International Journal of Research in Medical Sciences
Patti G et al. Int J Res Med Sci. 2017 Jan;5(1):346-349
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20164576

Case Report

A case of human parvo virus B 19 infection with erythroid hypoplasia and Idiopathic thrombocytopenic purpura in an immunocompetent child: a case report

Ganesh Patti*, Raju Y. S., Swaroopa Reddy D.

Department of Medicine, Nizam's Institute of Medical Sciences, Hyderabad, Telangana, India

Received: 05 October 2016
Revised: 16 November 2016
Accepted: 26 November 2016

***Correspondence:**
Dr. Ganesh Patti,
E-mail: drganeshpatti@gmail.com

ABSTRACT

Human parvo virus B19 (B19V) is a small (5.5kb) single stranded DNA (deoxy ribo nucleic acid) virus with known tropism and cytotoxicity for erythroid progenitors. Human parvovirus B19 infection is associated with various hematological disorders like aplastic crisis, erythroid hypoplasia and idiopathic thrombocytopenic purpura. Here we are presenting a rare case of parvo virus B19 infection with erythroid hypoplasia and idiopathic thrombocytopenic purpura occurring simultaneously in a 13year old girl who presented with fever and bleeding manifestations. A 13 year old girl presented with fever of 5 days duration, epistaxis and bleeding gums spontaneously of one day duration. On admission she had pancytopenia. Her B12 and folate levels were within normal range. Bone marrow aspiration suggestive of normal cellularity with paucity of erythroid precursors, myeloid: erythroid ratio 9:1 and gaint basophilic pronormoblasts with intra-nuclear inclusions, with no further maturation, as well as increased megakaryocytes with few hypolobate forms suggestive of erythroid hypoplasia and idiopathic thrombocytopenic purpura. Parvo virus B19 DNA PCR by nested polymerase chain reaction was detected in serum. She was treated with blood component support and with steroids for idiopathic thrombocytopenic purpura. She recovered and her cell counts are improved. This case highlights the morphology of Human parvo virus B19 inclusions and its association with simultaneous presentation of erythroid hypoplasia and idiopathic thrombocytopenic purpura in immunocompetent child, which is very rare.

Keywords: Erythroid hypoplasia, Idiopathic thrombocytopenic purpura, Parvo virus B19, Parvo virus B19 DNA PCR

INTRODUCTION

Human parvovirus B19 (B19V) is a small (diameter ~22 nm), nonenveloped, icosahedral virus with a linear single-stranded DNA (deoxy ribo nucleic acid) of genome ~5000 nucleotides.[1] B19V exclusively infects humans, and infection is endemic in virtually all parts of the world.[1] Most persons with parvovirus B19 infection are asymptomatic or exhibit mild, nonspecific, cold-like symptoms.[2] Parvovirus B19 usually infects children and causes the classic "slapped-cheek" rash of erythema infectiosum (fifth disease). The virus is highly infectious and spreads mainly through respiratory droplets.[2]

Human parvo virus manifestations in the host depend on immunological and haematological status.[3] Parvovirus B19 infection can trigger an acute cessation of red blood cell production, causing transient aplastic crisis, chronic red cell aplasia, hydrops fetalis, or congenital anemia. This is even more likely in patients with illnesses that have already shortened the lifespan of erythrocytes (e.g., iron deficiency anemia, human immunodeficiency virus,

sickle cell disease, thalassemia, and spherocytosis).[2] Chronic B19V infections has been reported in a immunosuppressed patients, with persistent anemia and reticulocytopenia. Recently, idiopathic thrombocytopenic purpura (ITP) was reported as a rare complication in children following B19V infection.[4] Most patients recover completely. Here we are presenting a case of erythroid hypoplasia and idiopathic thrombocytopenia occurring simultaneously in an immunocopetent patient with parvo virus B19 infection.

