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CASE ANECDOTES, COMMENTS AND OPINIONS

First successful cardiac allograft donation and transplantation after medical assistance in dying (MAiD)

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Background

Medical assistance in dying (MAiD), was decriminalized in Canada in 2016. MAiD permits competent adults with intolerable suffering from a serious incurable illness, disease or disability access to assistance to end their lives.[1] Organ donation after MAiD has been reported[2] and successful kidney, liver, and lung transplants have been performed in this context. Here, we report the first case of successful cardiac transplantation after MAiD.[3–5]

Case presentation

A 59-year-old male with a nonischemic cardiomyopathy, prior implantable cardioverter defibrillator (ICD) placement, and recurrent premature ventricular contractions (PVCs) and ventricular tachycardia (VT) requiring ablations in 2012, 2019 and 2020 presented with worsening heart failure. His medical history includes Wolff-Parkinson-White syndrome (WPW), type II DM, rheumatoid arthritis, and gastroesophageal reflux disease (GERD).

He was initially listed for cardiac transplantation as United Network for Organ Sharing (UNOS) Status 4E. Ultimately due to elevated filling pressures and persistent cardiogenic shock, an axillary Impella 5.5 device was placed, resulting in upgrade to status 2 for transplant.

Donor identification

Ten days after the recipient's status upgrade, a suitable donor was identified: a 38-year-old male with ALS, who was to receive MAiD and wished to donate his organs. Provision of MAiD and death determination occurred in keeping with Canadian standards. The end-of-life care plan is co-determined by the MAiD provider with the patient. The specific medications used for MAiD provision are chosen by the MAiD provider. In this case the in-hospital provision medication protocol utilized midazolam, propofol, rocuronium and potassium chloride. Death was declared within 7 minutes of initiating the MAiD protocol. Organ donation following MAiD was coordinated with the Provincial Organ and Tissue Donation Organization (ODO). The heart was subsequently procured using direct procurement and perfusion techniques. The TransMedics Organ Care System (OCS), was used to reanimate, evaluate and transport the donor heart to Pittsburgh, USA, where the transplant took place. Visually, the heart appeared to acceptable for transplantation once on OCS and arterial and venous lactates were less than 5 mmol/liters.

Orthotopic heart transplantation

The heart was transplanted with standard bicaval technique. Postoperative echocardiography demonstrated good biventricular function with a cardiac index (3.1–3.7 liters/min/m²). Time from donor aortic cross-clamping to recipient declamping was 5 hours and 28 minutes. Cardiopulmonary bypass (CPB) time was 157 minutes, with warm ischemic time of 52 minutes.

The postoperative course was complicated by ileus and acute kidney injury, requiring continuous renal replacement therapy, with normalization of renal functions. He was transferred to the floor on POD 10. RHC on POD 12 showed improved hemodynamics, with cardiac index of 3.33 liters/min/m². Endomyocardial biopsy showed Grade 2R cellular rejection with 0 AMR, for which the patient was

Abbreviations: MAiD, Medical Assistance in Dying; ICD, Implantable Cardioverter Defibrillator; PVCs, Premature Ventricular Contractions; VT, Ventricular Tachycardia; WPW, Wolff-Parkinson-White syndrome; DM, Diabetes Mellitus; GERD, Gastroesophageal Reflux Disease; UNOS, United Network for Organ Sharing; DCD, Donation after Circulatory Death; DBD, Donation after Brain Death; OCS, Organ Care System; CPB, Cardiopulmonary Bypass; POD, Postoperative Day; RHC, Right Heart Catheterization; AMR, Antibody-Mediated Rejection; 2R, Moderate Acute Cellular Rejection (International Society for Heart and Lung Transplantation grading); 1R, Mild Acute Cellular Rejection (ISHLT grading)

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treated with IV methylprednisolone. Follow up biopsy on POD 19 showed Grade 1R cellular rejection with 0 AMR. The patient was discharged home on POD 20 without the need for dialysis in good condition and remains well at most recent follow up.

Discussion

Donation after circulatory death (DCD) significantly enhances access to heart transplantation, reduces waitlist mortality and morbidity by expanding the number of donor allografts available.[6] Furthermore, Post-transplant outcomes are similar for DCD and donation after brain death (DBD) donors.[6] Recent work has demonstrated that the use of DCD donors can be expanded.

In Ontario, Canada the majority of patients who receive MAiD are provided outside of hospital. Patients wishing to donate organs following MAiD need to attend a health care facility for donor suitability and matching testing prior to provision. Almost all Canadian organ donors following MAiD have their MAiD provision and death determination in hospital. In-hospital provision limits organ ischemic time prior to recovery surgery. There a have been lung donors in Ontario who have had MAiD provision at home.[7]

Here, we report the successful use of a donor cardiac allograft obtained after MAiD. To our knowledge, this represents the first case reported. While longer term data and data on additional cases will be required, this case suggests that safe cardiac transplantation can be performed after MAiD.

Conflict of interest

None.

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