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Fever and Petechial Rash in a 9-year-old Boy

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Presentation
A 9-year-old boy presents to the emergency department in mid-April complaining of subjective fevers for 5 days and a rash for 2 days. The rash had appeared initially on his ankles. The day before, the rash had spread to his feet and began to itch. On the day of presentation, the patient is noted to have a temperature of 102°F. His past history is unremarkable and includes removal of a chalazion. He has no history of exposure to anyone with similar symptoms or any recent travel history or time spent in wooded areas. His twin sister had acquired Rocky Mountain spotted fever 1 year ago.

On presentation, the boy is alert, oriented, and in no acute distress. Vital signs are temperature, 37.3°C; blood pressure, 94/62 mm Hg; heart rate, 100 beats per minute; respirations, 20 breaths per minute; and oxygen saturation, 99% on room air.

Physical examination reveals petechiae on his right hand, left palm, and both knees. No bruising is noted. There are ~6 petechiae on his chest, and a coalescing petechial rash is present on the dorsal and pedal surfaces of both feet extending to the ankles (Fig).

Initial laboratory values include C-reactive protein level of 1.29 mg/L (normal, 0–5 mg/L), hemoglobin concentration of 11.4 g/dL, and hematocrit level of 32.6%. The patient is leukopenic (white blood cell count, $2.8 \times 10^3/\mu$L) and mildly thrombocytopenic (platelet count, $135 \times 10^3/\mu$L).

A diagnosis is made based on clinical and laboratory findings.

Figure. Petechial rash on feet and ankles.

Author Disclosure
Drs Eng, Moon, Leander, and Del Vecchio have disclosed no financial relationships relevant to this article. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.
Diagnosis: Petechial Papulopurpuric Gloves-and-Socks Syndrome
The diagnosis of petechial papulopurpuric gloves-and-socks syndrome (PPGSS) is based on the following clinical picture: a monomorphic, purpuric, petechial maculopapular rash restricted to the distal extremities that is pruritic, swollen, and painful. Laboratory data can help to distinguish this dermatosis from others through the presence of immunoglobulin M (IgM) antibodies to parvovirus B19.

Discussion
PPGSS is an infrequently seen dermatosis of viral etiology that affects the pediatric population more commonly than the adult population. The syndrome is acute and self-limiting, with spontaneous resolution of symptoms 1 to 2 weeks after palmar and plantar desquamation. PPGSS also has been referred to as “papular purpuric gloves and socks syndrome,” yet, the term petechial PGGSS is better suited because the name emphasizes the petechial aspect of the syndrome.

Presentation
First described in 1990 by Harms et al, (1) PPGSS usually presents with a painful, pruritic, purpuric, petechial, and edematous maculopapular rash in a stocking-and-glove distribution over the distal extremities. Occasionally, similar lesions may appear at other sites on the body, including the oral and genital areas. This viral exanthem often is preceded by fever, abdominal pain, arthralgia, lymphadenopathy, myalgia, anorexia, weakness, and respiratory or gastrointestinal symptoms. Diagnosis is based on clinical characteristics and confirmed with laboratory results. (2)

Laboratory data may be nonspecific and can show leukopenia, leukocytosis, neutropenia, thrombocytopenia, cosinophilia, and mild elevation of transaminase levels. Markers of inflammation may be elevated, such as the erythrocyte sedimentation rate and levels of C-reactive protein. (2)

PPGSS is caused most frequently by parvovirus B19, but may be caused occasionally by other viruses, including herpesvirus 6, Coxsackie B virus, Epstein-Barr virus, measles virus, cytomegalovirus, and hepatitis B virus. Parvovirus B19 is associated also with other conditions, such as erythema infectiosum (fifth disease), transient aplastic crisis, arthralgias, rheumatoid-like arthritis, spontaneous abortions, and hydrops fetalis. (2)

Most cases of PPGSS have been described in white children and adolescents, with equal incidence among males and females. PPGSS tends to occur during the late spring and summer. (3)

