ELSEVIER

The Journal of
Heart and Lung
Transplantation

http://www.jhltonline.org

COMMENT AND OPINION

A unique case of driveline fracture in a continuous-flow mechanical support device

Antonio Loforte, MD, Paola Lilla Della Monica, MD, and Francesco Musumeci, MD

Department of Cardiac Surgery and Transplantation, San Camillo Hospital, Rome, Italy

A 49 year-old man underwent an uneventful implantation of a HeartMate II (Thoratec Corp, Pleasanton, CA) continuous-flow left ventricular assist device (LVAD) for treatment of refractory end-stage heart failure due to an idiopathic dilative cardiomyopathy, classified as Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS) level 2. During the follow-up, the patient did not follow a proper diet and exercise regimen and his body mass index (BMI) grossly increased from 24.3 to 32.7 kg/m^2 within 600 days of LVAD support.

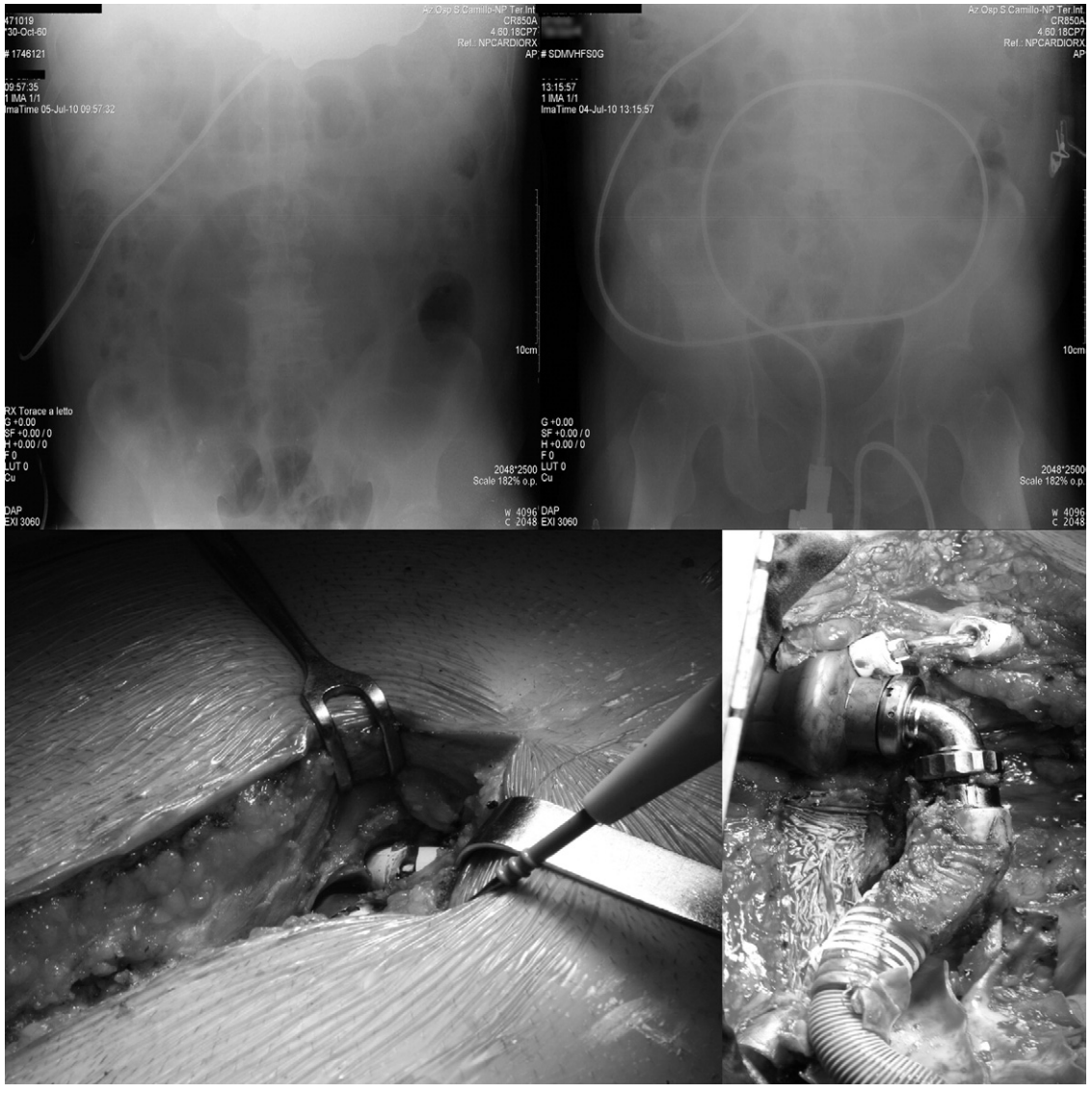

Figure 1 (Upper panels) X-ray imaging shows no apparent lesions in the length of the drive cable of the left ventricular assist device. (Lower panels) Intraoperative view shows the fracture of the proximal driveline tract that caused pump malfunction.

doi:10.1016/j.healun.2011.02.009

A sudden pump malfunction developed, as indicated by an audible and visual alarm 693 days after implantation. The patient was alert, oriented, and awake, and his vital signs were normal. An intermittent device function was noted by pushing on the midline of the superior abdomen. Improved native heart function with no regurgitant flow, as evaluated by echocardiography, was noted, and anticoagulation was initiated to prevent pump thrombosis. An evaluation with X-ray imaging showed no lesions in the length of the device drive cable (Figure 1).

