Acute Renal Damage and IgA Nephropathy, Intrauterine Ex Induced by Parvovirus During Pregnancy

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Parvovirus B19 is a small non-enveloped DNA virus that takes place in erythrovirus genus of parvoviridae family. Parvovirus B19 is primarily spread by respiratory secretions, blood transfusion, organ transplants and transplacental route. Intrauterine ex, hydrops fetalis and congenital anemia may develop as a result of parvovirus infection, especially between weeks 20 and 24 of pregnant women. In this article, intrauterine exitus developed as a result of parvovirus infection, HELLP syndrome, anuric renal failure and IgA nephropathy diagnosed case is discussed with the literature.

Key words: Parvovirus B19, Acute renal damage, IgA nephropathy.

INTRODUCTION

Parvovirus is a small non-enveloped DNA virus that takes place in erythrovirus genus of parvoviridae and the infection is very common worldwide. Prevalence in Australia was observed as 40% in adolescent and children, 60% in adults and 75% in people over 40 years of age. Prevalence is interestingly more common in temperate countries rather than tropical countries. Prevalence is similar to Australia in England and Wales, but lower in adults of Singapore and South Africa (1). Along with parvovirus infection or during follow-up, nephrotic and nephritic syndrome has been identified in many cases. Various clinical presentation and histological pattern are determined. Acute nephritic syndrome is common, frequently with hypocomplementemia following prodromal symptoms such as fever, arthritis and rash, however, it is identified in proteinuria in nephrotic level. Histological characteristics frequently include endocapillary and/or mesangial proliferation with subendothelial accumulation.

IgG and C3 granular deposits accompany along the mesangium and capillary wall and it is a consistent pattern with post infectious glomerulonephritis. Viral genome is detected by polymerase chain reaction in renal biopsy, B 19 antigen has been shown in some cases immunohistochemically (1-4). In this article, case admitted with 23 weeks intrauterine ex, hemolytic anemia and anuric renal failure as a result of parvovirus infection, diagnosed with IgA nephropathy as the result of renal biopsy was discussed with the literature.

CASE

27 years old female patient admitted to Gynecology and Obstetrics Clinic with 23 weeks of pregnancy, fever, cough, shortness of breath complaints. On physical examination; blood pressure 110/70mmHg, body temperature 35.4°C, pulse 110/min tachycardic listening to heart, widespread crackles listening to lungs, pretibial oedema were present, 23 weeks intrauterine ex was identified during gynecological examination. In laboratory examination, leukocyte count 7,200 / mm³ (4000-11000), hemoglobin (Hb) 14,2 gr/dl (12-16), thrombocyte count11000/mm³ (150000-300000) and one day after leukocyte count14000/mm³, Hb 7,0 gr/dl, thrombocyte count19000/mm³, serum glucose 94 mg/dl (74-106), serum blood urea nitrogen 60 mg/dl (6-20), serum creatinine 7.8 mg/dl (0.5-0.9), total protein 4.9gr/dl (6.4-8.3), serum albumin 2.3 gr/dl (3.5-5.2), alanine
aminotransferase 91 U/L (0-33), aspartate aminotransferase 473 U/L (0-32), lactate dehydrogenase 2828 U/L (135-214), creatine kinase 1053 U/L (26-192), total bilirubin 3.7 mg/dl (0-1.4), direct bilirubin 3.5 mg/dl (0-0.3), sedimentation 7 mm/h and C-reactive protein was found as 226 mg/l (0-8). Blood gas was pH 7.4, PCO₂ 30, HCO₃ 20, PO₂ 51 SO₂ 87. Proteiniura and hematuria were identified in complete urinalysis. 7-8 schistosomes were present in all areas of peripheral smear, reticuloocyte count was found as 5,4%, direct coombs negative, international normalized ratio (INR) 1.8 (0.8-1.2), partial thromboplastin time 42.7 (26-40), fibrinogen 169 mg/dl (200-400).

In serological tests, parvovirus IgM positive, parvovirus IgG positive, antinuclear antibody, anti-double stranded DNA, perinuclear anti-neutrophil cytoplasmic antibodies, cytoplasmic antineutrophil cytoplasmic antibodies, glomerular basement membrane antibody negative, complements C3 and C4 low, anticardiolipin IgM was found high. Hemodialysis catheters were fitted and hemodialysis started to patient with parvovirus disease, HELLP and anuric renal failure. In high resolution chest computed tomography, pleural effusion in both hemithorax as right 2.5 cm and left 2cm, extensive ground-glass areas in both lung parenchyma, interlobular septal thickening and increase in bronchovascular marking were monitored. Other diagnostic criteria were undetected although the radiological resemblance to acute respiratory distress syndrome. Patient’s hypoxia improved with oxygen therapy. Ejection fraction was identified as 40% in patient’s echocardiography. Meropenem 500 mg fiv 1x1 was initiated with sepsis diagnosis as the result of infection clinic consultation. No reproduction was observed in urine and blood cultures. Antibiotherapy stopped. A total of 6 units erythrocytes replacement, 8 units thrombocyte apheresis and 15 units fresh frozen plasma were given during treatment. Patient hemodialised a total of 7 times. Patient’s urination started after 10 days and 432mg/day proteinuria detected in 24 hours. In the result of renal biopsy, mesangial cell and matrix growth detected in glomerulus. Evaluated as IgA (+) in direct immunofluorescence staining, C3 (+) mesangial deposit, IgA nephropathy. In the examinations about 2 months later, Hb 12gr/dl, thrombocyte count 334000/mm³, serum blood urea nitrogen 13 mg/dl, serum creatinine 0.8 mg/dl, anticardiolipin IgM and complements normal and parvovirus IgM was found negative.