CASE REPORT

A 13 year old girl student of 9th standard presented with fever of 5 days duration, epistaxis and bleeding gums spontaneously of one day duration, dizziness and fall, and sustained injury over forehead one day before admission to hospital. She had fever of 5 days duration, high grade, intermittent, not associated with skin rash and arthralgias. She had dizziness and fall, and sustained injury over forehead with swelling over left side of forehead. She had loss of consciousness of 2-3 minutes, not associated with involuntary movements and regained consciousness spontaneously. There was no significant past history. On examination patient had pallor, multiple bilateral cervical lymph nodes, largest measuring 1x1cm, swelling over left side of forehead likely hematoma. Other systemic examination didn't reveal any abnormal findings.

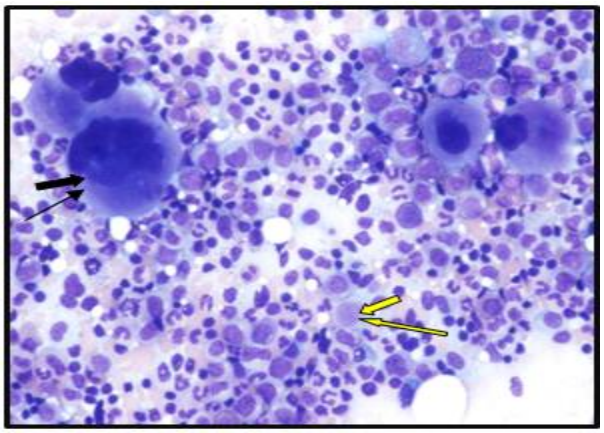

Figure 1: Bone marrow aspirate is particulate with normal cellularity for age. There is paucity of erythroid precursors (yellow arrow) with an M:E ratio of 9:1, myeloid maturation is normal. Megakaryocytes are increased with few hypolobate forms (black arrow). (Giemsa X 100).

Her initial complete blood counts revealed pancytopenia with Hemoglobin – 5.4g/dl (normal range: 13-18 g/dl), Total leucocyte count of 3700 cells/mm^3 (normal range: 4,000-11,000 cells/mm^3) with 62% polymorphs, 25% lymphocytes, 11% monocytes and platelet count of 3000 cells/mm^3 (normal range 1.5lacks-4 lacks/mm^3. In view of cytopenias with bleeding manifestations 2 units of packed red blood cell transfusion and 4 units of random donor platelets were initially given. Her B12 levels-348 pg/ml (normal range190-900pg/ml) and folate levels were - 4.2 ng/ml (normal range 4- 15ng/ml).

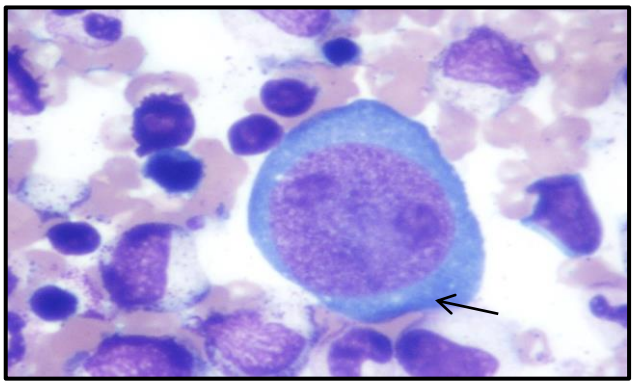

Figure 2: Bone marrow aspirate: Erythroid precursors consist of basophilic normoblasts with no further maturation and show megaloblastoid change with intranuclear viral inclusions and cytoplasmic dog-ear like projections (arrow) (Giemsa x 400).

Her renal function tests and liver function tests were within normal range. Viral markers were non-reactive for HIV 1/2, negative for anti-HCV, and HBsAg. Smear for malaria parasite and its antigen test was negative. Dengue serology was negative. Blood cultures were sterile. Chest x-ray was normal, ultrasonogram of whole abdomen was normal. Ultrasonogram of neck suggestive of multiple subcentimetric lymphnodes in cervical, submental and submandibular region. Computed tomography of brain showing left frontal scalp hematoma and no other intra parenchymal haemorrhages.

