



Parvovirus: Uncommon Causes of Anemia and Kidney Failure in a Kidney Transplant Patient

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Received 2021 May 25; Accepted 2021 June 13.

Abstract

Parvovirus is one of the uncommon causes of anemia in a kidney transplant patient. We reported a kidney transplant patient with parvovirus infection who developed severe anemia three weeks after kidney transplantation. Suspicion of infections increased due to the decrease in erythrocyte level. The patient's anemia became normal with a decrease in the amount of immunosuppressant and treatment with intravenous immunoglobulin (IVIg). Parvovirus B19 infection should be considered in all patients with persistent anemia with or without graft failure after renal transplant.

Keywords: Parvovirus B19, Anemia, Renal Transplant

1. Introduction

Parvovirus is one of the uncommon causes of anemia in a kidney transplant patient (1). Post-transplant anemia occurs in 25 to 50% of patients (2). In this study, we reported a kidney transplant patient with parvovirus infection who developed severe anemia with renal failure despite treatment with a therapeutic level of immunosuppressive drugs.

2. Case Presentation

The patient was a 20-year-old man with a history of renal failure in the field of glomerulonephritis who underwent a kidney transplant from a deceased donor on 5 July 2019. Induction treatment with anti-thymocyte globulin (ATG) 3 mg/kg and five courses of methylprednisolone pulse were done. Two weeks after renal transplant, kidney biopsy was taken because of creatinine 1.9 and pathologic finding acute tubular injury and mild interstitial inflammation. The patient was discharged with maintenance immunosuppressive therapy, including tacrolimus 4 mg/d and mayfrotic 1.5 gr per day and prednisolone with creatinine 1.29.

Tacrolimus level was 5.9 to 12. Four weeks after transplantation, he was hospitalized due to shortness of breath, fatigue, weakness, and palpitations. The patient's vital

signs were PR = 100/min, RR = 15/min, BP = 100/60 mmHg, and T = 37°C.

Laboratory findings showed: WBC = 14300/ μ L, hemoglobin = 5.6 g/dL, hematocrit = 17%, RBC = 2.08/ μ L, MCV = 81.7, PLT = 32000, BUN = 24 mg/dL, Cr = 1.5 mg/dL, iron = 177 μ g/dL, TIBC = 259 mg/dL, ferritin = 1650 μ g/L, LDH = 1751 μ /L, retic = 2.5%, Bk virus PCR = negative, CMV virus PCR = negative, parvovirus B19, PCR = positive.

Ultrasound result of the transplanted kidney showed: 56 × 65 × 123 mm kidney with normal echo and thickness, mild hydronephrosis in the transplanted kidney, and RI of segmental arteries was = 0.58 - 0.64. The patient received three courses of 45 g IVIg that creatinine decreased to 1.2 and anemia was improved.

3. Discussion

This is one of the rare cases of kidney transplantation and parvovirus infection with severe and progressive anemia with graft failure three weeks after kidney transplantation. The patient's anemia was not in favor of hemolysis gastrointestinal or urinary bleeding, or malnutrition. Suspicion of infections increased due to the decrease in erythrocyte level. Erythrocyte-involving infections, including parvovirus, were suspected. The patient's anemia became normal with a decrease in the amount of immunosuppressant and treatment with IVIg. A study between 1990 to

2005 evaluated 98 transplant patients (bone marrow, kidney, etc.) who had anemia and infection with parvovirus B19, six kidney transplant patients had parvovirus infection and anemia. The median time from transplantation to parvovirus development was 1.5 months. Anemia was seen in all six patients, and transplanted kidney dysfunction was seen in only one patient (3). All patients received IVIG for two doses of 0.5 to 1 g/day. Anemia resolved in all patients. In this 16-year follow-up study, the presence of seven cases of parvovirus indicates that the infection is rare, however, in this study, it should be noted that none of the 47 transplant patients who had anemia for about 23 weeks were evaluated for parvovirus, which indicates that parvovirus is less considered in transplant patients with anemia (3).

In a review of 144 kidney transplant patients from 2007 to 2013 by Krishnan et al, two percent (three subjects) had parvovirus infection. Two of them had kidney failure with anemia, and the average time of transplantation until the infection was 8.6 weeks. Kidney failure and anemia were eliminated by treatment with parvovirus infection (4).

The most common clinical manifestations of parvovirus in immunocompromised patients are arthralgia fever and anemia rash, and lack of response to erythropoietin (5). Parvovirus can be accompanied by hepatitis, myocarditis, pneumonitis, and graft dysfunction in transplant patients (3), as in our patient. A case of cardiogenic shock in parvovirus has also been reported (6). The disease is diagnosed by serology and PCR by showing the virus directly in the blood. Serological tests at the onset of the disease may be negative.

In case of negative PCR and strong diagnostic doubt, bone marrow sampling is recommended (3). Treatment strategy of parvovirus infection is to reduce the dose of immunosuppressant and IVIG 400 mg/kg per day for five days (7-9).

