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Abstract Book

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OP1 - PUBLIC ATTITUDES TOWARD ORGAN DONATION IN THE US: DOES THE TYPE OF DEATH OR PROCUREMENT TECHNIQUE MATTER?

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Background
Normothermic regional perfusion (NRP) has been shown to increase both the quality and quantity of organs available for transplantation from donation after circulatory death (DCD). Because of the way in which the thoracoabdominal (TA) NRP procedure is performed, where the heart is restarted in situ after the brachiocephalic vessels have been clamped to limit perfusion to the organs being used for transplantation, there have been questions about the ethical acceptability of the procedure. Moreover, there are concerns that this procedure may impact public perceptions of organ donation and decrease willingness of the public to donate.

Methods
Cross sectional survey of a representative sample of the adult (>18 years old) US population, comparing registered organ donors to non-registrants. Willingness to donate and beliefs about death using 3 scenarios: donation after brain death (DBD), DCD with ex situ heart perfusion, DCD with TA-NRP.

Results
1062 respondents completed the survey: 529 registered organ donors, 533 non-registrants. (Figure 1) Most respondents agreed or strongly agreed that they would want to undergo an organ donation procedure that maximized the utilization of their organs (79%), the quality of their organs (81%), and that the government (58%) and doctors (68%) should try to increase the number of organs available for transplantation. In response to the scenarios, regardless of donation type, most people would choose to be donors themselves or to donate as loved one's organs using any procedure. (Figures 1 and 2) However, registered donors are more likely to want to be donors in any scenario than non-registrants.

Conclusions
This study is the first step in elucidating public opinions on NRP in the US, and the findings support its continued use in that it does not appear that the public views it differently from other organ donation procedures and there is a similar willingness to donate with NRP as with standard DCD and DBD.

Figure 1: Respondent demographics (right panel) and survey responses about willingness to donate and conceptualization of death for donation after brain death and donation after circulatory death with ex situ machine perfusion scenarios

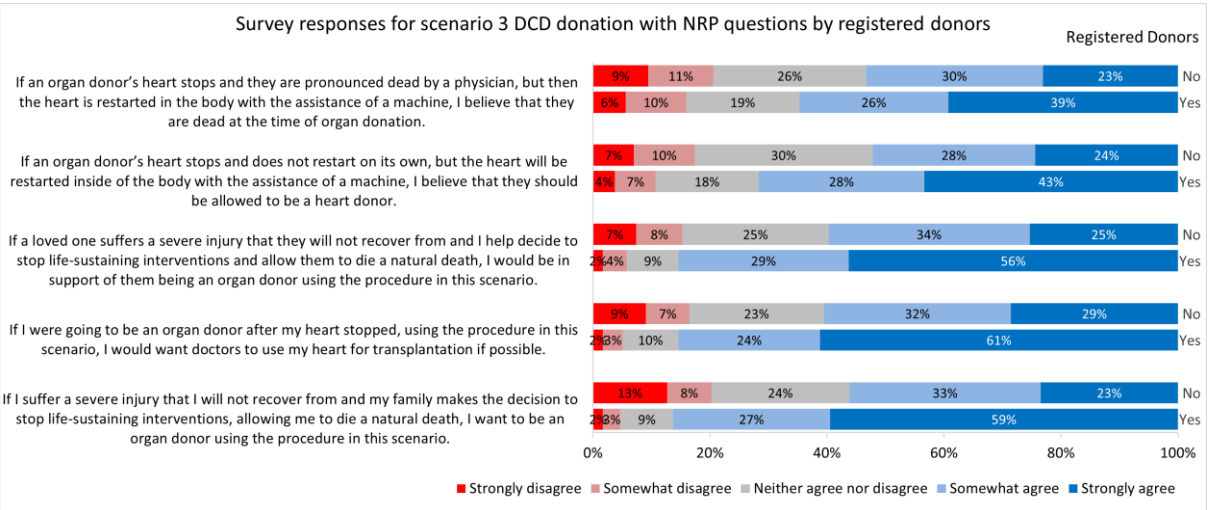
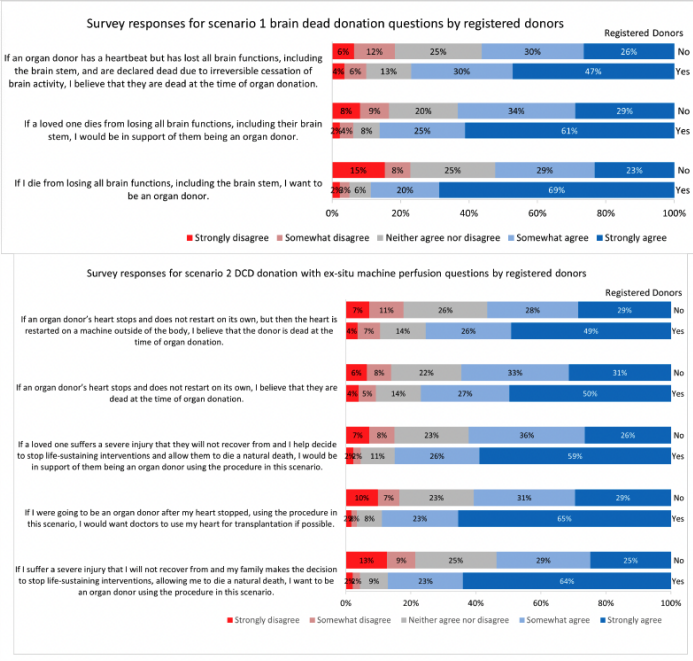


Figure 2: Survey responses about willingness to donate and conceptualization of death for donation after circulatory death with normothermic regional perfusion.



Characteristic	N = 1,062[1]
Age	
Mean (SD)	49 (18)
Median (IQR)	47 (33, 66)
Range	18, 98
Gender	
Female	735 (69%)
Male	314 (30%)
Non-binary / transgender / third gender	11 (1.0%)
Prefer to self describe	2 (0.2%)
Annual household income before taxes	
$25,000 to $49,999	233 (22%)
$50,000 to $74,999	229 (22%)
$100,000 to $149,999	182 (17%)
$75,000 to $99,999	147 (14%)
Under $25,000	137 (13%)
$150,000 to $199,999	77 (7.3%)
$200,000 to $299,999	41 (3.9%)
$300,000+	16 (1.5%)
Highest level of education completed	
Bachelor's degrees (BA, BS, AB, etc.)	282 (27%)
Some college (1–4 years, no degree)	236 (22%)
High school graduate (or equivalent)	203 (19%)
Associate's degree (including occupational or academic degrees)	150 (14%)
Master's degree (MA, MS, MENG, MSW, etc.)	132 (12%)
Professional school degree (MD, DDC, JD, etc.)	25 (2.4%)
Did not complete high school	18 (1.7%)
Doctorate degree (PhD, EdD, etc.)	16 (1.5%)

[1] n (%)

Conflicts of interest

No conflicts declared

OP2 - DTI TRAINING PROGRAMS IN DCD: A 25-YEAR EXPERIENCE

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Background
Donation and Transplantation Institute (DTI) has been promoting a better understanding of Donation after cardio-circulatory death (DCD) programs through its specialized trainings as the Transplant Procurement Management (TPM) and the University of Barcelona (UB) Master programs, in the last two decades. The aim of the study is to analyze the specialized training in DCD and its international impact.

Methods
DTI provides regularly face-to-face workshops and blended training on DCD controlled and uncontrolled either in the framework of international courses, university training, congresses and conferences or upon special request. Data show the programs, number and profile of participants and their level of satisfaction.

Results
Since 1999, 2197 participants attended the training in the advanced TPM courses in Barcelona, Spain: 1184 participants from 85 countries in 24 editions in English, and 1013 participants from 23 countries in 25 editions in Spanish. Sessions were evaluated with 4,46/5 marks in the English editions and 4,55/5 in the Spanish ones.
Since 2013, 295 participants from 48 countries were trained in the Master D&T by the TPM-University of Barcelona. Since 2017 it includes a specific online course on uncontrolled and controlled DCD. Evaluations marks were positive with 4.6/5.
TPM also organized DCD training programs in Hungary 2014 (14 participants), Jordan 2016 [15], Japan 2016 [39], Lebanon 2015 [34], Lithuania 2016 [20], in Spain with Hospital Clinic of Barcelona, CHUAC, and Hospital la Paz (2012, 2013, 2014, 2016, 2018, 2020, 2022, 2024) and UK [31], either upon request or as pre-congress workshops in: ESOT (2013, 2018), EDTCO (2014), 2nd National Congress in Lebanon (2015), MESOT (2016), National Surgery Congress in Moscow, Russia (2022).

Conclusions
DTI delivers efficient specialized training programs since 1999 on DCD with positive effects for healthcare workers on knowledge, technical skills and professional competence development with an international impact.

Conflicts of interest
No conflicts declared

OP3 - IDENTIFYING THE ETHICAL, LEGAL AND MANAGERIAL ISSUES FOR EXPANDING UDCD PROTOCOL IMPLEMENTATION WORLDWIDE

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Background
uDCD has generated both excitement and concern: potentially increase organ donation rates by making donors out of individuals who suffer OHCAs, but uDCD raises a number of ethical concerns: the truthfulness of the information provided to donor relatives, and the possibility that organ donation could compromise treatment for some patients in refractory cardiac arrest.

Methods
Analytical comparison of protocols for uDCD focused on identified issues: [1] death determination and time restrictions, [2] ethical, legal and logistic dilemmas, [3] organ preservation procedures, [4] refractory cardiac arrest definition, [5] truthfulness and transparency of information delivered to families, [6] extracorporeal technique (ECMO) for resuscitation (ECPR) and/or organ preservation (EISOR).

Results
We evidenced wide variability of recommendations regarding the definitions of and time limits associated with death declaration (see Fig 1). The practices associated with ante-mortem/post-mortem intervention, the logistic pathway, and the organ-preserving techniques used throughout process were also inconsistent. Concerns with respect to irreversibility of cardiac arrest, cannulation of the potential donor for the purpose of organ preservation without prior consent, possible re-establishment of oxygenated reperfusion of the brain after declaring death, and potential conflict of interests between resuscitation attempts and organ-preserving measures do exist.

Conclusions
ECMO poses potential conflicts of interest between lifesaving (ECPR) and organ-preserving (EISOR) strategies. We suggest to save lives, when still feasible/indicated, but providing also the option of organ donation when futile or after ECPR. Thus, clinical, ethical-legal and research communities in transplantation/resuscitation should add efforts: to improve resuscitation outcomes while expanding uDCD. Transplant policy makers should care just as much about *what* they are trying to achieve, as about *how* to get there.

