ORIGINAL RESEARCH PAPER

Immunohaematology

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STUDY OF THE CLINICAL PRESENTATION OF APLASTIC ANEMIA WITH SPECIAL REFERENCE TO ASSOCIATION WITH PARVOVIRUS B19 INFECTION- A TERTIARY CARE HOSPITAL BASED STUDY

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ABSTRACT

Aplastic anemia is a disease of bone marrow failure characterized by pancytopenia with marrow hypocellularity. Possible etiologies that have been implicated includes drugs, irradiation and preceding viral infections as non-A, non-B, non-C hepatitis, Epstein Barr virus, cytomegalovirus, HIV and rubella. Most cases of parvovirus B19 infection are asymptomatic or present with flu like symptoms. Severe aplastic anemia has been reported in a previously healthy boy without any underlying diseases, following asymptomatic infection with parvovirus B19. A total of 22 patients with aplastic anemia admitted in medicine ward were studied. Patient with Hb less than 10gm%, total count less than 4000/cumm, platelet counts less than 1, 00,000/cumm were included. Bone marrow aspiration was done in all cases. Serum samples taken from each patient tested for parvovirus antibodies and viral DNA. Parvovirus B19 IgM detected in 22.7% cases and Parvovirus B19 DNA in 18.18% cases.

INTRODUCTION

Aplastic anemia is a disease of bone marrow failure characterized by pancytopenia with marrow hypocellularity. In most cases the cause is unknown. The possible etiologies that have been implicated includes drugs, irradiation and preceding viral infections as non-A, non-B, non-C hepatitis, Epstein Barr virus, cytomegalovirus, HIV and rubella.

Human parvovirus B19 belongs to the genus erythrovirus of the family Parvoviridae. Human parvovirus B19 is a small DNA virus with a worldwide distribution. The genome of parvovirus B19 consists of single-stranded 5.6kb DNA that encodes three large proteins. The non-structural protein NS1 is composed of 671 amino acid. Structural capsid proteins VP1 and VP2 are encoded in the same ORF with production of proteins of 84 and 58kDa, respectively. [1, 2] Parvovirus B19 replicates in red blood cell precursors in the bone marrow, however, it could persist in other cells also.[3]

Most cases of parvovirus B19 infection are asymptomatic or present with u like symptoms. It causes Fifth disease in children and arthropathy in adults in the immunocompetent host.[4] Pure red cell aplasia may also develop with a persistent infection of parvovirus B19 in immunocompromised individuals.[5] Acute infection with this virus results in transient aplastic crisis in patients with chronic hemolytic anemia such as sickle cell anemia.[6] Severe aplastic anemia has been reported in a previously healthy boy without any underlying diseases, following asymptomatic infection with parvovirus B19.[7] In our study, we have studied the frequency of parvovirus B19 infection in patients with aplastic anemia to explore the relation between parvovirus B19 infection and aplastic anemia in addition to the study of the clinical presentation of aplastic anemia.

MATERIALS AND METHODS

It was a hospital based prospective observational study carried out in the Department of Medicine, Assam Medical College and Hospital, Dibrugarh during the period from July 2017 to April 2018. A total of 22 patients with aplastic anemia admitted in medicine ward were studied. A detailed history and careful clinical examination were performed on each patient. Patient with Hb less than 10gm%, total count less than 4000/cumm, platelet count less than 1,00,000/cumm were included. Bone marrow aspiration was done in all cases. Patients having history of therapy with ionizing radiation, history of taking chemotherapeutic agents and patient with splenomegaly were excluded. The study was approved by hospital ethics committee and informed consent was taken from each patient.

Serum samples taken from each patient were tested for parvovirus antibodies and viral DNA. Peripheral blood samples were collected from patients at the time of admission and serology was always done before administration of blood products. Parvovirus B19 IgM antibodies were tested using ELISA with a commercially available kit. Detection of Parvovirus B19 DNA was done by polymerase chain reaction (PCR).

RESULTS

22 cases of aplastic anemia were included in the study. The mean age was 31.59 ±16.78 years. The 10 cases (45.45%) were male and 12 cases (54.54%) were female.

