242.1

DCD lungs increase the lung donor pool: One OPO's 11-year experience with DCD lung allocation.

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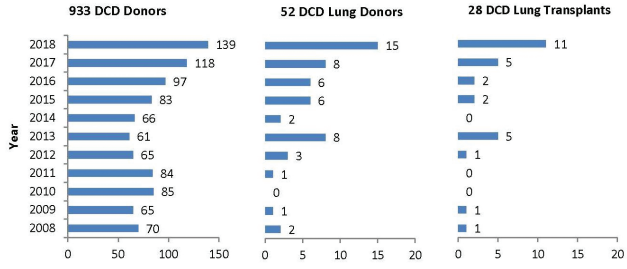
Background: Between 2008 and 2018, 2,365 U.S. patients on the UNOS lung transplant waiting list died and an additional 1,817 became too sick to transplant. One way of reducing these adverse outcomes is through the utilization of lungs from DCD donors.
Methods: This was a single OPO, multi-center study. DCD lungs were placed on EVLP to further evaluate lung quality or assess possible ischemic injury based on the surgeon's intraoperative assessment and access to EVLP at their respective center.
Results: Between 2008 and 2018, this OPO recovered 933 DCD donors including 52 (6%) DCD lung donors. The number of DCD donors from whom lungs were recovered for transplant annually increased from 2 (3%) in 2008 to 15 (11%) in 2018. The mean age of DCD donors overall was 38 years (s=0.51, r= 0.07– 69) and the mean age of DCD lung donors was 38 years (s=1.88, r=13 - 56). The mean WIT was 37 minutes (s=25, r=2 – 214) for all DCD donors and 39 minutes (s=2.68, r=11 – 114) for DCD lung donors. DCD recoveries were 84% controlled (n=803) vs. 16% uncontrolled (n=130), and DCD lung recoveries were 94% controlled (n=49) vs. 6% uncontrolled (n=3). In 12 cases, the lungs were placed on EVLP. Both lungs were declined for 25/52 (48%) DCD lung donors, 17 were declined subsequent to intraoperative evaluation and an additional 8 were declined subsequent to EVLP. Lungs were accepted for 28 (16 double, 12 single) DCD lung recipients at 7 centers (including 2 local, 2 regional and 3 national centers). DCD lung graft survival was 93% at 6 months and 88% at 1 year.
Conclusions: DCD lungs can be utilized with satisfactory transplant outcomes. OPOs should develop protocols to increase utilization of DCD lungs.



242.2

Similar 1-year organ function from controlled donation after circulatory death using normo-thermic regional perfusion and donation after brain death.

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Background: Donation after circulatory death (DCD) can increase the pool of available organs for transplantation. We hereby present the 1 year results from 18 controlled DCD (cDCD) using abdominal normo-thermic regional perfusion (NRP).
Methods: Patients aged 16 -70 years in coma with devastating brain injury, with a high probability of attaining cardiac arrest within 90 minutes after extubation, were eligible for cDCD evaluation. With the acceptance from the next of kin and their wish for organ donation, Heparin® was given at withdrawal of life-sustaining treatment (WLST) and cardiac arrest observed. After a 5 minute "no-touch" period, extracorporeal membrane oxygenation cannula were introduced by Seldinger´s technique via pre-identified femoral vessels to establish NRP. Cerebral and cardiac reperfusion was prevented by an aortic occlusion catheter.
Post transplant kidney graft function was evaluated by measured glomerular filtration rates (mGFR, iohexol plasma clearance) at eight weeks and one year comparing cDCD grafts with DBD grafts matched for recipient and donor age, immunosuppression and era. Mann-Whitney U test was used for comparison and two-tailed p-values < 0.05 were considered statistically significant.
Descriptive data from all liver transplant recipients receiving cDCD livers in Oslo are also presented.
Results: Eighteen cDCD were performed from 2014-2017. Diagnosis in the cDCD group: traumatic brain injury (n=6), cerebrovascular accident (n=5), hypoxic-anoxic brain injury (n=7). Organs from 2 donors were not used (pre-operative cancer/misplaced aortic catheter).
There was no significant difference in mGFR between the recipients of 32 cDCD and 163 DBD kidney grafts (P=0.43). The increased rate of delayed graft function in the cDCD group compared to the DBD group (22 vs 5%) did not affect the one-year graft survival (P=0.61).
Eight liver transplantations after cDCD were observed for median (range) 26 (16-40) months. There were no delayed graft function and all patients are alive with normalized liver function. No patient has ischemic type biliary lesions associated with cDCD.
At ISODP19, we also plan to present two- years data on organ function and graft survival.
Conclusions: Excellent graft- and patient outcomes in addition to content next of kin and ICU staff has encouraged us to continue this line of work. The first 32 cDCD kidney transplants have clinical graft function in line with results from our DBD transplantations. The results after liver transplantation using NRP cDCD liver are excellent. The cDCD protocol is now under assessment for national implementation.