Conflicts of interest
No conflicts declared

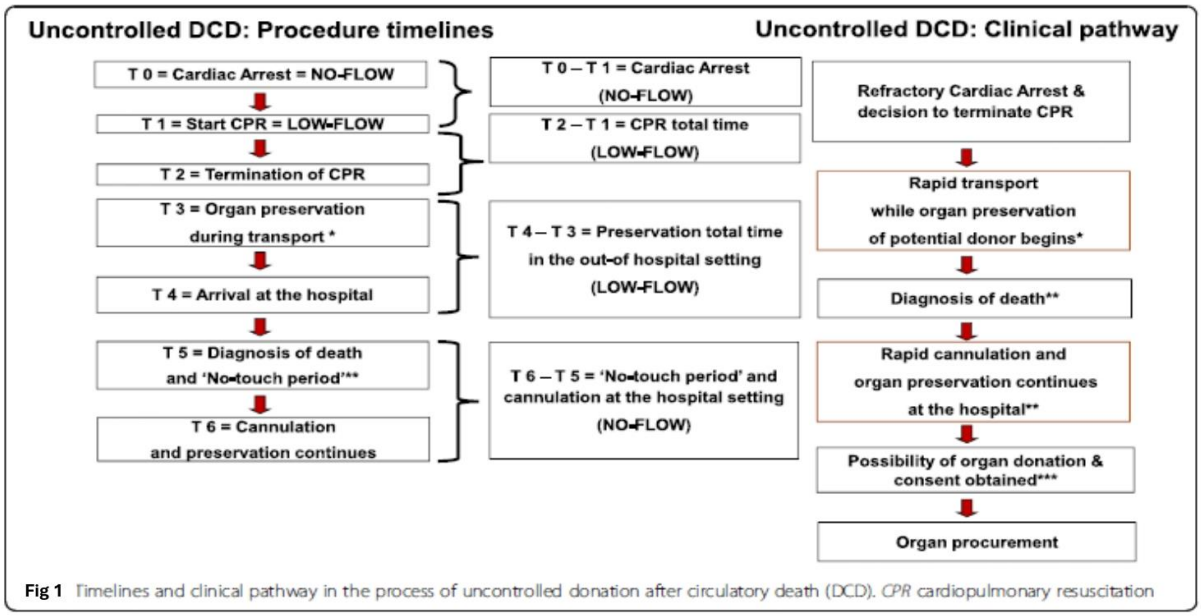

Fig 1 Timelines and clinical pathway in the process of uncontrolled donation after circulatory death (DCD). *CPR* cardiopulmonary resuscitation

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OP4 - THE INCREASING CONTRIBUTION OF ORGAN DONATION AFTER EUTHANASIA TO THE LUNG TRANSPLANTATION DONOR POOL IN THE NETHERLANDS

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Background

The number of organ donation after euthanasia (ODE) procedures in the Netherlands has grown substantially over time, yet their contribution to the lung-donor pool, the quality and utilization remains unclear. There is no clinical consensus on how these potential ODE donors should be assessed. We aimed to describe the total contribution of ODE to the lung-donor pool in the Netherlands and to describe the assessment of potential ODE lung-donors.

Methods

We collected details from all ODE procedures performed between 2012 and 2023 in the Netherlands. We assessed the number of ODE-lungs offered, rejected, accepted and transplanted, comparing characteristics of discarded and transplanted donor lungs. In addition, assessment of donors prior to the ODE procedures and reasons for decline or acceptance was investigated.

Results

1041 lung donors were offered of which 471 (45%) were DCD donors. In the DCD group 122 (26%) were ODE lung donors. Between 2012 and 2023 the ODE lung donors comprised 12% of all lung donors and 26% of all DCD lung donors in the Netherlands. The numbers of DCD-ODE have risen from 3% in 2012, to 40% in 2023 of all DCD lung donors. Total proportion of donor lungs acceptable to offer for lung transplantation was 72 of which 89% were transplanted.

Evaluation prior to donation was highly variable, with medical history and chest CT most affecting acceptance decisions.

Conclusions

We found that ODE lung donors make up an increasing part of the donor lung pool in the Netherlands, with high donor acceptance rates, despite highly variable lung evaluations. Evaluation of potential lung donors prior to ODE can be further standardized based on the current clinical experience to increase acceptance of donor lungs. Based on current experience with ODE lung donation a limited evaluation including medical history, virological evaluation and chest CT may suffice to make appropriate decisions.

Conflicts of interest

O.C. Manintveld: OM reports speaker engagement or advisory board fees from Astra Zeneca, Abbott, Boehringer Ingelheim, Daiichi Sankyo, Novartis, Novo Nordisk, Siemens and Vifor. D. Ruigrok: DR reports participation on a Data Safety Monitoring Board (DSMB “Anticoagulant medicines for Balloon Pulmonary Angioplasty (AIM-BPA)” (protocol ID NL75523.100.20)).

OP5 - ONE-YEAR OUTCOMES OF REMOTE EX-VIVO LUNG PERFUSION (EVLP) FOR DONOR OF CIRCULATORY DEATH (DCD) ORGANS IN THE REAL-WORLD SETTING

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Background

Ex vivo lung perfusion (EVLP) allows for in-depth evaluation of donors of circulatory death (DCD) for suitability, though widespread adoption is limited by lack of center expertise and logistical support for in-house EVLP.[1] Clinical trials demonstrate the feasibility of centralized, remote EVLP to expand access, but outcomes outside of studies are lacking.[2] We report a dual-center study of 1-year outcomes of DCD lungs assessed by remote EVLP via a third-party provider in a real-world setting.

Methods

This is a retrospective analysis of DCD lungs referred to a third-party facility by two institutions between 12/2020 - 3/20/2023 for assessment of viability. We compared characteristics between accepted and rejected DCD lungs by univariate analysis. We also assessed factors associated with primary graft dysfunction at 72hours (PGD72h). Categorical and continuous variables were compared using Fisher's Exact and Mann-Whitney U test, respectively (StataBE v17).

Results

Nineteen DCD lungs were referred for EVLP and six (32%) were transplanted. Donor traits and EVLP parameters during the first 2-hours are listed in **Table 1**. Parameters associated with acceptance for transplant include: greater PaO2/FiO2 prior to procurement, greater static compliance after 2 hours on EVLP, and greater oxygen transfer after 2 hours on EVLP. Of the lung recipients, 2/6 (33%) developed grade 2 or 3 PGD at 72h. Donor, recipient and EVLP parameters did not associate with PGD (**Table 2**). All six recipients survived >1-year**.**

Conclusions

DCD lungs evaluated by remote EVLP in a real-world setting are associated with a 32% utilization rate for transplant. Pre-procurement PaO2/FiO2, static compliance, and oxygen transfer all associate with increased likelihood for lung utilization. PGD and 1-year survival with remote EVLP-conditioned lungs is similar to standard donor lungs.[3] EVLP duration <3 hours may be sufficient to assess DCD lungs.

Table 1: Baseline Donor Characteristics Based on Lung Acceptance Following EVLP for DCD Lungs

Characteristic	Lungs Accepted Post-EVLP (N=6)	Lungs Rejected Post-EVLP (N=13)	P-value
Transplant Center			
A	4	8	
B	2	5	
Donor Age	28 (22 – 42)	37 (23 – 43)	0.69
Donor Female Sex	3 (50%)	6 (46%)	1.00
Donor Smoker>20py	1 (17%)	1 (8%)	1.00
Last P_aO2/F_iO2	521 (479 – 552)	380 (343 – 432)	**<0.01**
Cold Ischemic Time 1 (minutes)	329 (285 – 388)	339 (297 – 383)	0.93
EVLP Duration (min)	220 (216 – 222)	223 (160 – 245)	1.00
EVLP Parameters of Donor Lungs			
Mean Pulmonary Artery Pressure – 1h	6.5 (5 – 7)	7 (5 – 7)	0.71
Mean Pulmonary Artery Pressure – 2h	7 (5 – 9)	7 (6 – 8)	0.96
Pulmonary Vascular Resistance – 1h	102 (47 – 169)	87 (49 – 116)	0.97
Pulmonary Vascular Resistance – 2h	129 (35 – 229)	98 (87 – 120)	0.93
Perfusate Loss (mL)-1h	113 (75 – 150)	150 (100 – 250)	0.29
Peak Inspiratory Pressure (cm H2O)- 1h	14 (13 – 16)	16 (15 – 18)	0.23
Peak Inspiratory Pressure (cm H2O)- 2h	14.5 (12 – 16)	16 (14 – 18)	0.12
Mean Airway Pressure (cm H2O) -1h	7.5 (7 – 8)	8 (8 – 9)	0.33
Mean Airway Pressure (cm H2O) -2h	8 (7 – 8)	8 (8 – 9)	0.19
Static Compliance 1	102 (65 – 125)	75 (66 – 101)	0.25
Static Compliance 2	132 (109 – 158)	95 (68 – 104)	**0.04**
Left Atrial Glucose – 1h	8.5 (7.7 – 8.8)	6.8 (6.4 – 8.2)	**0.02**
Left Atrial Glucose – 2h	8.6 (7.9 – 9.2)	7.8 (5.3 – 8.1)	0.05
Left Atrial Lactate – 1h	3.2 (2.5 – 4.6)	4.9 (3.2 – 6.0)	0.11
Left Atrial Lactate – 2h	3.8 (3.2 – 5.5)	6.0 (4.3 – 8.2)	0.05
Delta PO_2 -1h	409 (377 – 483)	329 (300 – 388)	**0.04**
Delta PO_2 -2 h	471 (429 – 489)	349 (289 – 392)	**<0.01**
Sequence Number	16 (1 – 45)	9 (3 – 35)	1.00

Table 2: Donor and Recipient Predictors of PGD3 at T72h

Characteristic	No PGD3 at T72h (N=4)	PGD2-3 at T72h (N=2)	P-value
Recipient Characteristics			
Age (years)	66 (45 – 72)	55 (45 – 64)	0.48
Interstitial Lung Disease	3 (75%)	2 (100%)	1.00
Lung Allocation Score	41.1 (36.2 – 47.1)	38.9 (35.9 – 41.8)	0.64
Donor Characteristics			
Age (years)	28 (23 – 38)	37 (18 – 55)	1.00
Smoking History >20 py	0 (0 – 0.5)	0 (0 – 0)	0.35
Cold Ischemic Time 2 (minutes)	260 (198 – 289)	255 (190 – 320)	0.64
EVLP Parameters			
Static compliance – 2h	132 (110 – 225)	99 (40 – 158)	0.64
Peak Inspiratory Pressure – 2h	14 (12 – 16)	15 (14 – 16)	0.47
Delta PO2 – 2h	455 (440 – 470)	349 (289 – 392)	0.32
Glucose- 2h	9.0 (8.3 – 9.6)	8.1 (7.7 – 8.5)	0.16
Lactate - 2h	3.6 (2.7 – 4.8)	4.6 (3.6 – 5.7)	0.35

Conflicts of interest
No conflicts declared

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OP6 - OUTCOMES OF HEART TRANSPLANTS FROM DONATION AFTER CIRCULATORY DEATH DONORS WITH THORACO-ABDOMINAL NRP AND STATIS COLD STORAGE: THE SPANISH EXPERIENCE

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Background
Heart transplantation from donation after the circulatory determination of death (DCD) donors was launched in Spain in 2020. We report the outcomes of this nationwide experience.

