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Parvovirus B19 induced red cell aplasia in a heart transplant patient diagnosed on pleural fluid

Emily X. Shao, BSc, MBBS, MPH[1,2], Christopher S.W. Wang, BMedSc, MBBS[1],

George Javorsky, MBBS, RACP[1]

[1]Queensland Heart-Lung Transplant Unit, The Prince Charles Hospital, Brisbane, Queensland, Australia.

[2]Faculty of Medicine, The University of Queensland, St Lucia, Queensland 4072, Australia

Correspondence Information

Emily Ximin Shao

The Prince Charles Hospital,

Rode Road

Chermside, 4032

Queensland, Australia.

+61433948611

Authorship

ES wrote the paper with significant input and editing from CW and GJ.

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Abbreviations

DNA, deoxyribonucleic acid

IgG, Immunoglobulin G

IgM, Immunoglobulin M

PCR, polymerase chain reaction

Ethics/Consent Statement

Informed consent was obtained from the individual included in this case.

A 30-year-old male was seen 6 weeks post cardiac transplant, there were no complications in the immediate posttransplant period. Transplant was indicated for idiopathic cardiomyopathy.

The patient was found to be anemic with a hemoglobin of 63 mg/dL. This was thought to be due to a combination of myelosuppression secondary to immunosuppression and reactive anemia due to major surgery. At this point parvovirus IgG and IgM returned negative. The patient was transfused 3 units of red blood cells and was seen 1 week later.

At the 7 week review the patient noted symptoms of lethargy and chest pain. An electrocardiogram showed sinus rhythm without ischemic changes. An urgent bedside echocardiogram showed a large circumferential pericardial effusion with fluid density and maximum dimensions of 40mm behind the right ventricular diaphragmatic wall (Figure 1). A subxiphoid drainage was performed with 450mL of hemorrhagic fluid drained.

The pericardial fluid was tested for Epstein-Barr virus, cytomegalovirus, and parvovirus. Parvovirus DNA returned positive. Parvovirus serology and PCR was subsequently requested on the serum for that day, with serology remaining negative and PCR returning positive. The diagnosis of parvovirus induced red cell aplasia was made. Parvovirus IgM eventually became positive 2 weeks later. The patient was treated with 80mg of Flebogamma over 2 days every 4 weeks. The patient's hemoglobin increased from 82mg/dL to 132mg/dL after 8 months of therapy, without any further transfusions of red cells.

There are many causes of anemia in the posttransplant patient. Immediately postoperative, anemia can be explained by blood loss after surgery.[1] Inflammation can also cause anemia, where pro-inflammatory cytokines released after surgery cause impairment in iron homeostasis and erythropoietin production.[1] Impaired mucosal integrity and bleeding from stress gastritis can occur with mechanical ventilation, nutritional deficiencies, and anticoagulation, can also contribute to anemia. Furthermore, postoperative anemia can be caused by bone marrow suppression as a result of the antimetabolite action of immunosuppressive medications.[2]

Viral infections can cause anemia, with associated viruses including Epstein-Barr virus, cytomegalovirus, varicella-zoster virus, human herpes virus, parvovirus B19, human immunodeficiency virus, and hepatitis A and C viruses.[3]

Parvovirus is usually diagnosed with serology. In immunocompetent patients with evidence of anemia, IgM should be positive by day 3.[4] Parvovirus B19 serology is not reliable in immunocompromised patients due to a delayed antibody-mediated immune response.[5] PCR may be a more useful modality to detect parvovirus infection in transplant patients.[5] It has a high positive predictive value in an immunocompromised patient with red cell aplasia. However, PCR can also be falsely negative in high-level viremia, and may not detect non-B19 strains. In the case of a negative PCR and serology with a clinical picture suggestive of parvovirus B19 infection, bone marrow examination may establish the diagnosis.[5]

Our case demonstrates a missed diagnosis, where parvovirus B19 infection was overlooked as a result of false negative serology. Our case re-presented, unwell, with a pericardial effusion as a result of infection. Diagnosis was finally made with DNA detection on pericardial fluid.

There are numerous causes of anemia in the posttransplant patient. Parvovirus B19 infection should always be considered. Serology may be falsely negative in immunocompromised patients. In such cases, PCR and bone marrow examinations may be useful to establish diagnosis.

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Figure Legends

Figure 1:

Subcostal echocardiogram image showing a pericardial effusion which was used to diagnose Parvovirus B19 infection in this case.

Figure 1