3.1. Conclusion

High suspicion for parvovirus infection in kidney transplant patients with severe anemia and allograft failure should be considered. In the early stages, anemia is diagnosed by PCR testing, which is a safe and non-invasive method.

Footnotes

Authors' Contribution: F.Y developed the original idea, edited and prepared the manuscript. M.Y contributed to the development of the protocol, abstracted data, and wrote the manuscript.

Conflict of Interests: The authors declare no conflicts of interest.

Ethical Approval: This article is a case report

Funding/Support: Tehran University of Medical Science, Shariati Hospital.

Informed Consent: Written informed consent was obtained from the patient for publication of this study.

References

- Sharma N, Bajwa R. Parvovirus infection-related anemia after kidney transplantation. *Case Rep Transplant.* 2020;**2020**:6437392. doi: [10.1155/2020/6437392](https://doi.org/10.1155/2020/6437392). [PubMed: [32082691](https://pubmed.ncbi.nlm.nih.gov/32082691/)]. [PubMed Central: [PMC7013336](https://pubmed.ncbi.nlm.nih.gov/PMC7013336/)].
- Mix TC, Kazmi W, Khan S, Ruthazer R, Rohrer R, Pereira BJ, et al. Anemia: A continuing problem following kidney transplantation. *Am J Transplant.* 2003;**3**(11):1426-33. doi: [10.1046/j.1600-6135.2003.00224.x](https://doi.org/10.1046/j.1600-6135.2003.00224.x). [PubMed: [14525605](https://pubmed.ncbi.nlm.nih.gov/14525605/)].
- Eid AJ, Brown RA, Patel R, Razonable RR. Parvovirus B19 infection after transplantation: A review of 98 cases. *Clin Infect Dis.* 2006;**43**(1):40-8. doi: [10.1086/504812](https://doi.org/10.1086/504812). [PubMed: [16758416](https://pubmed.ncbi.nlm.nih.gov/16758416/)].
- Krishnan P, Ramadas P, Rajendran PP, Madhavan P, Alex A, Jayaschandran V, et al. Effects of parvovirus B19 infection in renal transplant recipients: A retrospective review of three cases. *Int J Angiol.* 2015;**24**(2):87-92. doi: [10.1055/s-0034-1371759](https://doi.org/10.1055/s-0034-1371759). [PubMed: [26060378](https://pubmed.ncbi.nlm.nih.gov/26060378/)]. [PubMed Central: [PMC4452608](https://pubmed.ncbi.nlm.nih.gov/PMC4452608/)].
- Pakkyara A, Jha A, Al Salmi I, Siddiqi WA, Al Rahbi N, Kurkulasurya AP, et al. Persistent anemia in a kidney transplant recipient with parvovirus B19 infection. *Saudi J Kidney Dis Transpl.* 2017;**28**(6):1447-50. doi: [10.4103/1319-2442.220846](https://doi.org/10.4103/1319-2442.220846). [PubMed: [29265066](https://pubmed.ncbi.nlm.nih.gov/29265066/)].
- Jonetzko P, Graziadei I, Nachbaur K, Vogel W, Pankuweit S, Zwick R, et al. Fatal course of parvovirus B19-associated myocarditis in a female liver transplant recipient. *Liver Transpl.* 2005;**11**(4):463-6. doi: [10.1002/lt.20375](https://doi.org/10.1002/lt.20375). [PubMed: [15776413](https://pubmed.ncbi.nlm.nih.gov/15776413/)].
- Manaresi E, Gallinella G, Zuffi E, Bonvicini F, Zerbini M, Musiani M. Diagnosis and quantitative evaluation of parvovirus B19 infections by real-time PCR in the clinical laboratory. *J Med Virol.* 2002;**67**(2):275-81. doi: [10.1002/jmv.2218](https://doi.org/10.1002/jmv.2218). [PubMed: [11992590](https://pubmed.ncbi.nlm.nih.gov/11992590/)].
- Jordan SC, Toyoda M, Kahwaji J, Vo AA. Clinical aspects of intravenous immunoglobulin use in solid organ transplant recipients. *Am J Transplant.* 2011;**11**(2):196-202. doi: [10.1111/j.1600-6143.2010.03400.x](https://doi.org/10.1111/j.1600-6143.2010.03400.x). [PubMed: [21219579](https://pubmed.ncbi.nlm.nih.gov/21219579/)].
- Kumar J, Shaver MJ, Abul-Ezz S. Long-term remission of recurrent parvovirus-B associated anemia in a renal transplant recipient induced by treatment with immunoglobulin and positive seroconversion. *Transpl Infect Dis.* 2005;**7**(1):30-3. doi: [10.1111/j.1399-3062.2005.00082.x](https://doi.org/10.1111/j.1399-3062.2005.00082.x). [PubMed: [15984946](https://pubmed.ncbi.nlm.nih.gov/15984946/)].