Methods
This is a retrospective, multicenter, study of all DCD heart transplants (HTs) performed in recipients aged ≥ 18 years from January 2020 to December 2023. All DCD procedures were performed with thoraco-abdominal NRP followed by static cold storage. The comparison group consisted of HTs from donation after brain death (DBD) donors performed in the same centers.

Results
A total 98 DCD and 350 DBD HTs were performed in 14 centers. The contribution of DCD to the HT activity of participating centers evolved from 14% in 2020 to 24% in 2023.Table 1 displays characteristics of donors, recipients and HT procedures. Donors differed in terms of sex and cause of death. DCD recipients were less frequently in an emergency status and under mechanical circulatory support prior to the HT. Cold ischemic time was significantly shorter in the DCD cohort. No differences were observed between the DCD and the DBD group in terms of primary graft failure (18.6% vs 23.7%; p=0.28), severe primary graft failure (13.4% vs 14.9%; p=0.72), average number of rejection episodes (0.49 (SD:0.76) vs 0.51 (SD:0.84); p=0.90) or median ICU length of stay in days (7.0 [5.0-13.0] vs 7.0 [5.0-14.0]; p=0.50). Patient survival was similar between the groups(Figure 1). The duration of ventilatory support after the HT was significantly shorter in the DCD group (median in hours =12.0 [6.0-24.0] vs 24 [12.0-96.0]; p<0.001). In multivariate analysis, DCD did not impact post-transplant mortality in recipients of a HT [HR 1.07; 95%IQR 0.52-2.21; p=0.86].

Conclusions
DCD HTs using TA-NRP with cold static storage does not result in inferior outcomes compared with DBD heart transplantation.

Table 1. Donor and recipient characteristics and HT procedures.

	Circulatory death (n = 98)	Brain death (n = 350)	P value
Donor			
Age (years)	44.0 [34.0-49.0]	46.0 [35.0-53.0]	0.09
Sex (female)	21 (21.4)	112 (32.0)	0.03
Present smoking	12 (12.5)	24 (7.2)	0.10
Alcohol ≥ moderate	11 (11.2)	48 (13.7)	0.52
Hypertension	14 (14.9)	54 (16.3)	0.75
Diabetes mellitus	2 (2.2)	13 (3.9)	0.44
Cause of death			<0.001
Craneal trauma	16 (16.3)	54 (15.4)	
Traffic accident	6 (6.1)	25 (7.1)	
Cerebrovascular accident	11 (11.2)	41 (11.7)	
Brain hemorrhage	18 (18.4)	139 (39.7)	
Cerebral anoxia	7 (7.1)	31 (8.9)	
Others	40 (40.8)	60 (17.4)	
Recipient			
Age (years)	54.5 [47.0-61.0]	56.0 [47.0-62.0]	0.39
Sex (female)	23 (23.5)	90 (25.7)	0.65
Primary heart disease			0.27
Dilated	34 (35.7)	120 (34.3)	
Ischemic	36 (36.7)	118 (33.7)	
Valvular	0 (0.0)	17 (4.9)	
Hypertrophic	11 (11.2)	23 (6.6)	
Congenital	2 (2.0)	13 (3.7)	
Retransplant	2 (2.0)	9 (2.6)	
Restrictive	5 (5.1)	30 (8.6)	
Myocarditis	3 (3.1)	9 (2.6)	
Other	5 (5.1)	11 (3.1)	
Hypertension	336 (36.7)	111 (31.8)	0.36
Mechanical ventilation	3 (3.1)	26 (7.4)	0.12
Circulatory support prior to HTx			<0.001
No	84 (84.6)	207 (59.1)	
IABP	1 (1.0)	2 (0.6)	
ECMO	8 (8.3)	31 (8.9)	
Ventricular assist device	4 (4.1)	110 (31.4)	
High priority (urgent)	10 (10.2)	148 (42.3)	<0.001
Surgical procedure			
Cold ischemic time (min.)	99.5 [74.0-157.0]	191.5 [130.0-236.0]	<0.0001
Functional warm ischemic time (min)	13.0 [11.0-17.0]	-	
Total ischemic time (min)	113.0 [87.0-167.0]	191.5 [130.0-236-0]	<0.0001
Surgical technique (bicaval)	93 (94.9)	273 (78.5)	<0.0001

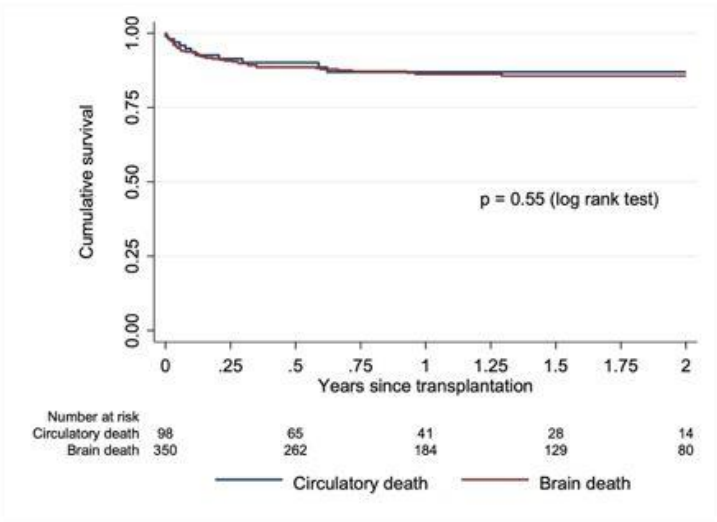

Figure 1. Patient survival of DCD HT vs DBD HT recipients (Kaplan Meier).

Conflicts of interest
No conflicts declared

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OP7 - PROLONGED EX VIVO KIDNEY PRESERVATION USING SUBNORMOTHERMIC ACELLULAR MACHINE PERFUSION

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Background

In kidney transplantation normothermic machine perfusion can be used to reduce exposure to cold ischemic injury. This may improve outcomes and allow the technology to extend preservation times and repair marginal kidneys. Subnormothermic acellular perfusion (SNAP) is a new approach proposed to achieve a balance between the cytoprotective effects of reduced cellular metabolism under hypothermia while having sufficient metabolism to allow potential organ repair. Kidneys can be perfused without red blood cells to simplify the procedure, reduce cost and prevent potential harmful effects of hemolysis. The aim of this study was to assess the effects of different durations of SNAP in human kidneys.

Methods

Twelve kidneys declined for transplantation were perfused with a human serum albumin-based solution at 32°C for 6,12 or 24h (N=4/group), followed by reperfusion at 37°C for 4h using a blood-based perfusate.

Results

Mean donor age was 70±6y, 63±11y and 61±15y in the 6h,12h and 24h groups, respectively(P=0.530). There was no significant difference in the cold ischemic time prior to SNAP (6h 892±415, 12h 1203±327, 24h 1042±368 min, P=0.523). Throughout SNAP, perfusate flow, mean arterial pressure, acid-base balance and oxygen consumption remained stable in all kidneys. Kidneys perfused for 12h had a significantly higher flow (P=0.0098) compared to the 6h and 24h group. During reperfusion, kidneys in the 24h group had a numerically lower urine output (24h 27±33, 12h 83±77, 6h 198 ±176ml/h; P=0.074), lower creatinine fall (24h 38±11%, 12h 61±23%, 6h 59±22%; P=0.298) and higher fractional sodium excretion (24h 98±12%, 12h 47±22%, 6h 50±37%). Levels of kidney injury markers NGAL and L-FABP were similar between the 3 groups although increased during reperfusion in the 24h kidneys while decreased in the 6h and 12h kidneys. Histological evaluation showed a preserved renal morphology in all kidneys. Kidneys perfused for 24h showed a mild increase in tubular and endothelial damage compared to 6h and 12h**.**

Conclusions

We demonstrate that human kidneys can be successfully perfused with SNAP for up to 12h to extend the preservation time. There was evidence of additional ischemic injury in the 24h kidneys which warrants further investigation.

Conflicts of interest

No conflicts declared

OP8 - THE IMPACT OF TIME TO DEATH IN DONORS AFTER CIRCULATORY DEATH ON RECIPIENT OUTCOME IN SIMULTANEOUS PANCREAS-KIDNEY TRANSPLANTATION

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Background

Currently there is little evidence supporting procurement team stand down times for donor time to death (TTD), with teams waiting at least 3 hours from withdrawal of treatment, and up to 30-minutes after the onset of functional warm ischaemia for asystole for pancreas grafts. We examined what impact TTD had on pancreas graft outcomes following DCD transplantation.

Methods

Data were extracted from the UK transplant registry maintained by NHS Blood and Transplant from 2014 to 2022. TTD was from withdrawal of life-sustaining treatment to donor asystole, functional warm ischaemia time (FWIT) was from donor systolic BP <50mmHg and/or SaO2 <70% to aortic perfusion, and asystolic time was from asystole to aortic perfusion. Potential predictors were fitted in separate Cox proportional hazards models for TTD and FWIT to avoid collinearity. Adjusted restricted cubic spline models were generated to further delineate the relationship between TTD and outcome, and the Kaplan-Meier method was used to estimate graft survival.

Results

375 DCD simultaneous kidney-pancreas transplant recipients were included. Median TTD was 13-minutes (IQR 11 to 15-minutes), median FWIT was 21-minutes (IQR 17.1 to 24.9-minutes), median asystolic time was 13-minutes (IQR 11 to 15-minutes). Increasing TTD was not associated with graft survival (aHR 1.09, 95% CI 0.59-2.00, P=0.778), however increasing FWIT was significantly associated with poorer graft survival (aHR 2.21, 95% CI 1.06-4.61, P=0.035). Increasing asystolic time was significantly associated with worse graft survival in the TTD model (aHR 3.08, 95% CI 1.38-6.68, P=0.006). Restricted cubic spline modelling confirmed that there was no relationship between TTD and graft survival, however a non-linear relationship was demonstrated between asystolic time and graft survival (figure 1). Graft survival at 5-years was significantly higher in recipients of grafts with an asystolic time ≤13-minutes compared to >13-minutes (89.5% vs. 74%, P=0.002, figure 2).

Conclusions

Increasing asystolic time and FWIT were significant predictors of graft loss, whereas TTD was not. Procurement teams should attempt to minimise asystolic time to reduce ischaemic injury to the pancreas graft. Further prospective investigation of agonal times and their impact on graft outcome is warranted.

