

Acute human parvovirus B19 infection in a 6-year old girl with sickle cell disease: a case report

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ABSTRACT

A 6-year-old girl with Sickle-cell disease was hospitalized because of fever and arthralgia. During hospitalization she developed a splenic sequestration with the need of three successive red packed-cell transfusions. Microbiological investigations revealed positive HPVB19 IgM and IgG and HPVB19 DNA in blood. Given the diagnosis of HPVB19 infection and persistent fever, she received intravenous immunoglobulins (IVIg) with progressive clinical improvement and discharge after 24 days of hospitalization. This is the first case of acute HPVB19 infection in a child with Sickle cell disease and more than 20 days fever, associated with splenic sequestration. IVIg may represent an effective therapy.

INTRODUCTION

Human parvovirus B19 (HPVB19) is a common childhood infection all over the world and its rate of incidence seems to be higher in children with sickle cell disease (SCD) compared to healthy children. In fact, 47% of children with SCD

had specific IgG by age 10 years in the north-eastern United States cohort, 45% in the Jamaican cohort and these rates are higher than those observed in healthy hosts from the United Kingdom and Australia where 27% and 28% were infected by 11 years of age, respectively [1].

Since HPVB19's primary target of infection

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are erythroid precursor cells, patients with chronic haemolytic disorders, such as SCD, with increased reticulocytes have an increased risk of infection by HPVB19 and of infection-related complications.

Transient aplastic crisis (TAC) and acute splenic sequestration (ASS) are two important complications of SCD: TAC causes severe anemia and reticulocytopenia, typically in older patients and in association with acute HPVB19 infection; ASS is characterized by an enlarged spleen with increased anemia and reticulocytosis, usually occurs in infants and toddlers with HbSS who produced sickled erythrocytes but have not yet developed splenic infarctions and organ involution [2]. ASS is a major cause of morbidity in SCD and can result in severe anemia, hypovolemic shock and even death [3, 4].

Scattered case reports describe ASS occurring in conjunction with HPVB19 infection resolved with red blood cells transfusions, erythrocytapheresis and splenectomy in some cases [2]. Intravenous immunoglobulin (IVIg) have been sometimes used with success for the treatment of autoimmune disorders, agranulocytosis, red cell aplasia related to HPVB19 but there's a lack of clinical studies about the useful of IVIg therapy in HPVB19 infection particularly standardization of criteria and modality of use is needed [5, 6]. We report the case of a school-age child with SCD who developed prolonged fever, arthralgia and ASS with acute HPVB19 who didn't respond to red blood cells transfusions and needed IVIg therapy for the resolution of fever and symptomatology.

Useful in our case was the high index of suspicion of HPVB19 infection despite few and non-specific signs and symptoms, the prompt identification of ASS and the beginning of IVIg therapy.

CASE REPORT

A six-year old African girl with Sickle-cell disease (HbSS) was admitted to our Paediatric Emergency Department due to a one-day fever (40°C) with right knee arthralgia. At admission (day 1) she appeared in no acute distress; the only remarkable physical findings were a palpable spleen pole and a painful right knee.

Haemoglobin was stable for her steady state (Hb 7.9 g / dl) and inflammatory markers

were mildly increased (Leukocytes 19.250/mm³; Neutrophils 14.030/mm³; CPR 23 mg /L (normal value 0-6 mg/l); Procalcitonin 0.2 ug / L (normal value <0.5 ug / L).

While waiting for the results of microbiological investigations, she was treated with empiric antibiotic therapy with ceftriaxone and clarithromycin.

During hospitalization, fever remained high with a progressive decline of clinical conditions and worsening of arthralgia without impairment of the joint and with inflammatory markers slightly higher than normal values (CPR always around 30 mg/L).

On day 8 the patient presented with a significant hepatosplenomegaly (liver and spleen respectively 4 and 8 cm below the costal margin), decreased haemoglobin until 6 g/dl and increased reticulocyte count (356.000/mm³), meeting the criteria for diagnosis of splenic sequestration. She required three successive red blood cell transfusions (the last on day 16). Fever never went below 39- 40°C, regardless the use of intravenous Paracetamol and oral Ibuprofen every 4 hours.

On day 10, microbiological investigations revealed positive HPVB19 IgM and IgG and HPVB19 DNA in blood. Adenovirus IgM and IgG were also positive (possible cross-reaction) with negative Adenovirus-DNA, EBV, CMV, Mycoplasma, Chlamydia, Brucella, Salmonella and Leishmania serologies were all negative. Blood cultures were negative.

Other causes of persistent fever (e.g. autoimmune disease) were investigated but all exams resulted negative.

In consideration of the diagnosis of HPVB19 infection, the persistent high fever (steady temperature of 40°C) and the important aplasia with splenic sequestration, on day 13 antibiotic therapy was stopped and patient was treated with 1 g/kg of IVIg. Fever dropped by 37,5°C in 24 hours, until complete resolution on day 21. Progressive clinical improvement, resolution of hepatomegaly and reduction of splenomegaly (spleen 2 cm below the costal margin). At discharge (after 24 days of hospitalization) the child appeared well with a normalization of inflammatory markers. Right knee arthralgia slowly reduced in one month after discharge.