Differential Diagnosis
The differential diagnosis for fever and a petechial rash, especially with initial location on the hands and feet, must first include Rocky Mountain spotted fever, then meningococcemia (or other bacterial infection leading to sepsis), and ehrlichiosis. All of these illnesses can lead to significant morbidity and even mortality. Additionally, the differential diagnosis should include atypical measles, allergic reactions, and atypical collagen vascular diseases or Kawasaki disease. Other self-resolving viral illnesses include Epstein-Barr virus infection and enteroviral infection, specifically hand-foot-and-mouth disease. (3)

Management
PPGSS is a mild, self-limited illness and thus does not require treatment. Symptomatic relief of fever and pruritus may be indicated in some patients. The infectivity of parvovirus B19 will depend on the specific syndrome or condition acquired. Patients who have PPGSS should be considered infectious throughout the duration of symptoms, because the presence of symptoms indicates active viremia, and symptoms disappear once an antibody response has developed. Patients who have aplastic crises are infectious before the onset of symptoms and continue to be infectious for a short period of time after symptoms have subsided. Conversely, patients who have erythema infectiosum are most infectious before onset of their rash and are unlikely to be infectious once the rash or other symptoms have appeared. (4)

Because parvovirus B19 infection is spread by person-to-person contact, it is important to remember that certain groups of people should avoid contact with the affected individual (or decrease exposure time if contact is necessary). These groups include pregnant women, immunocompromised individuals, and individuals who have an increased need for production of red blood cells (eg, sickle cell disease). Pregnant caretakers should be informed of possible risks parvovirus B19 infections may pose to the fetus and told about preventive measures that may decrease these risks. These precautions include strict infection control procedures and limiting contact with patients who have parvovirus B19–associated aplastic crises or immunocompromised patients who have chronic parvovirus infection. For any patient presenting with a petechial or purpuric rash of unknown cause, testing for parvovirus infection should be considered. (4)(5)(6)

Patient Course
Because of the fever and petechial rash, the patient was admitted to the hospital to be treated for Rocky Mountain spotted fever.
Mountain spotted fever as well as meningococcemia and other bacterial processes. Upon arrival to the floor, the patient remained mildly tachycardic, febrile, and slightly hypotensive (blood pressure range, 94–99/35–49 mm Hg), with a widened pulse pressure of 49–59 mm Hg. He received vancomycin, cefotaxime, and doxycycline initially.

The patient defervesced by the third hospital day. At that time, vancomycin and cefotaxime were discontinued owing to negative blood cultures. Initially, the rash remained unchanged and showed no improvement until hospital day 4. Before discharge, the results of an *Ehrlichia* antibody panel, Rocky Mountain spotted fever IgG enzyme immunoassay, and enterovirus polymerase chain reaction were negative. Epstein-Barr viral antibody test results were consistent with a previous infection. A repeat complete blood count with differential showed improving white blood cell and platelet counts. The patient was discharged from the hospital with close follow-up with his pediatrician and with instructions to complete a 10-day course of doxycycline.

The patient presented to his pediatrician’s office for follow-up after hospital discharge and was improving. He was continuing his doxycycline regimen and his rash was fading. He was well otherwise, denying fever, rhinorrhea, cough, abdominal pain, headache, bruising, or bleeding. He appeared well on examination and had a fine, fading, erythematous papular rash on both feet and right forearm, with clustered petechiae on his right shoulder. The patient was instructed to complete his doxycycline course as prescribed.

Laboratory samples were drawn during the follow-up visit. Repeat Rocky Mountain spotted fever and *Ehrlichia* antibody titers were negative, and a complete blood cell count was within normal limits. However, the laboratory results did show positive (>1.11 mg/dL) parvovirus B19 titers (parvovirus B19 IgG 3.5 mg/dL and parvovirus B19 IgM 8.4 mg/dL). These findings were consistent with acute parvovirus infection.

**Summary**

- In evaluating a patient presenting with fever and a petechial rash, one must consider a serious underlying illness such as meningococcemia, Rocky Mountain spotted fever, and ehrlichiosis. However, the patient may have a benign, self-limiting viral illness.
- As illustrated by this case, one such diagnosis could be PPGSS, and parvovirus testing should be considered as part of the initial laboratory evaluation.

**References**

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