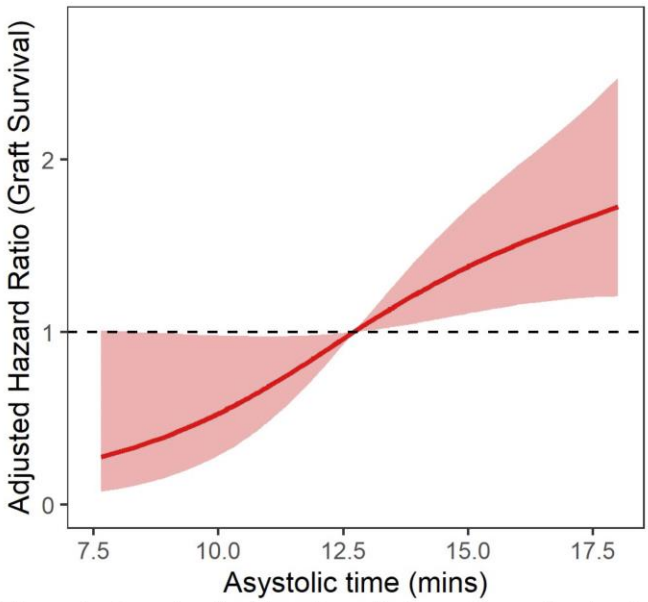

Figure 1 – Restricted cubic spline of adjusted hazard ratio of graft survival as a function of asystolic time

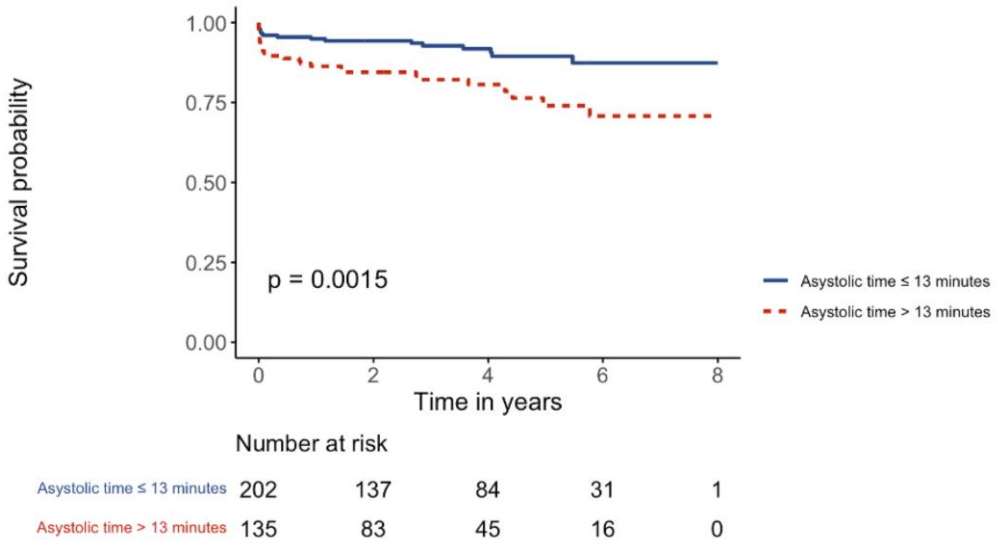

Figure 2 - Kaplan-Meier curve of graft survival, comparing asystolic time ≤13-minutes with asystolic time >13-minutes

Conflicts of interest
No conflicts declared

OP9 - KIDNEY TRANSPLANT OUTCOME FOLLOWING DONATION AFTER EUTHANASIA; A DUTCH NATIONAL COHORT STUDY

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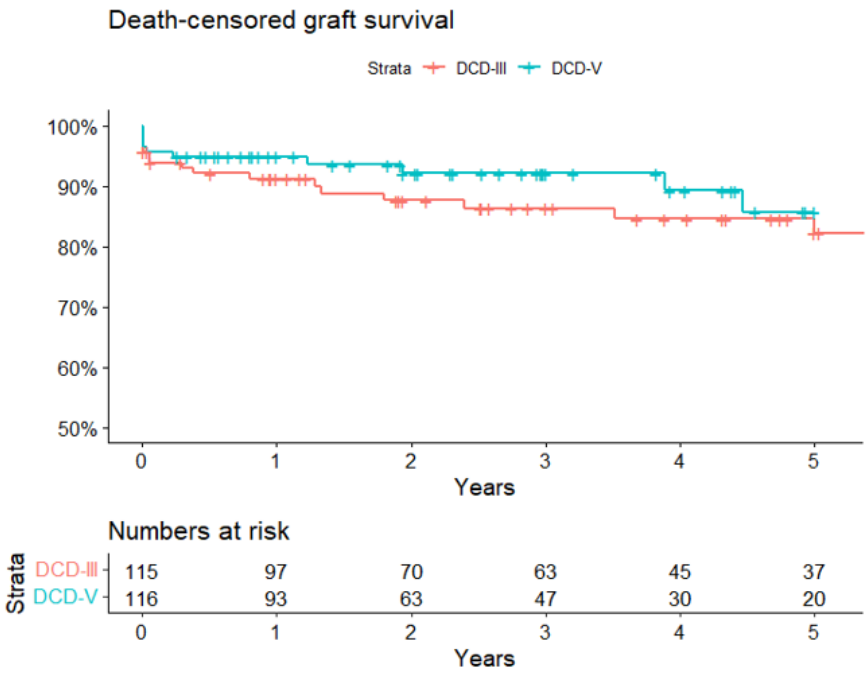
Background
For patients terminally suffering from neurodegenerative or psychiatric diseases, it is possible to donate their organs after euthanasia (DCD-V). The procedure is legally and ethically complicated, and only permitted in very few countries around the world. So far, the outcomes from DCD-V kidney grafts have not been investigated in a large population. To ascertain if DCD-V is a valuable option to expand the donor pool, it is important to determine the outcomes of these organs.

Methods
The database from the Dutch Transplantation Foundation was accessed from the start of the DCD-V program (September 2012) till June 2023. Both the short- and long-term outcomes from kidney grafts donated after standard donation after circulatory death (DCD-III) and DCD-V were compared. A propensity score matching was performed to correct for possible confounders.

Results
A total of 145 DCD-V kidneys were transplanted and compared to 2144 DCD-III kidney transplants. DCD-V was increasingly performed over the past years. Time from withdrawal of life support/administration of euthanasic drugs until cardiac arrest was significantly shorter in the DCD-V group compared to the DCD-III group (14.5 ± 5.7 versus 24 ± 19 min $p<0.001$). Delayed graft function (DGF) occurred significantly less in the DCD-V group compared to the DCD-III group (23.2% versus 51.4%, $p<0.001$). Serum creatinine in the DCD-V group was lower at 1-, and 3 years post-transplantation, although this did not reach statistical significance. Five year death-censored graft survival was 86% in the DCD-V-group, compared with 82% in the DCD-III group ($p=0.32$, Figure) and five-year patient survival was 71% in both groups ($p=0.39$).

Conclusions
Kidney grafts donated after euthanasia yield favorable short-term outcomes and comparable long-term outcomes to DCD kidney grafts. DCD-V is a safe and valuable way to increase the kidney donor pool.

Conflicts of interest
No conflicts declared


Death-censored graft survival
Strata DCD-III DCD-V
100%
90%
80%
70%
60%
50%
0 1 2 3 4 5
Years
Numbers at risk
Strata
DCD-III 115 97 70 63 45 37
DCD-V 116 93 63 47 30 20
0 1 2 3 4 5
Years

OP10 - ATTITUDE TOWARDS END-OF-LIFE PRACTICES AND DCD AMONG CRITICAL CARE PROFESSIONALS (CCPS) IN A COUNTRY WITHOUT A DCD PROGRAM: RESULTS FORM THE HELLENIC ORGAN DONATION IN INTENSIVE CARE UNIT SURVEY (HODICUS)

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Background

In relation to comparable European countries, Greece is lagging far behind in the field of organ donation after brain death, has not developed a DCD program and end-of-life practices are not formally applied. Education and attitude of critical care professionals (CCPs) regarding organ donation procedures is considered fundamental. The purpose of this study is to investigate the training level and the attitude of CCPs concerning the current national practices of deceased organ donation as long as the future perspectives of implementing end-of-life practices and donation aftercirculatory death (DCD).

Methods

CCPs from 14 Intensive Care Units in Greek hospitals were asked to answer voluntarily and anonymously an electronic survey containing qualitative, Likertscaled, closed-ended questions after participating in a lecture concerning present and future practices of deceased organ donation

Results

A total of 232 participants completed the survey (102 physicians and 130 nurses).Only half of the CCPs have received formal education concerning brain death and/or organ donation procedures. CCPs report as being very familiar in diagnosing brain death only in 45.7% of cases. Although the majority of CCPs acknowledge the futility in continuation of life support treatment (LST) in certain ICU patients, they feel less comfortable about withdrawal of LST and are reluctant to perform it mainly due to lack of legal framework. Perception of the meaning of limitation of LST (LLST) is not unanimous among CCPs,27.2% define it as a DNR order and almost 50% of CCPs believe that it is equal at some level to euthanasia. DCD seems to be accepted by CCPs but only half of them strongly agree with this procedure Similarly, 62.8% of physicians and 56.1% nurses strongly agree that organ donation should be considered as end-of-life practice.

Conclusions

This is the first study to investigate the attitude of CCPs in Greece towards DCD and organ donation as end-of-life practice. CCPs report the need of formation of legal framework and protocols concerning end-of-life practices and consider it to be important to perform LLST. LLST is perceived differently among CCPs.Although DCD is not applied in Greece, many of the CCPs agree with its implementation bur fewer support that organ donation should be considered inend-of-life procedures.

Conflicts of interest
No conflicts declared

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OP11 - OUTCOMES OF DONATION AFTER CIRCULATORY DEATH LIVERS TREATED WITH THROMBOLYSIS ON EX SITU NORMOTHERMIC MACHINE PERFUSION

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Background

Ex-situ normothermic machine perfusion (NMP) of donation after circulatory death (DCD) livers has superior outcomes compared to standard cold stored DCD liver transplants. However, they still suffer from biliary complications, especially non anastomotic biliary stricture (NAS), which has been attributed to peribiliary vascular fibrin microthrombi. In the present study, we discuss our experience of DCD liver transplants treated with thrombolysis during NMP (tNMP) as compared outcomes with NRP and NMP without thrombolysis (sNMP).

Methods

Retrospective analysis of DCD liver transplants in our institute from January 2019 till April 2023. Tissue plasminogen activator (alteplase) and Fresh frozen plasma was added to the perfusate for 1 hour in tNMP. The outcomes of tNMP were compared with sNMP and NRP. Livers undergoing sequential NRP and NMP were excluded from the analysis. All transplants had minimum 1-year follow up.

Results

There were 155 NRP-DCD donors and 152 NMP-DCD liver perfusions during the study duration leading to 183 (72% usage) liver transplants. After excluding 34 liver transplants with sequential NRP and NMP, the analysis included 82 NRP, 47 sNMP and 20 tNMP.

Cold ischaemia time and warm ischaemia time were significantly longer in the NRP group, median 457 minutes (IQR 389 – 540) and 31 minutes (IQR 27 – 39), respectively. Both sNMP and tNMP were suitable for mitigating ischaemia reperfusion injury with low peak alanine transaminase levels in first seven days and lower Model for Early Allograft Function Score (Table 1).

