Emergency Department's
Case of the Month

A Slap in the Face

Jody Enright, MD; and Bijon Das, MD, CCFP(EM)

Sophie's case:

Presentation:

Sophie, 39, presents to the ED by ambulance, complaining of a rash and aches. She reports a four-day-history of feeling unwell, with weakness, nausea and vomiting associated with aches and pains throughout her body. Three days ago, she presented to a walk-in clinic where, despite not complaining of a sore throat, swabs were taken and she was diagnosed with strep throat and prescribed penicillin.

Two days later, she developed a facial rash, most prominently on her cheeks and a generalized rash on her trunk and extremities. She also complained of abdominal discomfort, lower back pain and bilateral aching in her legs. She denied neck stiffness or neurological changes.

Examination:

On examination, Sophie appeared to be in mild distress. She was afebrile with a:
- BP of 120/70 mmHg,
- pulse of 68 bpm and
- respiratory rate of 20/min.

On inspection, Sophie was found to have erythematous exanthem on both cheeks, on her nasal bridge with perioral sparing. She also had a blanching, lacy reticular rash on her trunk with similar, although less prominent, findings on her upper and lower extremities. Tenderness in her knee and her ankle joints was elicited bilaterally during movement in her normal range of motion. Examination of the neurological, cardiovascular and respiratory systems were normal. Review of systems revealed nothing noteworthy. Routine blood work including:
- complete blood count,
- electrolytes,
- blood urea nitrogen,
- creatinine and
- international normalized ratio

were remarkable for mild anemia.

On further questioning, Sophie revealed that her young nephew had experienced a similar rash several weeks ago.

Diagnosis:

Based on her history and physical examination, a clinical diagnosis of parvovirus B19 (B19V) infection was made. Sophie was discharged on 2 mg of hydromorphone q.4.h., p.r.n. for pain and 600 mg of ibuprofen t.i.d., for five days.

Questions & Answers

1. What is the epidemiology of Parvovirus B19?

Parvovirus B19 (B19V) is the only member of the *Parvoviridae* family of viruses known to cause human disease. B19V infection can manifest itself in a variety of clinical presentations, but the most widely known is *erythema infectiosum.* Popularly known as Fifth Disease, *erythema infectiosum* is a mild viral infection that is followed by a characteristic "slapped cheek" facial exanthema and a generalized lacy reticular rash on the trunk and extremities. Although common in childhood, *erythema infectiosum* is less often seen in adults. Other clinical presentations of B19V include: aplastic crisis, chronic anemia, polyarthropathy and, in women who are pregnant, *hydrops fetalis,* as well as fetal death.

2. What is the course of B19V?

B19V infection follows a biphasic course. The first phase is the infectious one where the virus replicates and causes damage to the bone marrow. The second phase appears to be immune related and is characterized by a rash and arthralgia.

During the infectious phase, which occurs during the first week, viremia is accompanied by a depletion of red blood cell precursors in the bone marrow. At the height of viremia, the reticulocyte count drops dramatically, although the anemia is rarely clinically apparent in healthy patients. Patients who already have a low red blood cell count can experience serious anemia during this time. During the first phase, large numbers of the virus are released into oral and respiratory secretions, making the disease contagious at this time.

The second phase, which is characterized by the appearance of B19V-specific IgM antibodies in the serum, occurs in the second week and corresponds with clearance of the viremia. Although antibodies stop the viremia and are important in clearing the virus, they are also responsible for many of the symptoms of the B19V infection, namely the rash of *erythema infectiosum* and arthropathy. Because the appearance of the rash occurs after the viremia has been cleared, patients presenting with the rash are no longer contagious (Table 1).

3. What are the clinical manifestations of B19V?

Infections caused by B19V can result in a wide variety of conditions, depending on the immunologic and hematologic status of the patient. In the normal host, B19V infection is asymptomatic or causes *erythema infectiosum,* or arthropathy.

