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Early Rejection and Graft Vasculopathy in DCD Hearts: A Comparison of Recovery Methods

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Purpose: During transplantation of cardiac allografts after circulatory death (DCD), either thoracoabdominal normothermic regional perfusion followed by static cold storage (TA-NRP) or direct procurement and perfusion (DPP) is used for heart recovery. We sought to explore differences in rates of biopsy-proven acute cellular rejection (ACR) and antibody mediated rejection (AMR) as well as angiographically confirmed coronary allograft vasculopathy (CAV) among heart transplant (HT) recipients based on perfusion method used.

Methods: We identified all adults undergoing DCD HT at our center between 01/2020 and 06/2024 and stratified patients based on method of heart recovery. Patients undergoing multiorgan transplantation and those with congenital heart disease were excluded. Primary outcomes included ACR $\geq$ 2R, AMR (pAMR1-i, pAMR2, and pAMR3), and CAV $\geq$ 2, as detected on surveillance or for-cause biopsies and surveillance angiography, respectively, during the first post-HT year.

Results: A total of 174 patients met inclusion criteria, including 38 patients in the DPP group and 136 in the NRP group. Both groups had similar median follow-up times from HT. The DPP group had significantly longer ischemic times compared to the NRP group (353 vs 216 mins, $p < 0.001$). Rates of ACR (10.5% DPP vs 8.1% NRP, $p = 0.74$) and AMR (2.6% DPP vs 1.5% NRP, $p = 0.52$) were similar between groups, as were the rates of moderate-severe CAV (7.9% DPP vs 5.9% NRP, $p = 0.52$).

Conclusion: In the largest single-center comparison of early rejection and CAV outcomes among DCD HT recipients stratified by recovery method, there were no significant differences observed in an unadjusted analysis. A longer-term analysis adjusted for potential confounders will be completed in time for ISHLT 2025. We expect our findings to shed further light on the relative merits of TA-NRP versus DPP for DCD heart recovery.

Table 1: Post heart transplant outcomes by perfusion method (N=174)

	DPP (n=38)	NRP (n=136)	P value
Total Ischemic Time (mins)	353.2 (71.0)	216.0 (52.6)	<0.001
Primary Outcomes			
Rejection	4 (10.5%)	12 (8.8%)	0.75
ACR	4 (10.5%)	11 (8.1%)	0.74
AMR	1 (2.6%)	2 (1.5%)	0.52
CAV	3 (7.9%)	8 (5.9%)	0.71

ACR = acute cellular rejection; AMR = antibody mediated rejection; CAV = coronary allograft vasculopathy

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Use of Organ Care System (OCS) Heart with Longer Perfusion Provides Effective Cardiac Protection

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Purpose: The organ care system (OCS) is being used with increasing frequency for donor heart procurement in transplantation. The OCS is particularly useful when transport and ischemic times are expected to be greater than 4 hours. Perfusion times greater than 4 hours are common but the maximum possible time on the OCS has not been determined. We report data from donor hearts that were preserved on OCS over 10 hours.

Methods: Cardiac transplants with OCS perfusion times allowing preservation (donor cross clamp to recipient clamp removal) over 10 hours were identified from the organ care system heart perfusion (OHP) registry. Donor, recipient and transplant data were obtained from the Organ Procurement and Transplantation Network (OPTN) database. Data on OCS duration, total ischemic time, PGD and recipient survival were analyzed. Both donors after brain death (DBD) and donors after cardiac death (DCD) were assessed.

Results: Twenty OCS cases were identified with perfusion times up to 15 hours. Of these 65% (13/20) were DBD and 35% (7/20) were DCD. Mean OCS perfusion time was 9.91 hours (range 5.4-15.03) for the DBD group and 9.49 hours (range 8.53-10.53) for the DCD group. Median follow up time for the DBD group was 207 days (range 24-403) and 103 days (range 74-196) in the DCD group. Thirty-day survival was 100%. One death occurred in the DCD group at 103 days of follow up. Incidence of severe LV primary graft dysfunction (PGD) was 20% (4/20) in this cohort, which compares with 10.6% in the overall OHP registry where the mean OCS perfusion time was 4.8 hrs.

Conclusion: Prolonged transport times with relatively short ischemic times are possible using the OCS. OCS perfusion up to 15 hours is feasible but more long-term data are needed to assess the impact on graft function.

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Outcomes Following Donation After Brain Death: Comparing Controlled Hypothermic Preservation and Extracorporeal Normothermic Perfusion

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Purpose: Novel donor organ transport systems have breached geographic barriers in heart transplant, allowing for more effective donor-sharing. There is limited data comparing the outcomes in donors after brain death (DBD) preserved with controlled hypothermic storage using the SherpaPak Cardiac Transport System (SCTS) and extracorporeal normothermic perfusion using the Organ Care System (OCS).

Methods: We analyzed a single center registry of heart transplants from 1/2022-8/2024. All DBD donors were transported with either SCTS or OCS. **Results:** Of 156 donors, 132 (85%) were SCTS and 24 (15%) were OCS. Recipient age was 49 ($\pm$ 16), 31% female, 30% had ischemic etiology, 14% had durable mechanical circulatory support, and 35% were transplanted as UNOS status 1-2. The OCS group was older [59 (47-66) vs 52 (35-62), $p=0.09$], had more diabetes (54% vs 30%, $p=0.03$), and more