Pallor (100%) was the most common findings followed by fever (45.45%). 13.63% patients gave history of joint pain. There is no history of bleeding manifestations and typical facial erythema in any patients. Bone marrow aspiration samples were significantly hypocellular in all the patients.

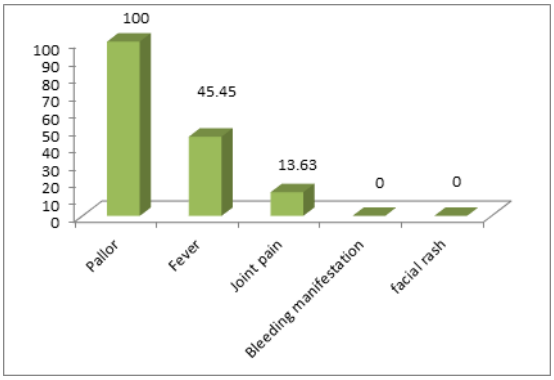

Fig.1.1- Clinical manifestation

22.72% of patients were classified as very severe, 59.09% as severe and 18.18% as non-severe aplastic anemia.

Out of 22 cases of aplastic anemia, parvovirus B19 IgM detected in 5 (22.7%) cases and Parvovirus B19 DNA in 4 (18.18%) cases.

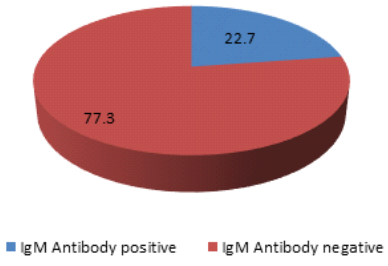

Fig.1.2- Parvovirus B19 IgM antibody positivity

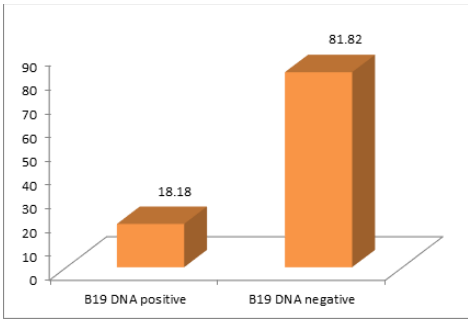

Fig.1.3- Parvovirus B19 DNA positivity

DISCUSSION

Not much study has been carried out about the causal relation between parvovirus B19 infection and aplastic anemia. In a recent report, a 14 year old boy with no obvious underlying disease who developed severe aplastic anemia following parvovirus B19 infection was described.[7] In order to investigate the relation between parvovirus B19 infection and aplastic anemia, we studied the presence of parvovirus B19 IgM antibodies and parvovirus B19 DNA in 22 cases of aplastic anemia and found parvovirus B19 IgM in 5 cases (22.7%) and parvovirus B19 DNA in 4 cases (18.18%).

Mishra B et al. (2005)[8] study observed the presence of Parvovirus B19 IgM antibody in 40.7% and parvovirus B19 DNA in 37% of aplastic anemia patients, thereby showing an association of parvovirus infection with aplastic anemia.

Qian XH et al. (2002)[9] study in 30 pediatric patients with aplastic anemia observed parvovirus B19 IgM antibody were detected in 13.3% and parvovirus B19 DNA in 20% patients.

Gupta V et al. (2013)[10] study carried out in 66 pediatric patients with acquired aplastic anemia observed that 25.8% patients were positive for parvovirus B19 IgM antibody.

Our study also suggests that parvovirus B19 infection is associated with aplastic anemia. Therefore parvovirus B19 infection should be considered as a possible etiological agent in patient with aplastic anemia.

CONCLUSION

Parvovirus B19 infection is highly prevalent among patients with aplastic anemia. Therefore, parvovirus B19 infection must be suspected and screened for in the presence of aplastic anemia with pancytopenia. However, the role of parvovirus B19 infection in the pathogenesis of aplastic anemia is yet to be thoroughly researched and more studies involving larger numbers of subjects need to be conducted to determine the exact role of parvovirus B19 in causation of aplastic anemia.

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