The illness typically presents with a prodrome, followed by a cutaneous eruption. The typical prodrome can be very mild and may go unnoticed. Prodromal symptoms may include: headache, coryza, low-grade fever, pharyngitis, GI

Table 1
Typical course of B19V

Phase 1:
- Period of transmissability
- Mild prodromal illness
- Viremia
- Erythroid progenitor cell depletion
- Development of B19V specific IgM antibodies

Phase 2:
- Development of B19V specific IgG antibodies
- Clearance of viremia
- Facial exanthem, or "slapped-cheek" appearance
- Lacy, erythematous maculopapular exanthem on trunk and extremities
- Arthropathy
- Evanescent course of exanthem over 1 week to 3 weeks

Table 2
Clinical presentations of B19V

Adult presentation:
- Complaints of symmetric joint pain are more common (lasting from 1 week to 3 weeks) than the "slapped cheek" rash of *erythema infectiosum*
- Some may experience the prodromal stage and some aspects of the cutaneous exanthema, but the majority (as many as 78%) present with acute onset of polyarthropathy
- Women are more likely than men to experience joint pain

Complications in special populations:
- Certain populations are especially vulnerable to complications (*e.g.*, aplastic crisis, hereditary spherocytosis and sickle cell disease) from the interrupted erythropoiesis that occurs during B19V infection

Infection during pregnancy:
- 30% of B19V infected women will have transplacental infection
- Transplacental infection can lead to congestive heart failure, *hydrops fetalis* and a 5% to 9% risk of fetal loss among infected pregnant women

symptoms and malaise. This corresponds to the viremia of the first phase and the patient is contagious during this time.

Following the prodrome, patients develop the characteristic "slapped-cheek" facial exanthema which involves the malar eminences and spares the nasal bridge and perioral areas. This stage is more commonly seen in children, but may occur in adults. One day to four days later, the facial rash is followed by the appearance of a lacy, erythematous, maculopapular rash on the trunk and extremities. This eruption may be pruritic and is often evanescent, recurring over one week to three weeks. The appearance of the rash corresponds with the development of antibodies, so patients with the rash of *erythema infectiosum* are no longer contagious. Both the "slapped cheek" and lacy rashes are aggravated by exposure to sunlight, heat and exercise.

4. *How do you diagnose B19V?*

In the case of *erythema infectiosum* in an otherwise healthy patient, the diagnosis is made on the basis of clinical presentation alone. In cases of aplastic crisis, exposure of the virus to pregnant women, immunocompromised patients, or in cases of prolonged arthropathy, laboratory confirmation via IgM assays, dot blot hybridization or polymerase chain reaction may be helpful (Table 2).

5. *What is the management of B19V?*

As B19V infection is often a benign, self-limited disease, no specific treatment is required. However, in cases where the infection is associated with significant arthropathy or pruritis, analgesics, anti-inflammatories and/or antihistamines may be indicated. For more serious complications, such as aplastic crisis, blood transfusions may be required to prevent congestive heart failure. In immunocompromised patients who develop chronic anemia, intravenous immune globulin or a temporary reduction in immunosuppressive agents may be indicated.

Dx

Resources
1. Cotran RS, Kumar V, Collins TC: *Robbins Pathologic Basis of Disease.* Sixth Edition. Toronto: WB Saunders Company, 1999.
2. Cunningham D, Rennels MB: "Parvovirus B19 Infection." Emedicine.com. http://www.emedicine.com/ped/topic192.htm.
3. Goldman L, Ausiella DC: *Textbook of Medicine.* 22nd Edition. Philadelphia: WB Saunders Company, 2004.
4. "Material Safety Data Sheet – Infectious Substances – Parvovirus B19." Health Canada, 2001. http://www.cdc.gov/ncidod/diseases/parvovirus/B19.htm.

For additional resources, please contact: **diagnosis@sta.ca**

***This department covers selected points to avoid pitfalls and improve patient care by family physicians in the ED. Submissions and feedback can be sent to* diagnosis@sta.ca.**

Publication Mail Agreement No.: 40063348
Return undeliverable Canadian addresses to:
STA Communications Inc.
955 boulevard St-Jean, Suite 306
Pointe-Claire, QC, H9R 5K3