CASE REPORT

Successful treatment of a severe case of rhabdomyolysis following heart transplantation by hemoadsorption

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Abstract
Patients after heart transplantation are often showing a variety of different perioperative complications causing an impaired outcome. Rhabdomyolysis can be caused by several reasons such as limb ischemia or myocardial damage and become a trigger for kidney injury. Chronic renal failure with the need for hemodialysis remains a common problem after transplantation and impacts post-transplant survival. We describe the successful treatment of a patient with severe rhabdomyolysis following heart transplantation by the usage of hemoadsorption.

KEYWORDS
hemoadsorption, limb ischemia, renal failure, rhabdomyolysis, transplantation

1 | INTRODUCTION

Heart transplantation is the best treatment option for patients suffering from severe heart failure; however, it often shows a variety of perioperative complications leading to an impaired recovery in patients. Chronic renal failure requiring hemodialysis is a common problem after transplantation, and it impacts post-transplant survival. Rhabdomyolysis caused due to several medical conditions such as limb ischemia or myocardial damage can trigger kidney injury. Rhabdomyolysis is characterized by tremendously high levels of serum creatine kinase (CK) and myoglobin leading to kidney failure. Newly developed hemoadsorption devices are able to treat the side effects of rhabdomyolysis by decreasing CK and myoglobin concentration in the serum. However, due to their nonspecific adsorption spectrum, these devices may also adsorb unknown concentrations of potential beneficial plasma ingredients as well as drugs such as antibiotics and immunosuppressive drugs. Here, we present, to the best of our knowledge, the first case report of a heart transplant recipient who developed severe rhabdomyolysis that was successfully treated using a hemoadsorption device.

2 | CASE REPORT

A 61-year-old male patient suffering from terminal heart failure, which was caused by ischemic cardiomyopathy and left ventricular assist device implanted 4 years earlier as a bridge-to-transplant therapy (Medtronic HeartWare HVAD), underwent orthotopic heart transplantation. The transplantation process involved a cold and warm ischemic time of 156 minutes and 45 minutes, respectively. Due to primary graft dysfunction, the patient suffered from post-transplantation transient cardiogenic shock as well as cardiac arrhythmia (atrial fibrillation, atrioventricular block) and required support with veno-arterial extracorporeal membrane oxygenation (va-ECMO) via the right femoral vessels (flow rate: 3.49 L/min). The patient was stabilized, and the need for catecholamines significantly decreased (2.7 µg/kg/h norepinephrine, 2.7 µg/kg/h epinephrine, and 27.03 µg/kg/h milrinone). Two days after the surgery, an enormous increase in plasma creatine kinase (CK) level was observed. The next day, plasma CK level was >100 000 U/L. Simultaneously, myoglobin concentration increased to approximately 380 000 µg/L. Limb ischemia and myocardial damage were successfully excluded as the potential reasons for rhabdomyolysis. Advanced clinical examination indicated a combination of statin and immunosuppressive therapy...
(simvastatin, tacrolimus, mycophenolate mofetil, and prednisolone) to be the most likely cause of rhabdomyolysis. In addition, the patient was treated with heparin, sufentanil, propofol, sildenafil, furosemide, amphotericin, pantoprazole, levofloxacin, and co-trimoxazole. Conventional therapeutic strategies failed to decrease the plasma CK concentration, and the patient subsequently developed acute kidney injury requiring continuous veno-venous hemodialysis. Therefore, we started treatment using an extracorporeal cytokine adsorber (CytoSorb; CytoSorbents Corporation, Monmouth Junction, NJ) for the next 4 days (Figure 1). The adsorber was incorporated into the va-ECMO circuit according to the manufacturer’s instructions. Plasma concentrations of immunosuppressive drugs, as well as antibiotics, were carefully monitored. As soon as the adsorber was applied, the patient was stabilized. In addition, the level of CK, as well as myoglobin, decreased fast and continuously. At treatment completion, CK and myoglobin concentrations were 45,866 U/L and 53,700 µg/L, respectively. Plasma drug concentrations were stable during the whole treatment period. The patient recovered, and the va-ECMO was successfully explanted after 6 days. At the time of hospital discharge, CK concentration was 276 U/L and the patient showed no signs of organ rejection in the right ventricular endomyocardial biopsy. Renal function also recovered with no sign of chronic kidney failure. At the 6-month follow-up, the patient was doing well and did not show any further postoperative complications.

In the present case, we successfully treated a patient suffering from severe rhabdomyolysis after heart transplantation with extracorporeal cytokine adsorption and were able to preserve his renal function. Although cytokine adsorption was able to decrease the CK and myoglobin concentration, its beneficial effects in the case of cardiac surgery as well as heart transplantation remain uncertain. Furthermore, it removes antibiotics and immunosuppressive drugs such as tacrolimus, which may cause severe adverse side effects in heart transplant patients. Therefore, we carefully monitored the concentrations of different drugs in the plasma. We did not observe any problems concerning pharmacokinetics. Thus, the usage of cytokine adsorption was a safe and feasible technique to purify the blood to preserve kidney function.

CONFLICT OF INTERESTS
The authors declare that there are no conflict of interests.

REFERENCES