While the patient was in the intensive care unit, the pump stopped functioning. The patient was emergently moved to the operating room, where groin vessels were quickly exposed. During a pump stop evaluation performed over 52 minutes, the left ventricle internal end-diastolic diameter was 55 mm and the left ventricular ejection fraction was 45%, whereas the right ventricular diameter and function remained stable. There was no restrictive transmitral flow pattern, a normal stroke volume, and no relevant left ventricle geometry alteration; thus, device explantation[1] was planned because the patient's hemodynamics remained stable.

Partial femoral cardiopulmonary bypass was instituted. Through repeat sternotomy and debridement of adhesions, the pump, including the inflow and outflow conduits, was exposed. A driveline fracture was found in its inner and proximal tract close to the device housing (Figure 1). Before the pump was detached,[2,3] the heart was fibrillated while the patient was placed in the Trendelenburg position. The device was disconnected by ligating the outflow graft near the point of insertion into the ascending aorta. The inflow cannula was removed, and a Dacron patch was sutured on the left ventricle apex. The heart was then defibrillated, the left ventricle chamber deaired, and the patient successfully weaned from cardiopulmonary bypass.

The patient was discharged from the hospital 22 days later on anti-heart failure medications and has since returned to normal activity without any recurrence of heart failure events at 106 days after surgery. We speculate that the patient's increased BMI caused a progressive stretching and final fracture of the proximal driveline tract, resulting in pump malfunction.

Disclosure statement

The authors thank all mechanical circulatory support (MCS) team of Deutsches Herzzentrum Berlin, Germany, for continuous support and advice.

This report was done within the PhD Program in "Transplantation" awarded by Rome Tor Vergata University, Italy, in cooperation with the Deutsches Herzzentrum Berlin, Germany.

None of the authors has a financial relationship with a commercial entity that has an interest in the subject of the presented manuscript or other conflicts of interest to disclose.

References

1. Dandel M, Weng Y, Siniawski H, et al. Prediction of cardiac stability after weaning from left ventricular assist devices in patients with idiopathic dilated cardiomyopathy. Circulation 2008;118(suppl 1):S94-105.
2. Slaughter MS, Pagani FD, Rogers JG, et al. Clinical management of continuous-flow left ventricular assist devices in advanced heart failure. J Heart Lung Transplant 2010;29:S1-S39.
3. Gregoric ID. Exchange techniques for implantable ventricular assist devices. ASAIO J 2008;54:14-19.

High-urgency priority heart transplantation in HIV-positive patients on life support: Breaking barriers?

Aude Boignard, MD,[a] Myriam Blanc, MD,[b] Olivier Chavanon, MD, PhD[a,c]

[a]Cardiac Surgery Unit, Cardiovascular and Thoracic Department; [b]Infectious Disease Unit, CHU Grenoble, Grenoble, France; and [c]University Joseph Fourier, Grenoble, France

A 32-year-old man developed severe cardiogenic shock due to dilated cardiomyopathy. Human immunodeficiency virus (HIV)-1 positivity (viral load of 4,000 copies/ml and CD4 cell count of 700/mm^3) required us to initiate anti-retroviral therapy that included: lamivudine/zidovudine (nucleoside-analog reverse-transcriptase inhibitors, or "NRTIs"); raltegravir (integrase inhibitor); and enfuvirtide (fusion inhibitor). Although the viral load was negative by Day 5, the cardiac condition deteriorated, requiring intra-aortic balloon counter-pulsation and listing as a "high-urgency" priority for heart transplantation. Percutaneous extracorporeal life support (ECLS) was subsequently needed and transplantation performed within 1 day. Two acute rejections (ISHLT Grade 2R) were encountered in the first year, but by 30 months the patient stabilized with normal cardiac allograft function, no rejection and an undetectable viral load, while working full time (CD4 cell count was 1,560/mm^3 on quadruple anti-retroviral therapy, unchanged from pre-transplant).

This case illustrates several facets: the ethical dilemma posed by granting "high-urgency" priority status to an HIV-positive patient in light of the scarcity of donor organs; the potential aggravation of HIV infection by immunosuppressants; and interactions between immunosuppressants and anti-retroviral therapy. Before highly active anti-retroviral therapy, HIV-positive patients were generally viewed as unsuitable candidates for heart transplantation. Yet, successful kidney and liver transplantations have been reported in HIV-positive patients.[1] Recommendations for such transplant candidates include: recent conversion; an undetectable HIV viral load; "normal" (>200 cells/mm^3) CD4 cell count; and no history of AIDS-defining opportunistic illnesses.[2] The first heart transplantation was performed in 2001, with a survival of 3.5 years.[3] In 2009, Uriel et al reported the cases of 5 heart recipients diagnosed with HIV before transplantation, with a mean follow-up of 30 months and no low CD4 cell counts or detectable viral loads.[4] To our knowledge, only 7 heart transplantations have been reported in recipients whose HIV-positivity was known before transplantation.[3–5]

Another significant concern is the potential aggravation of HIV infection because of immunosuppressive treatment. Past experience suggests that the use of standard immuno-