

Gloves and Socks Syndrome Associated with Parvovirus B19 Infection

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SUMMARY The spectrum of disease caused by parvovirus B19 infection ranges from asymptomatic to a serious disease. Parvovirus B19 plays a role in the pathomechanism of gloves and socks syndrome, erythema infectiosum, acute polyarthralgia, aplastic crisis in persons with hemolytic anemia, and birth defects. Gloves and socks syndrome has an acute febrile course. Painful edema of hands and feet, and numerous small confluent petechiae in the same localization are the most characteristic signs. Blisters and erosions may occur in oral mucosa. General discomfort and arthralgia accompany skin lesions. The disease tends to be self-limiting. A typical case of gloves and socks syndrome in a 36-year-old woman is reported. Serological tests disclosed the parvovirus B19 infection, confirming the causal relationship between the syndrome and this infection.

KEY WORDS: gloves and socks syndrome; parvovirus B19

INTRODUCTION

Gloves and socks syndrome shows cutaneous and mucosal symptoms, most often associated with parvovirus B19 infection. It was first described by Harms *et al.* as papular-purpuric gloves and socks syndrome (1). The relation of clinical symptoms to parvovirus B19 infection was demonstrated by Bagot *et al.* (2). The disease has an acute course and is accompanied by fever. It begins suddenly, with painful edema of the hands and feet that are covered by numerous small confluent petechiae in a few days. Lesions may cover the buttocks, elbows and knees as well. Blisters and erosions may occur in oral mucosa. Elevated body temperature, general discomfort and arthralgia accompany skin lesions. The disease tends to be self-limiting. The symptoms, dermal, mucosal or general, subside in 7-14 days.

Parvovirus B19 is also of importance in the pathomechanism of other diseases such as ery-

thema infectiosum (3), acute polyarthralgia (4), and aplastic crisis in persons with hemolytic anemia (5,6). In women, this infection may cause birth defects (7).

CASE REPORT

In a 36-year-old female patient, the illness began with itching of the hands and feet, followed by edema and redness in several hours. The patient had sore throat and myalgia. Dermal symptoms were expanding gradually in the form of small blue-purple papules on the hands and feet. On day 2 of the disease, her body temperature rose to 39.5 °C. At that time the patient was on antihistaminic (clemastine, cetirizine) and anti-inflammatory medication (metamizole), along with calcium, yet with no effect. On day 3, the patient presented to the hospital. On admission, she showed the following symptoms: edema intensifying the



Figure 1. Erythematopapular eruption on the palms.

blue-purple reddening of the hands and feet (Figs. 1 and 2), and similar yet less pronounced symptoms on the elbows, buttocks and in armpits. Redness and small papules were discernible around her lips. The throat was reddened. Elevated body temperature persisted for 3 days, 2 of these at hospital, then returned to normal. There was gradual regression of dermal symptoms. On day 15, mild redness and desquamation were observed on the hands and feet. Pain in the elbow and knee joints persisted for 2 months.

Additional tests showed normal erythrocyte, leukocyte and platelet counts, and erythrocyte sedimentation rate (32 mm/h). On day 4, erythrocytes and 25 mg/dL protein were found in urine. Urinary changes subsided after several days. The results of biochemical blood tests (glucose, urea, bilirubin, creatinine, GOT, GPT levels and electrolytes) were close to normal. In addition, an average level of C3c and C4 components of complement, negative result for rheumatoid factor, and low level of ASL were recorded. At the same time, the level of CRPm increased to 63.30 mg/L. Serologic tests for B19 parvovirus infection were performed on three occasions, i.e. on days 4, 21 and 52. The result of IgG and IgM was negative on day 4 but positive on days 21 and 52. These tests were performed by ELISA method. On day 4 absorption within IgG was 0398, ratio 0.47; absorption within IgM was 0573, ratio 1.35; on day 21 absorption within IgG was 2345, ratio 2.77; absorption within IgM was 2659, ratio 6.29; and on day 52 absorption within IgG was 2201, ratio 2.60; absorption within IgM 0862, ratio 2.04.

Samples for histopathologic tests were obtained from the infected areas on the feet: cuticular hyperkeratosis, significant stromal edema



Figure 2. Erythematopapular eruption on the feet.

in the dermis, and small inflammatory infiltrates around blood vessels were recorded. There was no extravasation of erythrocytes. Direct immunofluorescence testing showed no accumulation of IgG, IgM or IgA class antibodies, or of the components of complement.

