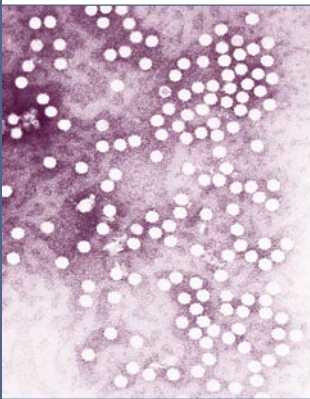


Parvovirus B19 Overview

ABOUT THE VIRUS

Parvovirus B19 (ParvoB19) is a nonenveloped, single-stranded DNA virus. It was discovered in 1974 and is currently the only member of the Parvoviridae family known to be pathogenic to humans. ParvoB19 is a major causative agent of transient aplastic crisis and erythema infectiosum, as well as an acute infection that causes an adult arthritis syndrome, hydrops fetalis in fetuses and chronic anemia in immunocompromised patients.



This electron micrograph depicts a number of parvovirus H-1 virions of the Parvoviridae family of DNA viruses which includes Parvovirus B19.

Image courtesy of CDC.

CLINICAL MANIFESTATIONS

ParvoB19 infections occur commonly throughout the globe; although infections can occur at any age, they are most frequently seen in children of school age. The prevalence of infection is 2-15% in children 1-5 years of age, 15-60% for those 5-9 years and approximately 60% for adults. Over 90% of the geriatric population has detectable ParvoB19 antibodies. ParvoB19 is transmitted through respiratory secretions, contaminated blood products, nosocomial infections and vertical transmission from mother to fetus.

A primary infection, lasting approximately 1 week, usually involves mild and nonspecific symptoms, such as fever, malaise and headache. In children, erythema infectiosum, also known as the fifth disease or slapped cheek disease, is commonly seen. A rash on the arms, legs and trunk can develop within a few days, accompanied by mild to moderate pruritis in up to 70% of cases. In adults, especially women, arthralgia and arthritis are the most common symptoms seen in community outbreaks. One of the most serious complications of ParvoB19 is transient aplastic crisis (TAC), which is seen in patients with chronic hemolytic anemias. The symptoms of TAC are typically secondary to the acute viremia and serious anemia caused by ParvoB19.

ParvoB19 causes pure red cell aplasia and anemia in bone marrow and solid organ transplant recipients. Because anemia is a common problem after transplantation, it is important to determine whether the cause is due to another clinical condition, such as GI bleeding, iron deficiency, hemolysis or drug toxicity, instead of a virus, such as ParvoB19. The virus has been shown to cause chronic anemia in renal transplant patients, HIV patients, and hematopoietic stem cell transplant (HSCT) patients with graft-versus-host disease. A ParvoB19 infection should be strongly suspected any time a renal transplant patient develops anemia (in the presence of normal renal function) and resistance to erythropoietin therapy. In some cases, chronic ParvoB19 infections have been associated with congenital immunodeficiency syndrome, AIDS and immunosuppression induced during chemotherapy.

LABORATORY DIAGNOSIS

Diagnosis of a primary ParvoB19 infection typically relies on the detection of IgM and/or IgG antibodies or viral DNA. In immunocompromised patients, serological forms of diagnosis are inadequate since these patients are often unable to mount an adequate immune response. Additionally, serological methods are not useful in diagnosing a low grade chronic infection of the virus. Since it is important to rapidly identify the cause of anemia in transplant patients in order to begin treatment as soon as possible, a more sensitive and reliable method of diagnosis is required. Real-time quantitative PCR is the preferred method for an accurate diagnosis in these patients. Real-time quantitative PCR is sensitive and allows an accurate measure of the viral burden (viral load) in the patient, thereby enabling the physician to monitor the infection and track the response to therapy over time.

TREATMENT

Currently, there is not a specific antiviral drug for ParvoB19. Patients with TAC can often benefit from blood transfusions. Immunocompromised patients can be helped by a reduction of immunosuppressive therapy and, in some cases, by the administration of IV immunoglobulin (IVIG). Both low dose IVIG (0.25 g/kg/for 3 days) and high dose IVIG (0.5 g/kg for 5 days) have been used, depending upon patient response.

Selected References

- Bertoni E, Rosati A, Zanazzi M, Azzi A, Zakrzewska, K, et al. Aplastic anemia due to B19 parvovirus infection in cadaveric renal transplant recipients: an underestimated infectious disease in the immunocompromised host. *J Nephrol.* 1997;(10):152-156.
- Gallinella G, Manaresi E, Venturoli S, Grazi GL, Musiani M, et al. Occurrence and clinical role of active parvovirus B19 infection in transplant recipients. *Eur J Clin Microbiol Infect Dis.* 1999;(18):811-813.
- Knipe D, Howley P. *Fields Virology.* 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.
- Liefeldt L, Buhl M, Schweikert B, Englemann E, Sezer O, Laschinski P, et al. Eradication of parvovirus B19 infection after renal transplantation requires reduction of immunosuppression and high-dose immunoglobulin therapy. *Nephrol Dial Transplant.* 2002;(17):1840-1842.
- Pamidi S, Friedman K, Kampalath B, Eshoa C, Hariharan S. Human parvovirus B19 infection presenting as persistent anemia in renal transplant recipients. *Transplantation.* 2000;(69):2666-2669.
- Portmore AC. Parvoviruses (erythema infectiosum, aplastic crisis). In: *Mandell GL, Bennett JE, Dolin, eds. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases.* Vol 2. 4th ed. New York, NY: Churchill Livingstone; 1995:1439-1446.
- Zolnourian ZR, Currin MD, Rima BK, Coyle PV, O'Neill HJ, et al. Parvovirus B19 in kidney transplant patients. *Transplantation.* 2000;(69):2198-2201.