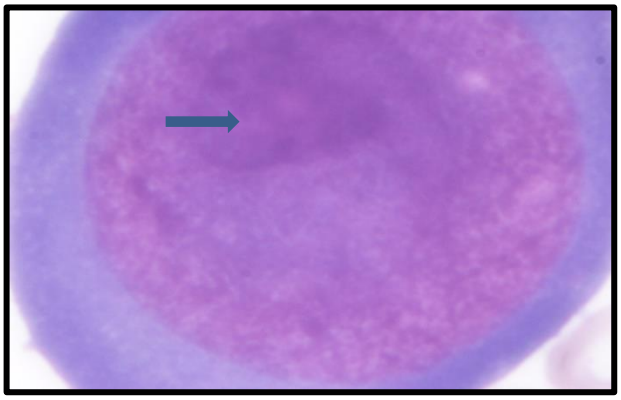

Figure 3: Bone marrow aspirate: Erythroid precursors consist of basophilic normoblasts with no further maturation and show megaloblastoid change with intranuclear viral inclusions (arrow) (Giemsa x 1000).

On day 3 of admission bone marrow aspiration and biopsy was done showing normal cellularity with paucity of erythroid precursors, myeloid: erythroid ratio 9:1 and gaint basophilic pronormoblasts with intranuclear inclusions (Figure 2-4), with no further maturation, as well as increased megakaryocytes with few hypolobate

forms suggestive of erythroid hypoplasia and idiopathic thrombocytopenic purpura (figure 1) and suggested parvo virus serology. Parvo virus B19 DNA PCR by nested polymerase chain reaction was detected in serum. Cervical lymphnode biopsy showing reactive hyperplasia.

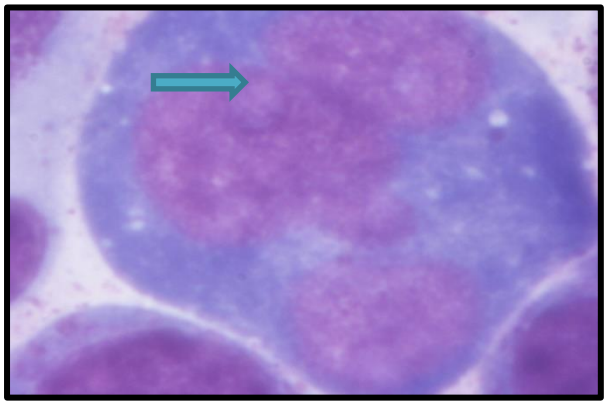

Figure 4: Bone marrow aspirate: Erythroid precursors consist of basophilic normoblasts with no further maturation and show megaloblastoid change with intranuclear viral inclusions (arrow) (Giemsa x 1000).

She was treated with empirical parenteral antibiotics and blood component support. She received pulse steroids of inj. Methylprednisolone 15mg/kg for 5 days, later oral prednisone of 1mg/kg. Her cell counts are improved and discharged in stable condition. She was on follow up with low dose prednisone and after 1 month her hemogram was completely normal and she was doing well.

DISCUSSION

Parvoviruses, members of the family Parvoviridae, are small (diameter ~22 nm), nonenveloped, icosahedral viruses with a linear single-strand DNA genome of ~5000 nucleotides.[1] B19V exclusively infects humans, and infection is endemic in virtually all parts of the world.[1,5] Transmission occurs predominantly via the respiratory route and is followed by the onset of rash and arthralgia.

B19V replicates primarily in erythroid progenitors.[6] This specificity is due in part to the limited tissue distribution of the primary B19V receptor, blood group P antigen (globoside).[1] Infection leads to high titer viremia, with >1012 virus particles (or IU)/mL detectable in the blood at the apex, and virus-induced cytotoxicity results in cessation of red cell production. In immunocompetent individuals, viremia and arrest of erythropoiesis are transient and resolve as the IgM and IgG antibody response is mounted.[1]

Parvovirus B19 infection can trigger an acute cessation of red blood cell production, causing transient aplastic crisis, chronic red cell aplasia, hydrops fetalis, or congenital anemia. This is even more likely in patients with illnesses that have already shortened the lifespan of erythrocytes (e.g., iron deficiency anemia, human immunodeficiency virus, sickle cell disease, thalassemia, spherocytosis).[2] Most B19V infections are asymptomatic or are associated with only a mild nonspecific illness.[2] The main manifestation of symptomatic B19V infection is erythema infectiosum, also known as fifth disease or slapped-cheek disease. Parvo virus B19 has been associated with a broad range of diseases.