NAS were more common in the sNMP livers compared to the NRP and tNMP groups (Figure 1). Similarly, one liver grafts was lost to NAS in the sNMP group compared to none in the other two groups.

Conclusions

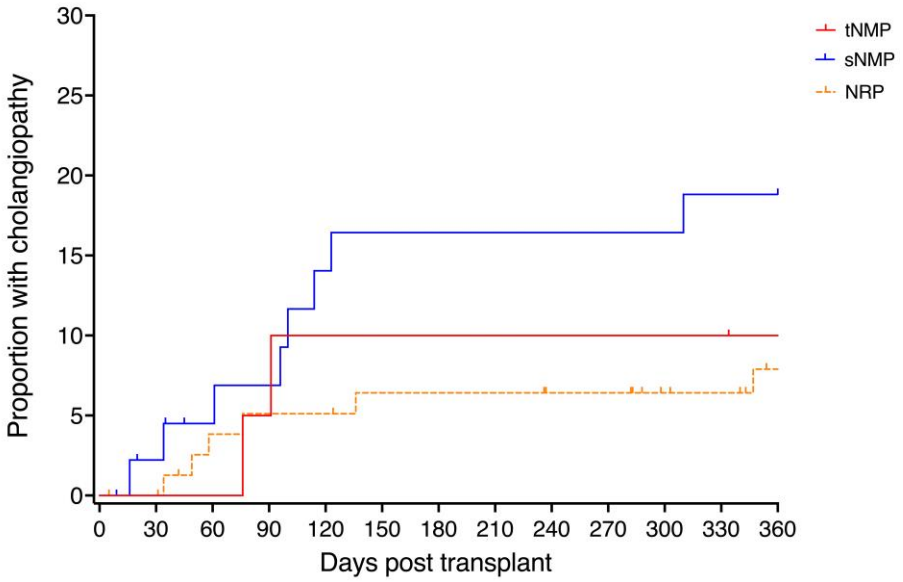
This experience suggests that thrombolysis of livers on NMP is safe with comparable outcomes to NRP liver transplant.

Parameters	NRP (n=82)	sNMP (n=47)	tNMP (n=20)	p-value
DRI (Feng et al, AJT2006)	2.4 (2.1 – 2.6)	2.2 (2.0 – 2.7)	2.8 (2.2 – 3.0)	0.023
Warm ischaemia time, min*	31 (27 – 39)	26 (22 – 29)	28 (25 – 40)	<0.001
Cold ischaemia time, min	457 (389 – 540)	404 (347 – 456)	405 (375 - 440)	0.003
NMP duration, hrs	-	536 (454 – 662)	627 (491 – 734)	0.226
MELD-Na score	18 (14 – 21)	16 (13 – 21)	17 (15 – 19)	0.641
Peak ALT in first week	542 (305 – 879)	360 (201 – 530)	414 (188 – 886)	0.002
MEAF score	4.5 (3.0 – 6.3)	3.2 (2.0 – 4.3)	3.6 (2.1 – 5.6)	0.007
AS requiring intervention (%)	9 (11)	9 (19)	2 (10)	0.377
NAS (%)	7 (9)	9 (19)	2 (10)	0.196
Overall graft loss (%)	1 (1)	4 (9)	0	0.058

Values are medians (interquartile range) or number (percentage)

Donor risk index (DRI); Alanine transaminase (ALT); Model for early allograft function (MEAF); Anastomotic stricture (AS); Non anastomotic biliary stricture (NAS) excluding hepatic artery thrombosis.

*Warm ischaemia time: Withdrawal of treatment in donor to start of NRP or cold perfusion



Conflicts of interest
No conflicts declared

References
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Cambridge National Institute for Health Research (NIHR) Biomedical Research Centre, Cambridge Biomedical Campus, Cambridge, and the NIHR Blood and Transplant Research Unit in Organ Donation and Transplantation, Cambridge Biomedical Campus, Cambridge, United Kingdom.

OP12 - LOW INCIDENCE OF EARLY ALLOGRAFT FAILURE AND SUSTAINABLE INCIDENCE OF ISCHEMIC CHOLANGIOPATHY IN DCDS AND DBDS WITH AND WITHOUT USE OF MACHINE PERFUSION DEVICES. RESULTS AT 5 YEARS OF THE RETROSPECTIVE SEGMENT OF THE IMPROVEMENT STUDY

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Background

Donors from Circulatory Death (DCD) are currently utilized in several liver-transplant Centers worldwide, with or without the adoption of Machine Perfusion (MP) devices and Normothermic Regional Perfusion (NRP).

Previous studies reported a high incidence of early allograft failure (EAF, at 90 days) and ischemic cholangiopathy (IC, at 365 days).

An international *Steering Committee designed the IMPROVEMENT study to investigate the global prognosis of liver transplanted patients (LTx) in the field of EAF and IC.

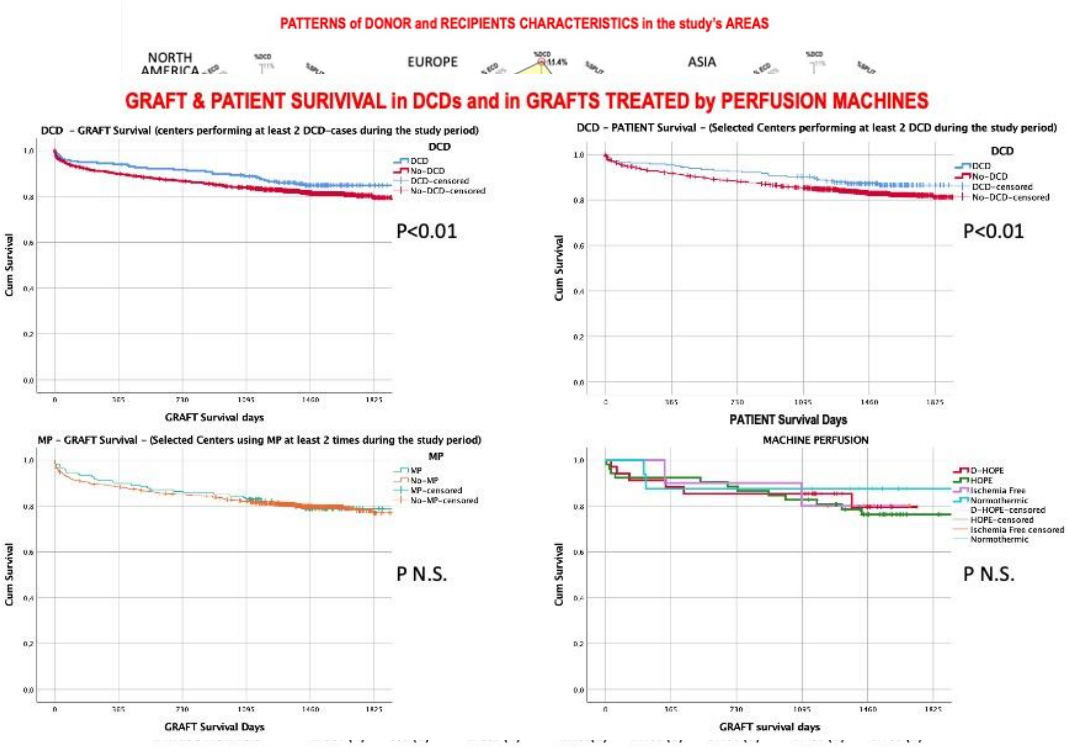
Methods

The cases enrolled in the retrospective segment of the study were investigated. The inclusion criterion was the availability of the ISCHEMIC CHOLANGIOPATHY status at 1 year. There were 2292 LTx from

Donors after Brain Death (DBD), 79 from type III DCD, and 271 from Living Donors. The minimum follow-up was 54 months.
The cases were stratified in 6 geographic areas (Italy, the primary study population; Europe except Italy, Asia, Oceania, North and South America) according to the various strategies to address the organ shortage.

Results
Overall, the incidence of IC was 7.6% in DCDs with MP, 8.8% in DBDs with MP, 9.5% in DBDs without MP, and 8.5% in Living Donors. The rates according to the Croome stratification (ref.) of IC in the LTx subgroups are reported in the table.
DCD with MP implementation resulted in the strongest strategies in Europe, while MP was also effective in Italy. NRP was systematically used in Italy for DCDs. Other approaches were adopted in Asia and South America. In North America, DCD implementation aligned with the weighted average (red-dotted circle).
The incidence of EAF was low in DCD and MP-treated cases. The retransplant rate due to IC was negligible since the stent treatment worked in many cases.

Conclusions
Results from the retrospective segment of the IMPROVEMENT study show that the incidence of EAF and IC are sustainable. Validation of these results for the prospective segment of the study is in progress.
Incidences of Ischemic Cholangiopathy in DCDs and DBDs with MP compared to DBDs without MP and Living Donor grafts.



Multi-focal Progressive	2.9% (1)	0% (0)	2.6% (1)	3.6% (3)	0.0% (0)	0.0% (0)	1.5% (33)	0.4% (1)
Minor Form	2.9% (1)	50%(2)	7.9% (3)	0.0% (0)	8.3% (1)	0.0% (0)	5.2% (114)	5.9% (16)
TOTAL	8.8 % (3)	50% (2)	13.1% (5)	7.2% (6)	24.9% (3)	0.0% (0)	8.0% (208)	8.5% (23]

Survivals in DCDs and MP grafts.

Conflicts of interest
No conflicts declared

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OP13 - NO RECIPIENT SELECTION IN CONTROLLED DONATION AFTER CARDIAC DEATH LIVER TRANSPLANTATION WITH VERY PROLONGED WARM ISCHEMIA: OUTCOMES OF LOW-RISK VERSUS HIGH-RISK RECIPIENTS

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Background
In Italy, livers from controlled donation after cardiac death (cDCD) are considered high-risk grafts by most centers, due to the very long warm ischemic time (WIT) resulting from a stand-off period of 20 min. Therefore, it is common policy to transplant these livers into low-risk recipients. However, there is growing evidence that adequately managed cDCD livers may perform as well as donation after brain death livers. In light of this, at our institution, no recipient selection is routinely adopted. We analyzed our experience with cDCD liver transplantation (LT), aiming to verify if LT outcome was affected by the recipient risk profile.

Methods
We compared the outcomes of high-risk [MELD Na ≥21 points and/or retransplantation (reLT)] and low-risk recipients of cDCD livers procured with normothermic regional perfusion and subsequent cold storage. Continuous variables are presented as median (interquartile range).