DISCUSSION

HPVB19 is a small non-enveloped DNA virus belonging to the family of Parvoviridae.

HPVB19 infection is the cause of Fifth disease or erythema infectiosum. It is a common infectious disease and its clinical manifestations depend on the patient's immunological and haematological state. HPV19 can cause a broad spectrum of clinical conditions, ranging from mild to life-threatening. Fever usually lasts for 7-10 days.

It is rarely associated with arthropathy (8% in children versus 80% in adults) and it often causes acute bone marrow failure in patients with chronic haemolytic anaemias (e.g. sickle-cell disease). Furthermore, other HPV B19-related complications, including acute splenic sequestration, hepatic sequestration, acute chest syndrome, meningoencephalitis, and stroke may occur in patients with SCD [2].

The patient presented with high fever (40°C), arthralgia in the right knee and, during hospitalization, the patient also developed a significant hepatosplenomegaly with a reduction of haemoglobin (2 g/dl below steady-state values) and increase of reticulocyte count (35.6000/mm³). These data meet the criteria for splenic sequestration diagnosis.

Fever of less than 10 days in duration is a common manifestation of HPVB19 infection, also in patient affected by SCD. But in patients HPVB19 related fever lasted for more than 20 days) and resolved only 6 days after the administration of IVIg.

REFERENCES

- [1] Kelly HA, Siebert D, Hammond R, Leydon J, Kiely P, Maskill W. The age specific prevalence of human parvovirus immunity in Victoria, Australia compared with other parts of the world. *Epidemiol Infect.* **2000**; 124: 449-57. <http://dx.doi.org/10.1017/S0950268899003817>
- [2] Serjeant BE, Hambleton IR, Kerr S, Kilty CG, Serjeant G. Haematological response to parvovirus B19 infection in homozygous sickle-cell disease. *Lancet.* **2001**; 358: 1779-80. [http://dx.doi.org/10.1016/S0140-6736\(01\)06807-6](http://dx.doi.org/10.1016/S0140-6736(01)06807-6)
- [3] Kinney TR, Ware RE, Schultz WH, Filston HC. Long term management of splenic sequestration in children with sickle cell disease. *J Pediatr.* **1990**; 117: 194-9. [http://dx.doi.org/10.1016/S0022-3476\(05\)80529-3](http://dx.doi.org/10.1016/S0022-3476(05)80529-3)
- [4] Emond AM, Collis R, Darvill D, Higgs DR, Maude GH, Serjeant GR. Acute splenic sequestration in homozygous sickle cell disease: natural history and management. *J Pediatr.* **1985**; 107: 201-6. [http://dx.doi.org/10.1016/S0022-3476\(85\)80125-6](http://dx.doi.org/10.1016/S0022-3476(85)80125-6)

Therapy with IVIg (0.4 g/kg/die for 5 days or 1 g/kg/die for 2-3 days) resulted in an effective treatment for bone marrow failure in this case of persistent HPVB19 infection. IVIg is a good source of HPVB19 antibodies, since most part of adult population has been exposed to this virus [1]. In this case, with concurrent splenic sequestration, IVIg administration was useful to reduce the duration of symptoms.

CONCLUSION

To our knowledge, this is the first case of acute HPVB19 infection in SCD with more than 20 days of fever associated with splenic sequestration. In cases with concurrent splenic sequestration, IVIg may represent an effective therapy to reduce the duration of symptoms. Because there is no specific antiviral therapy is important to improve the efforts to develop a parvovirus vaccine since acute parvovirus infection can lead to severe morbidity especially in this group of patients.

ABBREVIATIONS

HPVB19 – Human parvovirus B19

SCD – Sickle Cell Disease

TAC – Transient aplastic crisis

ASS – Acute Splenic Sequestration

CONFLICT OF INTEREST

The authors have no conflict of interest to report.

- [5] Crabol Y, Terrier B, Rozenberg F, Pestre V, Legendre C, Hermine O, Montagnier-Petrissans C, Guillevin L, Mouthon L; Groupe d'experts de l'Assistance Publique-Hôpitaux de Paris. Intravenous Immunoglobulin Therapy for Pure Red Cell Aplasia Related to Human Parvovirus B19 Infection: A Retrospective Study of 10 Patients and Review of the Literature. *Clin Infect Dis.* **2013**; 56: 968-77.

- <http://dx.doi.org/10.1093/cid/cis1046>
- [6] Herzog-Tzarfati K, Shiloah E, Koren-Michowitz M, Minha S, Rapoport MJ. Successful treatment of prolonged agranulocytosis caused by acute parvovirus B19 infection with intravenous immunoglobulins. *Eur J Intern Med.* **2006**; 17: 439-40.
<http://dx.doi.org/10.1016/j.ejim.2006.02.014>

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