**DISCUSSION**

Parvovirus is a small non-enveloped DNA virus that takes place in erythrovirus genus of parvoviridae family. Recently due to the tropism to human erythrocyte precursor cells, the virus is also called as Erytrovirus B19. It is more commonly seen during winter and spring. The transmission of infection occur usually by the result of inhalation of droplets. Infection may also transmit from mother through vertical route, contaminate less frequently with the transfusion of blood products, bone marrow transplantationand/or organ transplantation. Since virus specifically affect erythrocytary series immature cells, erythrocyte production stop and can lead to aplastic crisis especially on patients with chronic hemolytic anemia. Parvovirus IgM, can be detected within three days after the beginning of viremia symptoms and Parvovirus IgG within a couple of days. IgM antibodies continue to grow for a month and disappear after 2nd – 3rd month IgG antibodies remain in serum for life. Definitive diagnosis can be made by hybridization or DNA detection with polymerase chain reaction. Parvovirus IgM and IgG were positive in the case after a week of complaints. Also IgM was detected negative after 2 months from symptomatic treatment. Parvovirus occurs in case of aplastic crisis developed as a result of B19 infection, especially when production of red blood cells decrease and turnover increase (such as hereditary spherocytosis and sickle cell anemia) (5). In healthy individuals, erythropoiesis is suppressed during the viremic phase, but it is well tolerated due to long erythrocyte lifespan and Hb value remain stable. Conversely in cases where lifespan of red cells is short as chronic hemolytic disorders, Hb level may decrease to life threatening values. As a result of antiviral neutralizing antibody production, although supportive therapy with transfusion is often necessary, aplastic crisis usually limits itself and rarely lasts up to 2 weeks.

Finally Parvovirus B19 infection during pregnancy can lead to intrauterine fetal death and fetal hydrops. Parvovirus B19 related fetal death mostly occur between 20th and 24th weeks of pregnancy. However, intrauterine deaths early as 10 weeks and late as 41 weeks are also reported (6). Also this case was in the period when the most intrauterine exitus occurred (23 weeks intrauterine ex). In this case HELLP syndrome without preeclampsia (increase in liver enzymes, hemolysis and thrombocytopenia) and then accordingly disseminated intravascular coagulation had developed. In patients with sickle cell anemia, nephrotic syndrome and acute parvovirus B19 infection are found to be related in many cases of literature. Wierenga et al. reported development of proteinuria or glomerulonephritis within 1-7 weeks as a result of parvovirus infection after aplastic crisis in 7 sickle cell anemia cases. 

In renal biopsy of 4 cases segmental proliferative glomerulonephritis and on one case in renal biopsy 4 months after the start of symptoms focal segmental glomerulosclerosis (FSGS) have been determined. In one of the cases spontaneous recovery, one case of death due to chronic renal failure, in other cases permanent kidney damage and in 4 cases persistent proteinuria have been observed (7). Tolaymat et al. similarly reported proteinuria and hematuria in 10 days after aplastic crisis associated with parvovirus B19 in patients with sickle cell anemia (8). Thrombotic microangiopathy (9), hemolytic uremic syndrome (10), vasculitis associated with renal involvement, and wegener granulomatosis (11) are also associated with parvovirus B19 infection. Tanawatthanacharoen et al. have checked B19 genome with PCR in 40 patients for various glomerular diseases (collapsing glomerulonephritis, idiopathic FSGS, membranous glomerulonephritis, minimal change disease and control). When B19 prevalence compared to other diseases it was found to be higher in collapsing...
glomerulonephritis and FSGS (12). In a similar study Moudgil et al. have found B19 DNA prevalence collapsing glomerulonephritis (78%) to be higher in renal biopsies. In other diseases: idiopathic FSGN (22%), HIV associated collapsing glomerulonephritis 16% and in control group found as 26% (13). In this case IgA nephropathy has been determined in renal biopsy. Due to patient’s normal blood pressure and INR height malignant hypertension related HUS was not considered. Also, thrombosis and acute tubular necrosis was not detected in renal biopsy. In literature cardioliopin and phospholipid autoantibodies are reported to develop during Parvovirus infection (14). In chronic fatigue syndrome patients after parvovirus infection decrease in level of complement and antibody production occur (15). In the case, anticardiolipin IgM positivity and complement C3 and C4 lowness have been identified, after patient’s symptomatic treatment anticardiolipin IgM detected as negative and complements normal.

As a result, after parvovirus disease we have shown that a successful symptomatic treatment improved clinical and laboratory results in a intrauterine exitus, normotensive, HELLP syndrome and IgA nephropathy determined case. Also heart failure and respiratory insufficiency symptoms which are thought to be developed due to parvovirus B19 infection completely recovered with successful treatment management. Parvovirus infection, should be strongly considered in intrauterine cases especially between 20-24. weeks because it can cause severe mortality increments in multisystem involvements.

REFERENCES