serum sickness, vasculitis, neuritis, encephalitis and nephrosis occurring in a temporal relationship with insect stings [2].

We report an 8-year-old patient having Parvovirus B-19-related erythema multiforme (EM) and vasculitis after yellow jacket bee sting.

CASE REPORT

An 8-year-old immunocompetent boy was referred from a peripheral hospital with macular eruptions,

high fever (38.6°C), microscopic hematuria and proteinuria. He had been stung on his left leg by a yellow jacket 5 days before. He did not have any significant problems immediately after being stung, except for erythematous swelling and itching at the local sting site. Macular eruptions developed on his trunk and extremities the next day, starting at the ankles. He was seen in a government hospital where symptomatic treatment was given. However, he was admitted to the same hospital 2 days later with high fever and persistence of his eruptions. He had also developed proteinuria and hematuria, and was therefore referred to our clinic with the presumptive diagnosis of vasculitis.

Physical examination revealed numerous round-shaped, reddish–violaceous macules on his trunk and upper and lower extremities, including palms and soles. Some of the eruptions were target-like lesions. Additionally, he had a local reaction (9 × 7 cm in size) on his left leg at the sting site (Fig. 1). He had no mucosal involvement, and other systemic findings were normal. He had never been stung by a bee before, and other personal and family history was unremarkable.

Laboratory results on admission revealed the following: white blood cell count, 11 000/mm³; neutrophils, 84%; lymphocytes, 6%; eosinophils, 6.5%; hemoglobin 11 g/mm³, platelets, 234 000/mm³; C-reactive protein, 33.8 mg/dl (cut-off point: 5 mg/dl); erythrocyte sedimentation rate, 79 mm/h; microscopic hematuria and proteinuria (16 mg/m²/h). C3



Fig. 1. Numerous round-shaped, reddish–violaceous macules; target-like lesions and local reaction on his left leg at the sting site.

and C4 levels were within normal ranges. The serum tryptase level was not measured because it was not covered by his health insurance. Serum biochemical analysis, such as urea, creatinine and electrolytes, was normal. Serologic markers for Epstein–Barr virus, Cytomegalovirus, Herpes simplex virus type 1 and Mycoplasma pneumonia was negative, except for serum parvovirus IgG, which was positive at a titer of 1/64. Serum parvovirus IgM was negative. Antinuclear antibody titer by indirect immunofluorescence was positive at a dilution of 1:160 and Anti-dsDNA antibodies were negative. A venom-specific IgE test was not performed because of financial issues.

The child was diagnosed with EM minor. After consulting with our dermatology clinic, treatment with pheniramine hydrogen maleate and cetirizine was started. On admission day 2, the patient had bilateral conjunctivitis, myalgia, headache and he showed a white strawberry tongue. A rash in the cheeks followed 1 day afterward. On day 4, his local reaction was 10 × 10 cm in size and he had positive signs of meningeal irritation. His cerebrospinal fluid examination and cranial magnetic resonance imaging were found to be normal. The patient was consulted with the pediatric cardiology department. Although his echocardiography revealed no pathology, intravenous immunoglobulin (IVIg; 2 g/kg) infusion was recommended due to the risk of incomplete Kawasaki disease. In the 15th minute of the infusion, the patient had difficulty in breathing and so the infusion was stopped. He did not receive IVIg again. After the fifth day of his admission, the rash began to fade, microscopic hematuria and proteinuria were resolved, and his fever subsided. The patient was discharged on the seventh day of his admission. One month later, the patient was retested for parvovirus IgG. There was no increase in serum parvovirus IgG titers; however, through a polymerase chain reaction, parvovirus DNA was found to be present.

DISCUSSION

Stinging insects of the class Hymenoptera include vespids and apids. Wasps (yellow jacket) fall into the vespid category [3]. Vespula are the most important species both in Europe and in Turkey [4, 5] Stung by a yellow jacket, our patient presented with a large

local reaction at the sting site, macular eruptions on his trunk and extremities (some of which were target-like), high fever, proteinuria and microscopic hematuria, which were followed by other manifestations such as conjunctivitis, myalgia, rash in the cheeks and positive signs of meningeal irritation.

The history of Hymenoptera sting suggests that the clinical findings, which included proteinuria, microscopic hematuria and positive signs of meningeal irritation, could be related to the delayed or toxic reactions of the Hymenoptera sting. There have been prior reports of acute renal failure, nephrotic syndrome and vasculitis related to insect stings [6]. However, they usually occur several days to several weeks after the sting, and are mostly related to multiple stings [7]. The time between symptoms and yellow jacket sting was shorter in our patient. EM has not been reported after hymenoptera stings.

Because of the appearance of the rash in the cheeks in our case, we investigated parvovirus B19 as a responsible infectious agent. Parvovirus IgM was negative, Parvovirus IgG was found to be positive. Vasculitis, encephalitis, glomerulonephritis and EM are rarely reported with parvovirus B19 infection [8, 9]. The natural course of an acute parvovirus B19 infection is classically controlled by neutralizing antibodies in immunocompetent individuals. A transient, high-level viremia is seen for <1 week and then declines with the appearance of specific IgM antibodies that persist for 8–10 weeks and specific IgG antibodies that persist throughout the life [8, 10]. Persisting infection may be observed in immunocompromised patients unable to produce neutralizing antibodies and they can develop symptomatic parvovirus B19 infections as a result of reactivation of latent or persistent viral infection [10, 11].

Although our patient was immunocompetent, based on positive viral serology for parvovirus B19 and parvovirus DNA, we speculate that he had parvovirus B19-related EM and vasculitis.

Recently, persisting low levels of parvovirus B19 DNA have been evidenced in the blood of the immunocompetent individuals several years after the primary infection, the mechanism of such chronic carriage being unclear [10]. Calistru *et al.* [11] reported the first case of acute generalized exanthematous pustulosis (AGEP) resulting from the

interaction between drug hypersensitivity and the reactivation of parvovirus B19. Th1-mediated immune response is mounted both in AGEP and parvovirus B19 infection. They concluded that a common pathway in their pathophysiology may be found.

A viral phospholipase A2 is required for parvovirus infectivity [12]. Group III secretory phospholipase A2 is the major allergen in bee venom which has *in vitro* and *in vivo* immunomodulatory effects [13]. A common pathway including phospholipase A2 can play a role in both parvovirus infection and bee sting. As a result, trauma induced by bee sting might cause the reactivation of parvovirus B19 in our patient.

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