

(993)

Single-Center Donation After Circulatory Death Heart Transplantation: Comparing Direct Procurement and Hypothermic Oxygenated Perfusion with Thoraco-Abdominal Normothermic Regional Perfusion and Static Cold Storage

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Purpose: Current strategies for DCD hearts face financial, ethical, and logistical challenges. Hypothermic oxygenated machine perfusion (HOPE) has emerged as a promising preservation method for hearts donated after brain death. We report our experience in DCD direct procurement (DP)-HOPE heart transplantation (HTX), in comparison with DCD thoraco-abdominal normothermic regional perfusion (TANRP) - static cold storage (SCS).

Methods: DCD Maastricht category III and V donors were considered. For DCD DP HOPE, the hearts were immediately flushed with cardioplegia after circulatory arrest. After procurement, they were placed on HOPE (XVIVO). Recipients pre-operatively on extracorporeal life support, recipients with adult congenital heart disease, and multi-organ transplantation were excluded. Results were compared with the first 10 DCD TANRP-SCS HTX performed at our center. Groups were compared using Mann-Whitney U and Fisher's exact tests.

Results: Table 1 shows donor and recipient data. No DCD DP-HOPE were discarded. There was no severe primary graft dysfunction in the DCD DP-HOPE group. Survival is 100% in both groups up to date. Since the introduction of DP-HOPE DCD HTX, the number of HTX at our center increased with 40%.

Conclusion: We report our first 8 clinical cases of DCD HTX using DP-HOPE in comparison to our first 10 clinical DCD TA-NRP SCS HTX, with satisfactory results. TA-NRP offers functional evaluation of the heart and is lower in cost in comparison to machine perfusion. DP-HOPE is a promising method for DCD HTX, with less logistic and ethical constraints in comparison to TA-NRP, and allowing for longer out of body times.

Table 1: Donor and recipient data. Data are expressed as median (range) or n (%).

	DCD DP-HOPE (n=8)	DCD TA-NRP SCS (n=10)	p value
DONORS			
Age (years)	46.5 (12-57)	47.5 (27-60)	0.71
Sex (M/F)	6 (75%) / 2 (25%)	7 (70%) / 3 (30%)	0.99
DCD III	7 (87.5%)	9 (90%)	0.99
DCD V	1 (12.5%)	1 (10%)	0.99
Functional warm ischemic time (min)	16 (9-22)	17 (10-21)	0.39
Asystolic warm ischemic time (min)	10 (9-14)	12 (5-17)	0.30
Out of body time (min)	313 (241-436)	117 (54-178)	<0.0001
HOPE duration (min)	237 (167-319)	N/A	N/A
RECIPIENTS			

Age (years)	55.5 (13-65)	56 (47-65)	0.65
Sex (M/F)	7 (87.5%) / 1 (12.5%)	6 (60%) / 4 (40%)	0.31
Pre-transplant VAD	5 (62.5%)	5 (50%)	0.66
Severe PGD	0 (0%)	1 (10%)	0.99
Intensive care unit stay (days)	4.5 (3-28)	8 (2-27)	0.10
Hospitalisation (days)	21 (12-49)	24 (17-65)	0.32
Left ventricle ejection fraction at 1 week (%)	55 (45-80)	57 (54-60)	0.99
Left ventricle ejection fraction at 3 months (%)	58 (55-81)(n=5)	60 (55-60)	0.81
Cardiac index at 1 week (L/min/m ²)	3.20 (2.65-4.32)	2.98 (2.1-2-3.92)	0.25
Cardiac index at 3 months (L/min/m ²)	3.16 (2.27-4.05)(n=5)	2.61 (1.9-3-3.83)	0.25

(994)

Cold Blood Cardioplegia Use for Cardiac Arrest After Heart Transportation with Organ Care System May Improve Outcomes

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Purpose: The efficacy of crystalloid cardioplegia (CC) for cardiac arrest after heart transportation using the Organ Care System (OCS) is unknown. Our institution transitioned from CC to blood cardioplegia (BC) in May 2024. We sought to evaluate outcomes of these two cardioplegia strategies with a focus on postoperative renal function.

Methods: This single-center, retrospective study analyzed 33 consecutive heart transplant recipients whose donor hearts were preserved using the OCS system from August 2023 to September 2024. Recipients with beating implant (n=6) were excluded. Patients were divided into two groups based on cardioplegia type (CC or BC). CC was given by the OCS national team as per the OCS protocol. BC was delivered via cardiopulmonary bypass connected to the recipient. Donor and recipient characteristics as well as post-operative outcomes were compared. Acute kidney injury (AKI) was defined according to the KDIGO criteria (increase in serum creatinine by ≥0.3 mg/dL within 48 hours or ≥1.5 times the baseline level within 7 days).