Parvovirus B19-Only a Childhood Disease?- A Case Report
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Parvovirus B19-Only a Childhood Disease?- A Case Report

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Parvovirus B19 is recognized as a widespread human pathogen, posing specific threats to certain vulnerable groups. These include children, pregnant women, and patients with conditions like sickle cell disease or AIDS. In most cases involving patients with pre-existing hematological diseases, B19 infection typically results in a marked impairment in red blood cell production, which can have significant clinical implications, particularly in individuals with underlying health vulnerabilities.

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1. Introduction

Human Parvovirus B19, first isolated in 1975 from sera intended for hepatitis B research, remained an enigma until 1981 when its association with aplastic crisis in the context of hemolytic anemia was identified. This revelation was propelled by observations of nonspecific viral prodromes, familial clustering of cases, and epidemic occurrences of aplastic crises, all pointing towards an infectious causative agent. Subsequently, the scope of conditions linked to Human Parvovirus B19 has broadened significantly, encompassing arthritis, erythema infectiosum (also known as fifth disease), fetal demise, and hydrops fetalis[1], [2].

Parvovirus B19, commonly abbreviated as 'B19', is a distinct member of the erythrovirus genus, aptly named for its marked tropism towards erythroid precursor cells. This pathogen is characterized as a single-stranded, nonenveloped DNA virus and is recognized as one of the smallest known viruses capable of infecting mammalian cells[3]. B19 is notable for its genetic stability. Sequencing of various isolates has revealed minimal variability, particularly in its two capsid proteins, VP1 and VP2, where the variability is confined to a few percentage points. Even more stability is observed in the nonstructural protein NS1, where the variability is even lower[4], [5].

In terms of transmission dynamics, children are often the primary vectors within familial settings, leading to a high seroprevalence rate of up to 90% in the elderly population. The clinical progression post-infection involves an incubation period ranging from 4 to 14 days, followed by the onset of symptoms characterized by high fever and general malaise. A distinctive rash marks a pivotal stage in the disease course; it is usually at this juncture that patients cease to be infectious. Unlike children, where erythema is the main manifestation, adults arthralgias and arthritis predominate[6]. The appearance of joint pain coincides with the detection of IgM / IgG antibodies against structural proteins vp1, vp2. The frequency of arthralgias can be up to two times higher in women than in men. Some data in the literature show that up to 15% of all new cases of arthritis are due to Parvovirus infections[7].

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II. Case

Parvovirus B19 infection, while typically inducing a moderate decrease in erythropoiesis in individuals with pre-existing hematological disorders (such as sickle cell disease, hereditary spherocytosis, hemolytic anemia, and β-thalassemia minor), can precipitate considerably more severe clinical manifestations. These are termed “aplastic crises,” characterized by a significant drop in hemoglobin levels, often below 4 g/dL, coupled with a stark reduction in reticulocytes to undetectable levels. Notably, platelet and leukocyte count generally remain unaffected. The clinical and hematological abnormalities associated with these infections tend to resolve within a week, although in rare instances, blood transfusions may be necessary [8]–[10].

An illustrative case involves a 73-year-old patient with a history of megaloblastic anemia, treated with vitamin B12 and iron supplements, as well as grade II hypertension managed with Aprovel. The patient presented with symptoms including a frontal headache, malaise, and fever (maximum recorded temperature of 37.8°C) that began four days prior. On examination, the patient was found to have pallor but no palpable superficial lymphadenopathy or hepatosplenomegaly. Laboratory investigations revealed leukopenia, thrombocytopenia (platelet count of 123,000/mm^3), and anemia (hemoglobin concentration of 6.8 g/dL).

Despite the clinical and laboratory findings initially suggesting a viral infection, the patient was preemptively treated with the antibiotic Ceftriaxone (2g) and received two blood transfusions. Given the suspicion of hematological disease, a bone marrow puncture was performed. The bone marrow analysis revealed normal cellularity with severe erythroblastopenia, suggesting the need for further investigation into Parvovirus B19 infection. The marrow findings included 3% plasma cells, 14% lymphocytes, a significantly reduced erythroblastic series with a block at the proerythroblast stage, normal quantitative granulocyte series with appropriate maturation, and a few hypogranulated neutrophilic granulocytes. The collected serologies refuted other possible etiologies of HIV-negative, EBV-IgM negative, CMV IgM-negative. Serology Echo virus and Coxsackie Ig M weakly positive, Herpes Simplex IgM weakly positive interpreted as false positive results in the context in which the spinal cord confirms Parvovirus B19 infection along with positive serology. Data from the literature mention the frequent occurrence of this infection in age groups (2-5 years), cases in elderly patients and aplastic seizures being extremely rare.

III. Discussion

Prolonged evolution with the need to administer blood transfusions (haemoglobin =6.8g/dl) is also of particularity in this case. The cytopenia observed in this case is atypical in patients infected with Parvovirus B19, only the number of erythrocytes being low in the case presented, the number of leukocytes and platelets remaining at normal values. We did not identify any epidemiological link. A possible infectious contact was with 4-year-old nephew but who did not have a fever or rash specific to infectious erythema; in fact, no other member of the family had clinical manifestations specific to this disease.

Despite these minimal genetic variations, the clinical manifestations of B19 infection are diverse and have not been conclusively correlated with the virus's sequence variability. The range of clinical outcomes following B19 infection, which vary significantly among different individuals, has been a subject of interest but remains largely unexplained by the existing variations in the B19 genome[11]. The prevalence of Parvovirus B19...
infection exhibits a notable age-related pattern. In children aged 2-5 years, seropositivity rates hover between 5-10%, escalating to 50% by the age of 15 and further rising to 60% in individuals up to 30 years of age. Intriguingly, the incidence of this infection demonstrates a cyclical pattern, with a surge in cases every 3 to 4 years. A critical aspect of Parvovirus B19 is its specificity to humans, distinguishing it from other parvoviruses which affect animals such as dogs and cats[12].

Further research to decipher the exact pathogenesis of this disease process is needed, as it might open up novel therapeutic possibilities for better patient management. No approved vaccine is currently available for B19, and there is a lack of structural characterization of any B19 epitopes[13].

IV. Conclusion

Parvovirus B19 plays a critical role in human pathology, primarily targeting erythroid progenitor cells. Its involvement in various medical conditions such as childhood erythema and myocarditis underlines its significance in clinical contexts. Particularly vulnerable groups, including children, pregnant women, and individuals with hematological or immunological deficiencies are at increased risk of severe complications. Typically, the virus causes a moderate decrease in erythropoiesis in individuals with existing blood disorders, but it can also lead to severe complications like "a plastic crises," marked by a drastic reduction in red blood cell production. These crises have serious clinical ramifications, particularly for those with pre-existing health conditions. Therefore, a thorough understanding of B19’s impact and the mechanisms underlying its infection is essential for effectively managing and reducing its risks in susceptible populations.

References Références Referencias