Results
35 cDCD LT, performed in 22 (63%) low-risk and 13 (37%) high-risk recipients (figure 1) from 2017 to October 2023, were examined. The in-hospital comprehensive complication index (CCI) was 23.6 (8.7-41.8) points in the low-risk cohort vs. 26.2 (20.9-38.2) points in the high-risk cohort (P=0.79). The CCI at 12 months was 34.1 (6.5-41.1) points in the low-risk cohort vs. 28.5 (22.2-39.9) points in the high-risk cohort (P=0.8). No cases of primary nonfunction or ischemic cholangiopathy were observed. Patient survival and non-censored for death graft survival were similar in the two groups (figure 2). At univariate Cox regression analysis, a high-risk recipient profile was not associated with an increased risk of graft loss (reLT and/or death) (RC=0.25, RR=1.29, P=0.77).

Conclusions
LT benefit is affected by recipient disease severity and organ quality. We reported similar, excellent short- and long-term outcomes after cDCD LT in high-risk and low-risk recipients. Our experience suggests that high-risk and low-risk recipients may equally benefit from LT with adequately managed cDCD grafts.

Variables	Overall (N=35)	Low-risk (N=22)	High-risk (N=13)	*P* value
MELD Na (points)	16 (10-22)	13 (9-16)	23 (21-26)	<0.001
ReLT	2/35 (6%)	0/22 (0%)	2/13 (15%)	0.06
Male sex	24/35 (69%)	16/22 (73%)	8/13 (62%)	0.49
Age (years)	55 (48-61)	53 (42-59)	57 (51-63)	0.06
Body mass index	25.47 (23.39-28.41)	24.98 (23.09-28.32)	25.78 (23,67-27,43)	0.76
HCC	14/35 (40%)	10/22 (45%)	4/13 (31%)	0.39
Liver disease				0.36
Alcoholic	11/35 (31.43%)	4/22 (18.18%)	7/13 (53.85%)	
HCV-related	8/35 (22.86%)	6/22 (27.27%)	2/13 (15.38%)	
HBV-related	3/35 (8.57%)	2/22 (9.09%)	1/13 (7.69%)	
Autoimmune	2/35 (5.71%)	1/22 (4,55%)	1/13 (7.69%)	
Metabolic associated fatty	2/35 (5.71%)	2/22 (9.09%)	0/13 (0%)	
Primary sclerosing cholangitis	2/35 (5.71%)	2/22 (9.09%)	0/13 (0%)	
Other	7/35 (20%)	5/22 (22.73%)	2/13 (15.38%)	
Functional WIT (min)	41 (35-50)	45 (38-52)	36 (35-50)	0.29
Asystolic WIT (min)	25 (23-30)	28 (24-30)	24 (23-26)	0.41
Cold ischemic time (min)	309 (245-350)	317 (260-356)	305 (229-314)	0.14
LT duration (min)	368 (303-414)	397 (347-417)	330 (283-368)	0.03
Intraoperative red blood cells (units)	3 (1-5)	2 (0-3)	4 (3-6)	0.17

Figure 1 – Recipients' characteristics, DCD-related data, and transplant-related data.

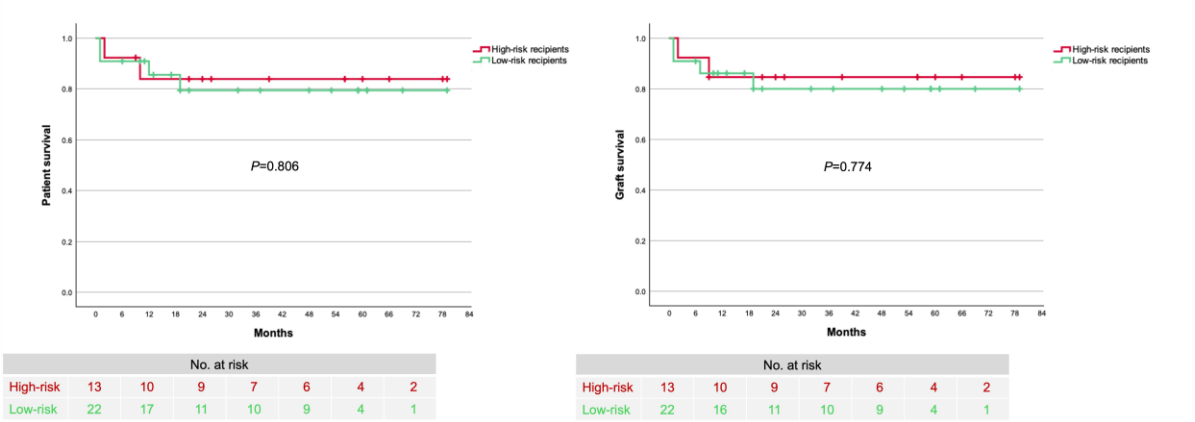

Figure 2 – Patient and graft survival.

Conflicts of interest
No conflicts declared

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OP14 - LIVER TRANSPLANTATION FROM CONTROLLED DCD DONORS IN NORMOTHERMIC REGIONAL PERFUSION WITH AND WITHOUT END-ISCHEMIC EX SITU MACHINE PERFUSION: A SINGLE CENTER CASE-CONTROL STUDY IN THE SETTING OF 20 MINUTES NO TOUCH PERIOD

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Background

According to Italian law, 20 minutes of continuous, flat-line electrocardiogram are required for death declaration, which significantly increases the risks of donation after circulatory death (DCD) for liver transplant (LT). To counterbalance the detrimental effects of prolonged warm ischemia time, normothermic regional (NRP) and end-ischemic machine perfusion (MP) are combined; the encouraging results of the first series have promoted a wider use of this protocol. However, data on the outcomes of controlled DCD (cDCD) donation without end-ischemic MP are lacking.

Methods

We reported our preliminary experience of cDCD LT with the use of NRP followed by static cold storage (SCS) alone. The results were compared with a control group of cDCD LT with the use of dual hypothermic machine perfusion (D-HOPE MP) after NRP.

Results

The final analysis therefore included a total of 19 cDCD performed between november 2021 and february 2024 (10 in the study group without MP and 9 in the control group with MP).

The two populations were comparable in terms of donor (age 72 vs 69 p=0,44, BMI 24,8 vs 26,5, p=0,09) and recipient (age 55 vs 58 p=0,25, BMI 23,9 vs 25, p=0,14) characteristics, although the MELD-Na score tended to be higher in the control group (MELD-Na 23 vs 17 p=0,3). Functional warm ischemia times were similar (38 vs 39 minutes, p=0,34) but the NRP duration and SCS time were longer in the group without the MP use (209 vs 169 minutes p<0,05, 209 vs 140 minutes, p<0,05) while the total preservation time was shorter (223 vs 277 minutes, p<0,05). No cases of primary non-function occurred in both groups. In terms of comorbidities, 2 cases of post-operative type II acute kidney injury occurred in both groups. The overall biliary stricture rate was 22% in the control group vs 11% (p=0,9) in the study group with a median follow-up of 15 months (3-27) vs 8 months (3-11).

Conclusions

Our initial experience showed that cDCD LT performed with NRP and SCS were not inferior in term of outcomes to NRP followed by end-ischemic D-HOPE MP even in the Italian setting of 20 minutes no touch period. In selected cases, effective management of NRP together with minimizing the total preservation time and the right donor-recipient matching may affect the preservation strategy in cDCD liver transplant

Conflicts of interest

No conflicts declared

OP15 - CONTROLLED DONATION AFTER CIRCULATORY DEATH WITH DONORS OLDER THAN 70 YEARS: ADAPTING TO THE NEW NORMAL

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Background
The use of controlled after circulatory death (cCDC) has increased
significantly in recent years. Progressive expansion of the acceptance criteria with cCDC in the last years has made us to use them in the same way as DBD kidney grafts are normally used. Our objective was to compare kidney transplant (KT) results obtained with cCDC older than 70 years with those from DBD transplants of similar age and demographics.

Methods
Single-center retrospective study that included KT performed from January-2017 to January-2024 from donors ≥ 70 years old after cCDC or DBD. We analyze demographic characteristics, renal function, post-KT complications and graft and patient survival.

Results
103 KT from donors ≥70 years old were included: 35 cCDC and 68 DBD. The median of follow-up was 31.8±25.2 (0-80.0) months. The age of the recipients was similar between cCDC and DBD (72.3 vs 75,p<0.001), without differences in recipients age (p=0.229). The cCDC had a lower proportion of death due to stroke (41.2% vs 75%,p=0.002), but a higher proportion of cardiac arrest recovered prior to donation procedure (44.1% vs 13%,p=0.002). No differences were found in recipient demographics (HTN, DM, vascular disease, or time on dialysis), but myocardiopathy was more frequent in cDCD recipients (19.4% vs 3.8%,p=0.018). Cold ischemia time (CIT) was lower in cCDC (11.8 vs 16.2 hours,p=0.005) with no differences in delayed graft function (DGF) (34.8% vs 35.0%,p=0.958) nor acute rejection (4.5% vs 17.8%,p=0.252). There were no differences in creatinine during the follow-up nor proteinuria. Graft survival was similar (1st y: 84% vs 73% and 3rd y: 79.3% vs 68.7% for cDCD and DBD respectively,p=0.420) as well as patient survival (1st y: 84.8% vs 92.7% and 3rd y: 84.8% vs 83.2%,p=0.686). Primary non function (PNF) was similar in both groups (cCDC 11.8% vs DBD 19.3%,p=0.23).

Conclusions
Our results with donors ≥ 70y were similar between cCDC and DBD. Despite the greater risk of PNF or DGF described for cCDC KT and the higher cardiovascular risk profile in cCDC recipients, we find similar results in terms of short-term graft and patient survival. The continuous revision of results with this pool of donors, especially in those of older age, are needed to increase its use in KT programs.

Conflicts of interest
No conflicts declared

OP16 - HYPOTHERMIC MACHINE PERFUSION OF THE KIDNEY FOLLOWING NORMOTHERMIC REGIONAL PERFUSION: DOES OXYGENATION MATTER?

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Background

Hypothermic machine perfusion (HMP) reduces the risk for delayed graft function (DGF) in kidneys transplanted from DCD donors. Although the effects of hypothermic oxygenated machine perfusion (HOMP) remain uncertain, studies suggest it may reduce complications and risk of acute rejection. With an increased use of normothermic regional perfusion (NRP), optimal kidney preservation following NRP remains to be elucidated.

Methods

Outcomes between two different centers utilizing HMP (n=29) and HOMP (n=33) preserved kidneys after NRP recovery were compared. Outcomes of interest were: DGF, 12 months graft survival,12 months creatinine and eGFR, and index hospital stay.

Results

There were significant differences in the median agonal time (13.6 [IQR:5.9] HMP vs 29.5 [IQR:24.2] HOMP, min, p=0.009), median warm ischemic time (37 [IQR:8] HMP vs 44 [IQR:33.8] HOMP, min, p=0.002), and cold ischemia time (504 [IQR:162] HMP vs 648 [IQR:346] HOMP, min, p=0.02). There was no difference in functional warm ischemia time, donor terminal creatinine, age, or BMI. There were no significant differences in recipient demographics, although preemptive transplantations were lower in HMP, this was non-significant (3.65 vs 24.2%, p=0.09). DGF (25% HMP vs 12.1% HOMP) and graft survival at 12 months (96.4% HMP vs 100% HOMP) were comparable. Kidney function at 12 months was significantly different with a better median creatinine with HOMP (91.5 [IQR:49.8], umol/L vs 122 [IQR:99] for HMP, p=0.01) and mean eGFR (74.7±27.9, ml/min/1.73m2 vs 47.3±19.6 for HMP, p=0.001). HOMP had significantly shorter index hospital stay (6 [IQR:1] HOMP vs 9.5 [IQR:6.3] HMP vs days, p=<0.001).

