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CASE REPORT

Severe acute anemia triggered by erythrovirus B19

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Abstract

Introduction: Parvovirus B19 is an erythrovirus, included in the family *Parvoviridae*, subfamily *Parvovirinae*. It is a very small virus (25nm in diameter), consisting of a highly tropic DNA strand for erythropoietic precursor cells causing inhibition of erythropoiesis and cytotoxic effects. The infection may lead to transient aplastic crisis (CAT) and chronic anemia, depending on the host. Generally, erythrovirus infection in children and adults does not require specific therapy, just the symptoms presented. Blood transfusion may be necessary in cases of severe anemia. **Objective:** To report a case of transient aplastic crisis triggered by erythrovirus in previously healthy schoolchildren. **Case Report:** A 10-year-old patient with a disability, vomiting, asthenia, and three episodes of falling from ones height. Laboratory tests suggested severe anemia and confirmed transient aplastic crisis triggered by B19 erythrovirus. **Conclusion:** This report contributes to inform professionals about the transient aplastic crisis triggered by erythrovirus B19 in a previously healthy child, as an alert for an early diagnosis and a good supportive treatment. This case had a benign course, there was a need for blood transfusion and the treatment was only supportive.

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INTRODUCTION

Parvovirus B19 is an erythrovirus, included in the Parvoviridae family, subfamily Parvovirinae. It is a very small virus (25nm in diameter), consisting of a DNA chain with high tropism for erythropoietic precursor cells, causing inhibition of erythropoiesis and cytotoxic effects. Infection can lead to Transient Aplastic Crisis (CAT) and chronic anemia, depending on the host. Generally, parvovirus infection in children and adults does not require specific therapy, only symptom relief. Blood transfusion may be necessary in cases of severe anemia.

CASE REPORT

Student, 10 years old, female, weight 64 kg. She was admitted to the emergency department, with a 10-day fever, peaking between 38-39 º C, remaining afebrile for 7 days. She used azithromycin for three days and ferripolimaltose for 1 week. On the day of admission, she presented inappetence, vomiting, asthenia and three episodes of falling from standing height. The mother reported having sought the service twice, and a viral infection was diagnosed according to laboratory results before the onset of symptoms, as depicted in the attached Table 1.

Upon examination, the patient was active, reactive, eupneic, afebrile, hydrated, acyanotic, anicteric, pale +2/+4. She had a free neck and full reflexes. No changes in respiratory and cardiac rates. Laboratory tests were requested at the onset of symptoms when significant anemia was observed. After the results, transfusion was performed with packed red blood cells (1 bag - 246 ml).

Post-transfusion control tests were carried out and improvement in the red blood series and reduction in the white cell series, as shown in Table 1.

During reassessment of the systems, splenomegaly was observed 3 cm from the left costal margin. Thinking about signs and symptoms of a viral pattern, with a significant change in blood count, we decided to request a viral serology and abdominal ultrasound.

In the image exam after 4 days of the beginning of the symptoms: the liver, bile ducts, gallbladder, pancreas and kidneys showed no changes. She had an enlarged spleen, with homogeneous structure, measuring 15 cm in the longitudinal aspect. After 6 days of the first examination: Enlarged spleen, measuring 13 cm in the longitudinal aspect and 5.9 cm in the anteroposterior aspect, without other changes.

Results of laboratory and serological tests on the day of hospital discharge are shown on attached Table 1.

Table 1. Laboratory tests.

Date	12/03/2018	12/09/2018	12/10/2018	12/12/2018	12/15/2018	12/16/2018
Red blood cells (m/mm^3)	3.39	1.85	2.19	2.3	2.67	3.37
Hemoglobin (g/dL)	10.26	5.5	6.2	6.5	7.9	10.2
Hematocrit (%)	26.95	14.7	18	21.2	25.7	31.5
Leucocytes (mm^3)	3150	20330	14410	8430	4090	4720
Basophils (%)	2.4	0	0	0	0	0
Eosinophils (%)	1.13	2	3	3	2	2
Myelocytes (%)	0	2	1	0	0	0
Metamyelocytes (%)	0	1	0	2	0	0
Rods (%)	0	8	10	8	1	2
Segmented (%)	45.9	56	65	40	50	56
Lymphocytes (%)	32.2	28	19	46	41	38
Monocytes (%)	18.2	3	2	1	6	2
Platelets (mm^3)	137.000	464.000	367.000	334.000	305.000	299.000
Reticulocytes (%)						9.5
LDH (UI/L)						1048
Haptoglobin (mg/dL)						< 6
Epstein Barr						IgG: 0,75
IgM: neg.						IgG: 32 IgM: > 48
Parvovirus B19						IgG: 32 IgM: > 48

LDH: Lactate dehydrogenase.

The patient was discharged from the hospital with iron supplementation and followed up at the pediatric infectious disease outpatient clinic.

DISCUSSION

Parvovirus B19 is an erythrovirus, included in the Parvoviridae family, subfamily Parvovirinae. It is a very small virus (25nm in diameter), consisting of a non-enveloped DNA chain, with high specific tropism for erythropoietic precursor cells, due to the presence in these cells of the globoside P receptor. Viral replication occurs only in erythroid progenitor cells of the bone marrow, which express the P antigen receptor and the α5β1 co-receptor integrin, used for the entry of the virus into the cell. As a consequence, there is inhibition of erythropoiesis and cytotoxic effects. Individuals lacking the P antigen are resistant to parvovirus B19 infection (ACUTE I. 2016)[1].