Figure 1: Donor characteristics - cDCD versus matched DBD controls for kidney transplantations.

	cDCD (n=18)	DBD (n=163)	p- value
Age (median)	52 (18-66)	47 (16-60)	<0,005
Gender (male)	13 (72%)	103 (63%)	<0,005
BMI (kg/m^2)	26 (17-35)	25 (14-49)	<0,005
Creatinine =(mmol/l)	65 (36-99)	68 (29-469)	<0,005
ICU stay (days) median (min-max)	4 (2-19)	2 (0-30)	<0,005
Asysole after WLST (min)	12 (5-83)		
fWIT (min)	19 (13-40)		
NRP procedure (min)	11 (0,5-34)		
Total NRP perfusion time (min)	91 (54-221)		

WLST; withdrawal of life-sustaining treatment, fWIT; functional warm ischemia time, NRP; normothermic regional perfusion

Figure 2: One year renal function in kidney grafts from cDCD using NRP compared to matched DBD

Kidney	cDCD (n=32)	DBD (n=163)	P-values
Age, years, median (range)	51 (31-73)	51(24-74)	0.29
Male sex, %	72	66	<0.005
Cold ischemia time (min), median (range)	463 (174-1023)	791 (245-1367)	<0.005
mGFR week 8 post-transplant (mL/min/1.73m^2), median (range)	55 (43-96)	62 (39-88)	0.43
mGFR week 52 post-transplant (mL/min/1.73m^2), median (range)	61 (44-96)	60 (37-112)	0.57
Delayed graft function, %	22	5	<0.005
1 Year graft survival, %	96	96	0.61

mGFR; plasma iohexol clearance

242.3

Converting donation after circulatory death donors to brain dead donors.

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Background: Efforts to increase the number of organs transplanted has been successful through donation after circulatory death (DCD). In 2018 in the United States, 27% of all deceased organ donors were DCD. This has increased from 10% ten years ago concerning some that it is reducing brain dead donation. While DCD transplants result in acceptable transplant outcomes, organs from brain dead donors have superior transplant results and are the preferred donor type. Maximizing each donation includes ongoing neurological assessment and declaration of brain death when present to allow for thoracic donations and improved transplant results for abdominal organs. Careful neurological monitoring of DCD patients to determine deterioration to brain death may increase the number of brain dead donors resulting in increases in the number of organs transplanted.
Methods: From January 2017 - December 2018, 220 families agreed to organ donation following circulatory death. Each of these DCD donors received ongoing neurological exams throughout the donation process to assess for deterioration to brain death. Evidence of brain death was reported to the attending physician. Formal evaluations were completed with a subsequent declaration of brain death in alignment with hospital policies. The donation process was adjusted to facilitate additional opportunities for donation. This included the creation of a new organ match list through OPTN, full work up of cardiothoracic organs and liver biopsy if warranted.
Results: 25% (55/220) DCD donors deteriorated to brain death increasing organs transplanted per donor (OTPD) by 63% as compared to DCD donors. From these 55 donors, 197 organs were transplanted. The average OTPD was 3.58 from this subset of donors as compared to 2.19 OTPD from DCD donors in the same time period. The resulting 63% increase in organs transplanted is the equivalent of 77 additional organs.
Conclusions: DCD opportunities not only increases opportunities for families to donate after cardiac death, it allows for additional brain death opportunities that otherwise would be been lost without a strong DCD program that includes ongoing neurological assessment. It is important for donation programs to have clinical pathways for DCD that facilitate the process of moving from DCD to brain death to increase the number of organs transplanted.

References:

1. Chen, G., Wang, C., Ko, D. S. C., Qiu, J., Yuan, X., Han, M., ... Chen, L. (2017). Comparison of outcomes of kidney transplantation from donation after brain death, donation after circulatory death, and donation after brain death followed by circulatory death donors. *Clinical Transplantation, 31(11)*, [e13110]. https://doi.org/10.1111/ctr.13110

January 2017 - December 2018			
Donor Type	**Donors**	**Organs Transplanted**	**OTPD**
DCD	98	215	2.19
Brain Dead *(excluding DCD converted to BD)*	215	741	3.45
DCD converted to BD	55	197	3.58
Grand Total	**368**	**1153**	**3.13**