Conclusions

Despite longer cold and warm ischemia times, kidney function at 12 months was significantly better in the HOMP post NRP group, although no difference was observed in remaining outcomes. This small series results indicate that oxygenated HMP might provide additional benefit following NRP, although center specific biases may be present. Hence, further studies are needed.

Conflicts of interest

No conflicts declared

OP17 - RESCUE LIVER GRAFT TO TRANSPLANTATION FROM DONATION AFTER CARDIAC DEATH WITH IN -SITU AND EX -SITU NORMOTHERMIC DYNAMIC PRESERVATION

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Background

Although Catalonia is the leader in donation and transplants, 10% of candidates dropped the waiting list.

Methods

Objective: To describe the experience of liver transplantation from donation after cardiac death (DCD) after viability assessment by Normothermic Regional Perfusion (NRP) and Normothermic Machine Perfusion (NMP). The viability of DCD grafts was assessed by means of transaminase levels, lactate, hemodynamic stability, and macroscopic aspect of the liver. When viability criteria were not met in NRP, the livers were placed in NMP (OrganOx metra®). The major criterion used was lactate clearance in the first 2 hours with pH 7.30-7.40, stable arterial and portal flow, alkaline bile production, glucose metabolism and homogeneous perfusion of the graft.

Results

Between November 2021 and December 2022, we evaluated 147 donors (37% from DCD) performed a total of 85 liver transplants (36% from DCD). A total of 16 liver grafts were evaluated on NMP (10 %), including 10 cases from controlled DCD (n=8) and uncontrolled DCD (n=2) with NRP. The main indication for ex situ dynamic preservation was poor perfusion based on macroscopic appearance of the liver. Among the 10 cases from DCD, mild-moderate steatosis was present in all cases and the donor profile was male (70%), middle-aged (61±3 years old), overweight (28±1 kg/m2) with associated comorbidity (90%). The mean time in NRP and MPN was 72±7 and 476±79 minutes, respectively. Viability criteria were met in 8 cases (80%) during in ex situ preservation. Seven recipients were transplanted. The mean time waiting list was 13±4 weeks. MELD-lab recipients were 17±3. The main indication was alcohol with hepatocellular carcinoma in 6/7 patients. One patient suffered a severe postreperfusion syndrome. None suffered primary non function or vascular complications. Early stenotic biliary anastomosis in two cases resolved by CPRE. One patient needs retransplantation after severe acute rejection and Sinusoidal Obstructive Syndrome. One patient died 15 months after transplant due de novo pancreatic tumor. The living patients after 26 months (18-30) of follow up are asymptomatic with functioning graft.

Conclusions

Evaluation of marginal livers from DCD by in situ and ex situ normothermic preservation is a safe strategy for the assessment and preconditioning of grafts in liver transplantation.

Conflicts of interest

No conflicts declared

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OP18 - METABOLOMIC-BASED LIVER GRAFT ASSESSMENT DURING NORMOTHERMIC REGIONAL PERFUSION: INSIGHTS FROM A PRECLINICAL STUDY

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Background
Normothermic regional perfusion (NRP) is mandatory for controlled donation after circulatory death liver transplantation (cDCD LT) in France. In addition to achieving superior outcomes to super rapid procurement, NRP also provides a dynamic platform for graft viability assessment prior to LT. However, comprehensive data on the metabolic state of the liver graft during NRP are currently lacking

Methods
In a first phase, we established a porcine cDCD model with 30 minutes of asystolic warm ischemia (WI) followed by 120 minutes of NRP (n=4). In a second phase (n=5), an in-depth analysis of metabolites in the liver tissue and bile was conducted at baseline, end of AWI and at 30min, 60min and 120 min of NRP, using mass spectrometry (LC-MS/MS). The aim was to provide dynamic metabolic liver graft profiles during NRP and compare these profiles using Principal component analysis (PCA) and Partial least square discriminant analysis (PLS-DA).

Results
During the 120 min of NRP all animals were hemodynamically stable with a progressive pH normalization (7.38-7.45). Median peak AST was 244 IU/L [172.5-417.5] with low histological injury scores at the end of NRP. At the tissue level, overall metabolic profiles were significantly different at 120min of NRP compared to both baseline and WI (Figure 1). Out of the 440 tissue metabolites identified, we found 78 metabolites that significantly discriminated the liver graft at baseline, AWI and 120min of NRP. In the bile, targeted metabolomic analysis showed an increase in Xanthine (p=0.01), Hypoxanthine (p=0.02) and Succinate (p=0.14) during 30min of NRP followed by a significant decreased at 120min close to baseline levels (Figure 2).

Conclusions
In a porcine cDCD NRP model, we observed dynamic changes in the metabolic profiles of tissue and bile during NRP. These data are an important prerequisite to characterize the impact of NRP and establish comprehensive graft viability markers prior to LT. The results of this study have a direct translational application in the ongoing prospective MAASTR3BOLOMIC clinical study focusing on metabolic profiles in NRP cDCD LT (NCT05371044).

Figure 1: PCA (Principal Component Analysis) (A) and PLS-DA (Partial Least Squares Discriminant Analysis) (B-C) of the tissue metabolomic profile during NRP, baseline and asystolic warm ischemia (AWI). (A) PCA analysis with 30% of the variance explained by the first component, 12% by the second. (B) PLS-DA analysis with 13% of the variance explained by the first component, 10% by the second. (C) Correlation between the VIP (Variable Importance in Projection) of discriminant variables and their significance (p-value), highlighting 78 discriminant variables in the model.

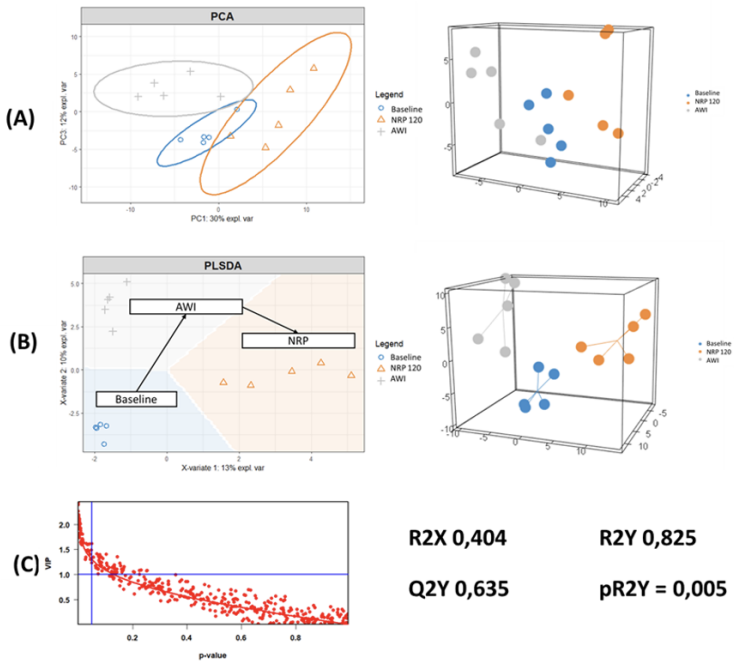

Figure 1

Figure 2: Bile metabolites variations during NRP. Variables are expressed as median values [interquartile range 25-75] analyzed using the Mann-Whitney test (* p<0.05; ** p<0.01).

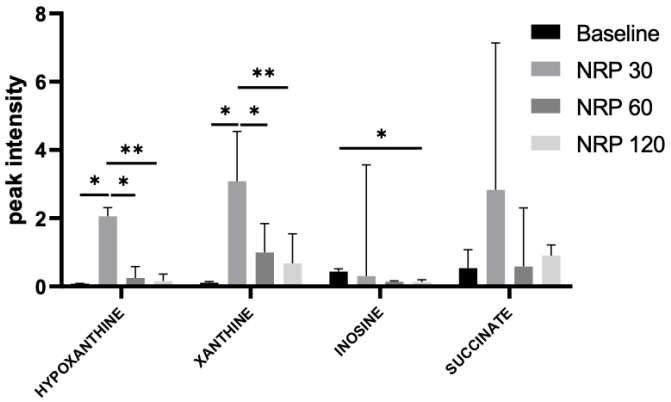

Figure 2

Conflicts of interest
No conflicts declared

OP19 - THE ROLE OF OXYGEN DELIVERY DURING HYPOTHERMIC OXYGENATED MACHINE PERFUSION AND ITS IMPACT ON GRAFT BIOLOGY AND POST- TRANSPLANT OUTCOME

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Background

Hypothermic oxygenated machine perfusion (HOPE) has significantly improved liver post-transplant results. While pO2 above 600 mmHg was recommended during HOPE, the effect of a high pO2 and its interplay with graft oxygen consumption (VO2) was poorly evaluated. This study aims to investigate the interplay between pO2, oxygen deliver (DO2) and VO2 during HOPE and their impact on post- liver transplant (LT) outcomes.

Methods

Cases of dual hypothermic oxygenated machine perfusion (DHOPE) were categorized based on perfusate pO2 levels: >600 mmHg (H-DO2) and <600 mmHg (L-DO2). In the L-DO2 group, pO2 <600 mmHg was titrated to maintain post-liver pO2 >120 mmHg). DO2 and VO2 were computed using the modified Fick equation. Samples of perfusion fluid were collected before HOPE and every hour during HOPE, and they were analyzed with Luminex technology. Results are expressed as median±IQR

Results

Twenty-seven livers underwent DHOPE and subsequent transplantation (12 brain- dead and 15 cardiac-dead donors). Among these cases, 13 (48.1%) were in the L-DO2 group, while 14 (51.9%) were in the H-DO2 group. In L-DO2 grafts, DO2 was 1.46±1.07 ml/min (pO2 233±89 mmHg), and VO2 was 0.82±0.44 ml/min, whereas, in H-DO2 grafts, DO2 was >5.06±1.95 ml/min (pO2>600 mmHg), and VO2 was >0.56±1.14 ml/min. Portal flow was comparable in the two groups (p=0.214). An increase in DO2 was directly correlated to VO2 (r=0.56; p=0.056) (Fig.1A), and EAD was more frequent in H-DO2 (15% vs 29%), even if it didn't reached statistical significance (p=0.102). While no differences were found in pre-HOPE perfusate, HGF and hepcidin concentrations were higher in HOPE samples of L-DO2 group and they were positively correlated (Fig.1B).