There are three documented ways for Erythrovirus B19 transmission. The first and most common is through respiratory secretions and saliva; although the disease does not manifest with respiratory symptoms. The second is through vertical transmission, which can occur if a susceptible woman is infected during pregnancy. The third can occur through the administration of blood or blood products containing the virus. (GARCIA SO, 2009)[2].

There are two clinical forms of disease presentation. In asymptomatic cases, subclinical erythrovirus B19 infection occurs, being the most common form among adults and children. Mild and nonspecific symptoms associated with the virus appear (HEEGAARD ED, 2002)[3].

In the symptomatic form, the infection manifests itself as an exanthematous disease, described as infective erythema, with erythrovirus B19 being its etiologic agent. It is also described as the "Fifth Disease". It has a predominance of outbreaks in school-aged children, although it can also occur in adults. It is represented as one of the six common childhood rashes. The disease begins with nonspecific symptoms such as fever, runny nose, headache, nausea and diarrhea. These symptoms coincide with the onset of viremia. Two to five days later, there is a classic malar eruption, described as "Slapped cheek", often followed by a morbilliform maculopapular eruption on the trunk and extremities. Erythema is usually lacy. The incubation period is 1 to 2 weeks, but it can take up to 3 weeks (YOUNG, 2004; UGAI S, 2018)[4,5].

Infection can lead to Transient Aplastic Crisis (TAC) and chronic anemia, depending on the host[6]. TAC is more common in individuals with a history of hematologic disorders, such as sickle cell anemia, iron deficiency anemia, aplastic anemia secondary to medications; as well as in immunosuppressed patients. The main clinical manifestations are related to the anemic syndrome that manifests as asthenia, pallor and dizziness. There was an association between clinical symptoms, decreased hemoglobin and the immune response to specific types of antibodies in relation to time. TAC is manifested due to viral tropism for the P antigen present on erythrocytes. There is an inhibition in the production of erythroid precursors in the bone marrow, causing severe anemia in immunocompromised patients, with rapid remission in immunocompetent patients. In erythrovirus B19 infection, the pathogen invades and replicates inside the cell, infecting new progenitor cells, until its arrest is interrupted by an acute response of IgG and IgM antibodies, where the disease lasts for only a short time (PIRES, 2016)[7].

The diagnosis of infection is based on serological and DNA screening tests, as the cultivation of the virus is difficult. The most sensitive and early diagnostic method available is the identification of viral DNA in the bone marrow or in blood aspirate cells by PCR or hybridization techniques, although IgM antibodies are detected after the third day, reaching their peak around the second week after the infection. Amplification of Erythrovirus B19 in serum samples is more difficult due to the short duration, around 2 to 3 days, of viremia. IgM antibodies are detected in most cases at the time of the clinical presentation of the Fifth Disease and appear a few days after the onset of the transient aplastic crisis; and it may persist in the circulation for 2 to 3 months after acute infection. The presence of IgG antibodies in a large part of the population makes the measurement of this immunoglobulin less useful than other tests to diagnose Parvovirus-B19 infection (VALERA., 2000)[8].

Erythrovirus infection in children and adults usually does not require any specific treatment, only the symptoms are treated. Blood transfusion may be necessary in cases of severe anemia. It is not necessary to isolate the patients. Because pure red cell aplasia and Erythrovirus B19 infection are usually more common in immunosuppressed patients or AIDS patients, treatment can be quickly determined by discontinuing immunosuppressive therapy, or instituting antiretroviral therapy in AIDS patients (DAMASCENO JA, 2012)[9].

REFERENCES

1. Agudo I, Serrano A, Murinello A. Aplasia medular transitória associada a infecção por parvovírus B19. Rev Soc Bras Clin Med. 2016 Jul/Set;14(3):159-62.
2. Garcia SO, Pereira J, Godoy CRT, Sanabani S, Kleine Neto W, Sabino EC. Doenças hematológicas associadas ao eritrovírus. Rev Bras Hematol Hemoter. 2009 Ago;31(4):285-90.
3. Heegaard ED, Brown KE. Human parvovirus B19. Clin Microbiol Rev [Internet]. 2002 Dez; [cited 2021 Dec 16]; 15(3):485-505. Available from: http://cmr.asm.org/content/15/3/485.abstract
4. Young NS, Brown KE. Parvovirus B19. N Engl J Med. 2004 Fev;350(6):586-97.
5. Ugai S, Aizawa Y, Kanayama T, Saitoh A. Parvovirus B19: a cause of sepsislike syndrome in an infant. Pediatrics. 2018;141(6):e20171435.
6. Zikidou P, Grapsa A, Bezirgiannidou Z, Chatzimichael A, Mantadakis E. Parvovirus B19-triggered acute hemolytic anemia and thrombocytopenia in a child with evans syndrome. Mediterr J Hematol Infect Dis [Internet]. 2018 Mar; [cited 2021 Dec 16]; 10(1):e2018018. Available from: https://www.ncbi.nlm.nih.gov/pubmed/29531655
7. Pires TDS. Aplasia pura da série vermelha em pacientes Imunocomprometidos infectados pelo Parvovírus B19. coreacuk [Internet]. 15/03/19 [cited 2021 Dec 16]; Available from: https://core.ac.uk/reader/187133040
8. Valera ET, Cipolotti R, Bernardes JE, Pacagnella RC, Lima DM, Tone G, et al. Pancitopenia transitória induzida por parvovírus B19 em criança portadora de esferocitose hereditárias. J Pediatr (Rio J). 2000;76(4):323-6.
9. Damasceno JA, Praxedes H, Praxedes MK, Pires ARC, Gabriel AHD, Donatti C, et al. Parvovirose e anemia acentuada em paciente imunocompetentes. J Bras Patol Med Lab. 2012 Abr;48(2):117-20.