During hospital stay, the patient was treated with clemastine, calcium and paracetamol, as necessary.

DISCUSSION

Harms *et al.* (1) were the first to describe the syndrome now known as petechial gloves and socks syndrome. They described 5 patients aged 16-31 with limited petechial symptoms on the hands and feet. In 3 patients the symptoms appeared on the cheeks, the inside of thighs, buttocks and penis. All patients showed changes of oral mucosa, accompanied by elevated body temperature. The course of the disease was acute, and the symptoms persisted for 7-14 days. Leukopenia was observed in some cases. Bagot *et al.* (2) described a similar case in a woman. They found the characteristic symptoms of the disease to be associated with parvovirus B19 infection, which was demonstrated by detection of specific antibodies of IgM class. Other authors also observed the association between the syndrome described by Harms *et al.* and parvovirus infection (8-11) as well as with simultaneous herpesvirus 7

infection and B19 parvovirus infection (12). Typical symptoms of the gloves and socks syndrome have also been described as a drug reaction after trimethoprim/sulfamethoxazole (13).

B19 parvovirus is an unenveloped virus, 20-25 nm in diameter. The infection shows a droplet pattern and may be asymptomatic. Typically, viremia occurs one week after the infection, lasting for a few days and with general symptoms (fever, discomfort, myalgia), and possible skin symptoms. Viremia is followed by a specific response, initially of the IgM class, and then, in several days, of the IgG class. Ten days after inoculation there are no erythroid precursors in the bone marrow and a small decrease in hemoglobin level in peripheral blood is observed (14).

However, the B19 parvovirus infection may have a clinical course different from that in the gloves and socks syndrome. In children, parvovirus B19 causes erythema infectiosum. The disease is observed in children aged 4-11. The symptoms include intensive erythema on the cheeks and trunk, and reticular erythema on the limbs. Skin symptoms remain for 1-2 days, and recede without traces. Another manifestation of B19 parvovirus infection is acute polyarthralgia and arthritis. Adults are most often affected by the disease that involves symmetrically small joints of the hands and wrists, rarely elbows and knees. The symptoms subside after 2 weeks, although may sometimes persist for several months. Parvovirus B19 can also play a role in the pathomechanism of aplastic crisis in individuals with chronic hemolytic anemia, e.g., in persons with sickle cell anemia, as it leads to damage to erythroid precursors in the bone marrow. A chronic parvovirus infection in immunocompromised individuals may lead to long-lasting or recurrent anemia. A case of chronic skin symptoms and anemia as the result of parvovirus B19 infection in a HIV positive patient has been reported (15). Parvovirus B19 infection in pregnant women can cause birth defects, usually hydrocephalus, or even lead to spontaneous abortion.

The diversity of symptoms associated with the infection is related to the pathomechanism of parvovirus B19 infection. Through the receptor, antigen P on erythrocytes, the virus affects vascular endothelial cells and fetal myocytes (16).

The group of symptoms in the course of petechial gloves and socks syndrome should be differentiated from drug reactions (chemotherapy: doxorubicin, cytarabine; erythrocyte and platelet transfusion; antibiotic therapy) (17), skin symp-

toms in serum sickness (18), Gianotti-Crosti syndrome (19), measles (20), and Kawasaki disease (21).

In our patient, a typical acute course of the disease symptoms was observed. Skin lesions, i.e. edema and erythema, had a characteristic acral localization. Less pronounced erythema and papules appeared on the buttocks, elbows and in armpits. In oral mucosa, only redness of the throat was observed. In the preliminary stage of the disease, body temperature was 39.0 °C and continued so for 3 days only. The patient felt discomfort and muscle pain during the period of symptom intensification. Skin lesions were withdrawing with desquamation and gradual decrease of erythema and edema severity.

During convalescence, there was no discoloration connected with the presence of hemosiderin. Histopathologic examination showed no extravasation of erythrocytes. Perhaps the gloves and socks syndrome may proceed without petechiae, depending on the severity of vascular wall changes. However, a case of severe vascular wall lesions that led to skin necrosis is described in the literature (9).

The parvovirus B19 infection in our patient was proved by serologic tests. The case described supports the substantial association between the gloves and socks syndrome and parvovirus B19 infection.

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