Hematologic disorders associated with parvo virus B19 include aplastic crisis, erythroid hypoplasia, idiopathic thrombocytopenic purpura, and hemophagocytosis. B19V infection may rarely cause hepatitis, vasculitis, myocarditis, glomerulosclerosis, or meningitis.

Here we presenting a case of parvo virus B19 associated with erythroid hypoplasia and idiopathic thrombocytopenic purpura occurring simultaneously in an immune competent child, which is a rare combination. There is literature and few case reports were described about this combination.

Erythroid hypoplasia associated with parvo virus B19 is well established. The usual bone marrow findings in acute parvovirus infections are marked erythroid hypoplasia and occasional giant erythroblasts. Intranuclear inclusions in developing erythroid precursors are rarely described in children or adults with parvovirus infection, although abundant intranuclear inclusions are commonly observed in the placenta and other tissues in infected fetuses.[5]

Many reports have centered on connecting parvovirus B19 infection with childhood idiopathic thrombocytopenic purpura (ITP).[6] The association is difficult to make because neither are rare disorders. Several case reports indicate that parvovirus B19 infection may also cause the development of thrombocytopenia. Despite recent studies, the frequency and clinical relevance of this association have remained questionable.[6] B19-induced thrombocytopenia seems to consist of a central and a peripheral type. Thrombocytopenia of central origin is due to BM suppression, and the possible cytopathologic effect is underlined by the finding that the NS1 protein, produced by B19, has been found to inhibit the megakaryocytic colony formation.[3]

This indicates tissue tropism of B19 beyond the erythroid progenitor cell and shows that viral proteins may be toxic to cell populations that are non-permissive for viral DNA replication. Destructive thrombocytopenia of peripheral origin may result from immunologically mediated antiplatelet antibody production with subsequent excessive platelet clearance in the reticulo-endothelial system.[3]

Diagnosis of B19V infection in immunocompetent individuals is generally based on detection of B19V IgM antibodies and B19 DNA detection by PCR.[2] Viral DNA

testing is crucial for the diagnosis of parvovirus B19 infection in patients with transient aplastic crisis or in immuno-compromised patients with chronic infection. These patients do not test positive for IgM or IgG and remain contagious.[2] No antiviral drug effective against B19V is available, and treatment of B19V infection often targets symptoms only. However, it appears that immunoglobulins in particular offer promise as therapy for more severe infections.

CONCLUSION

This case highlights the morphology of Human parvo virus B19 inclusions and its association with simultaneous presentation of erythroid hypoplasia and idiopathic thrombocytopenic purpura in an immunocompetent child, which is very rare.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Brown KE. Parvo virus infections. Dennis L. Kasper, Stephen L. Hauser, J. Larry Jameson et al. Harrison's principles of internal medicine. Mc Graw Hill education. 2015;2:1195-7.
2. Servey JT, Reamy BV, Hodge J. Clinical Presentations of Parvovirus B19 Infection. Am Fam Physician. 2007;75(3):373-6.
3. Heegaard ED, Brown KE. Human Parvovirus B19. Clin Microbiol Rev. 2002;15(3):485-505.
4. Cho HS, Bae SI, Moon JY, Kim KD. A Case of Human Parvovirus B19 Infection with Red Cell Aplasia and Idiopathic Thrombocytopenic Purpura. Korean J Clin Pathol. 1998;18(3):306-9.
5. Crook TW, Rogers BB, McFarland RD. Unusual bone marrow manifestations of parvovirus B19 infection in immunocompromised patients. Hum Pathol. 2000;31(2):161-8.
6. Heegaard ED, osthøj S, Petersen BL et al. Role of parvovirus B19 infection in childhood idiopathic thrombocytopenic purpura.Acta Paediatr. 1999;88(6):614-7.

Cite this article as: Patti G, Raju YS, Reddy SD. A case of human parvo virus B 19 infection with erythroid hypoplasia and Idiopathic thrombocytopenic purpura in an immunocompetent child: a case report. Int J Res Med Sci 2017;5:346-9.