Conclusions

During DHOPE, pO2 titration is feasible and safe. Elevated DO2 may cause graft metabolic activation (high VO2), possibly impacting early post-transplant graft function. Hepatoprotective molecule could play a key role in this phenomenon, thus suggesting a possible improvement in HOPE results applying L-DO2.

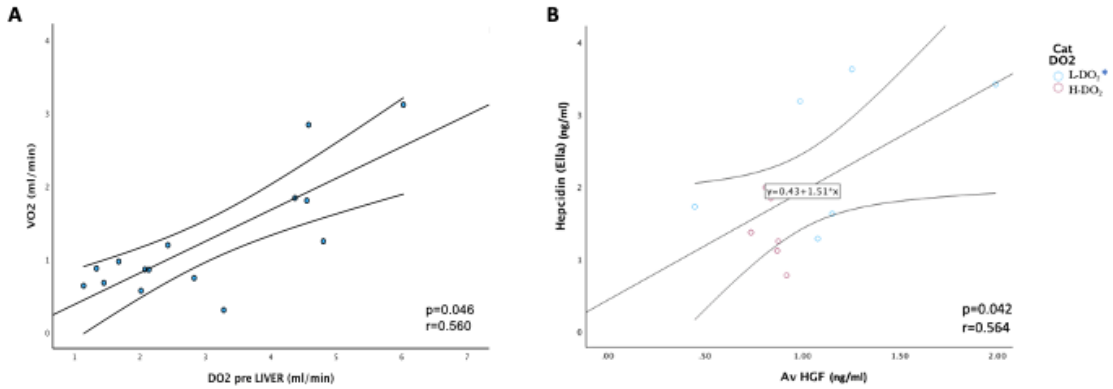

Figure 1. graphical representation of DO2/VO2 (**A**) and hepcidin/Hepatic growth factor (HGF) correlation (**B**).

Conflicts of interest
No conflicts declared

OP20 - EVALUATION OF CEREBRAL BLOOD FLOW DURING DONATION AFTER CIRCULATORI DETERMINATION OF DEATH USING PORTABLE GAMMACAMERA

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Background

The use of ECMO in controlled donation after circulatory determination of death (cDCD) is a recent development that raises ethical concerns about the possible passage of blood flow to the central nervous system through collateral circulation and a theoretical reversal of death with the recovery of brain function.

The aim of the study is to demonstrate the absence of cerebral perfusion by performing cerebral scintigraphy with a portable gamma camera on cDCD after the declaration of death and the initiation of normothermic regional perfusion.

Methods

A total of 9 cDCD were included in the study. Normothermic regional thoraco-abdominal perfusion was performed in three of them, and abdominal RPN in the rest. The radiotracer injection was administered 10 minutes after the declaration of death through the arterial cannula of the extracorporeal circuit, with image acquisition 5 minutes after the radiotracer injection. The images were interpreted on-site by nuclear medicine specialists.

Results

In all cases, scintigraphy revealed the absence of perfusion in the cerebral cortex and brainstem.

Conclusions

The absence of cerebral blood flow confirmed by scintigraphy in cDCD, supports the cessation of cerebral circulation, thus upholding the principle of the permanence of death and addressing ethical concerns regarding this technique.

SEX	AGE	PATOLOGHY	PRN	SCINTIGRAPHY RESULT
Female	75	Hemorrhagic stroke	RNP-A	Absence of perfusion
Male	45	Lung disease	RNP-TA	Absence of perfusion
Male	77	Euthanasia	RNP-A	Absence of perfusion
Female	70	Lung disease	RNP-A	Absence of perfusion
Male	69	Tumor CNS	RNP-A	Absence of perfusion
Male	64	TBI	RNP-A	Absence of perfusion
Male	43	Lung disease	RNP-TA	Absence of perfusion
Male	42	TBI	RNP-TA	Absence of perfusion
Male	68	Hemorrhagic stroke	RNP-A	Absence of perfusion

Conflicts of interest

No conflicts declared

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OP21 - UDCD PROTOCOLS: MAKING COMPATIBLE DECEASED DONATION AND RESUSCITATION. SAVING MORE LIVES ONE WAY OR ANOTHER

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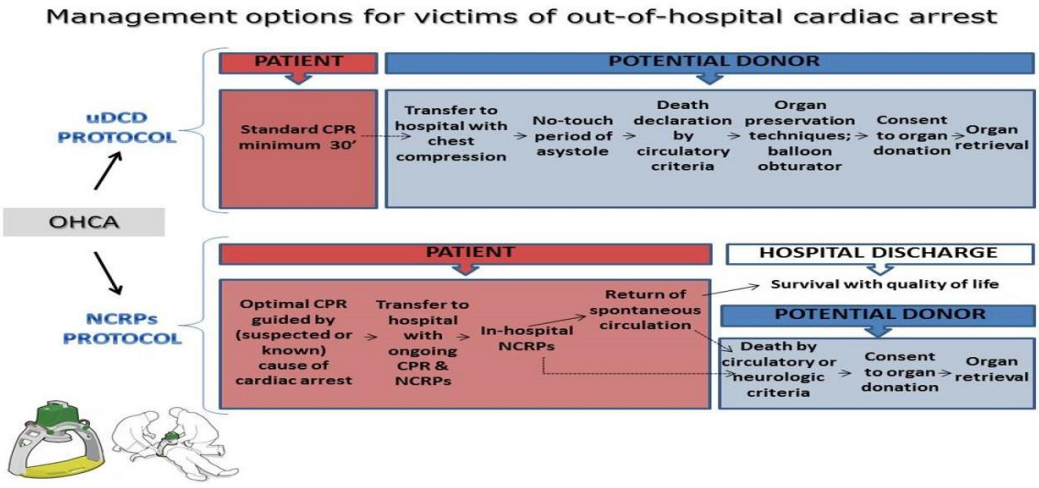
Background
ECMO technique has the potential to increase organ donation pool from individuals declared death after out-of-hospital cardiac arrest (OHCA) failed resuscitation. The use of ECMO in this pathway is the so-called organ preserving EISOR (extracorporeal support intevan until organ retieval). But ECMO has also the potential to increase survival rate from patients suffering OHCA through extracorporeal resuscitation (ECPR). We propose to expand our blended protocol for both purposes: ECPR and/or EISOR. A joint venture for doing possible uDCD and resuscitation after OHCA. A joint venture to save more lives one way or another. Patient´s life, when possible, or the one of recipients at the waiting list.

Methods
Improved protocol sharing after improvement based on our experience running uDCD protocols and resuscitation for OHCA patients in the emergency medical services (EMS) in Madrid, Spain.

Results
An analysis of our results during many years for both strategies, OHCA resuscitation for patients and uDCD for deceased individuals, show the following results. In Madrid region, the joint venture of EMS do possible to increase the survival rate of patients suffering from refractory OHCA, when selected for ECPR, and when futile at the beginning or after failed ECPR, the EISOR option remains increasing the donor pool with outstanding results in terms of quantity and quality of solid organs for transplant: kidneys, lungs and livers.

Conclusions
A comprehensive approach to OHCA patients from the EMS personnel results on an increase of survival rate for select patients suffering from refractory OHCA (saving the life of previously hopeless patients with ECPR) and/or a raise in the deceased donation pool based on our uDCD protocol and through EISOR. A joint venture to save more lives one way or another.



Conflicts of interest
No conflicts declared

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OP22 - POTENTIAL DONOR FAMILY BEHAVIOURS, EXPERIENCES AND DECISIONS FOLLOWING IMPLEMENTATION OF THE ORGAN DONATION (DEEMED CONSENT) ACT 2019 IN ENGLAND: A QUALITATIVE STUDY

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Background
Many countries have debated the merits of opt in versus opt out deceased organ donation (DD) systems but convincing evidence is scarce. In May 2020, England implemented “deemed consent” legislation to reduce barriers to consent for DD. We aimed to learn more about the experiences and decisions of families approached by specialist nurses about DD.

Methods
Qualitative study using semi-structured interviews with families.

Results
103 participants were interviewed representing 83 potential organ donation cases. In 31/83 (37%) cases organ donation was fully supported, in 41/83 (49%) cases family members supported retrieval of some organs, tissues and procedures but not others, and in 11/83 (13%) cases family members declined completely. Of the 83 cases, 34/83 (41%) were DBD, and 49/83 (59%) were DCD. There was a difference for families being told their relative had died (DBD) versus being told their relative was not going to survive (DCD). DCD was associated with more confused and mixed messages from staff, overwhelming and difficult decisions, and increased family burden. It was common for families to initially say “yes”, but then withdraw consent completely as the situation evolved. This often involved cases where there was perceived delays in withdrawing treatment and progressing to funeral arrangements, often combined with no guarantees of a successful organ retrieval. If family members saw other family members in (increasing) distress this (often in combination with the aforementioned) tended to lead to a rejection of the benefit to transplant recipients and a shift towards what was best for the family.

Conclusions
The (very) soft opt-out policy in England has not helped families at their most vulnerable to increase their support for and consent to deceased organ donation. New public ongoing media campaigns crafted to be more supportive of organ donation as a benefit to transplant recipients could help (some) families overcome the many difficulties they encounter at the bedside.

Conflicts of interest
No conflicts declared

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OP23 - MAINTAINING THE PERMANENCE PRINCIPLE OF DEATH DURING NORMOTHERMIC REGIONAL PERFUSION IN CONTROLLED DONATION AFTER THE CIRCULATORY DETERMINATION OF DEATH: RESULTS OF A PROSPECTIVE CLINICAL STUDY

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Background

Donation after circulatory determination of death (DCD) has become vital in organ donation programs, with normothermic regional perfusion (NRP) offering promising organ preservation benefits. Despite its advantages, ethical concerns arise regarding brain perfusion post-death declaration. This study aims to demonstrate that specific technical maneuvers during NRP effectively exclude brain perfusion, addressing these ethical dilemmas.

Methods

This trial at two Spanish centers aimed to see if intracranial arterial blood pressure (ICBP) increased with normothermic regional perfusion (NRP) compared to circulatory arrest. It included adult cDCD donors undergoing organ recovery with abdominal or thoracoabdominal NRP, except when ICBP assessment wasn't feasible. (Figure 1).

Results

This study involved 10 cDCD donors: 8 with abdominal NRP (A-NRP) and 2 with thoracoabdominal NRP (TA-NRP). Before withdrawal, mean arterial pressure (MAP) was 64, 71, and 68 mmHg, dropping to 17, 17, and 18 mmHg during circulatory arrest. With A-NRP, abdominal aorta pressure rose to 50 mmHg, and ICBP remained stable at 12 mmHg. In TA-NRP, thoracic aorta pressure increased to 71 mmHg, with ICBP at 8 mmHg. During NRP, intracranial blood pressure neither increased nor became pulsatile, and the bispectral index (BIS) remained at 0. (Figure 2)

Conclusions

This pioneering clinical study investigates brain perfusion during normothermic regional perfusion (NRP), a strategy utilized in controlled donation after circulatory death (cDCD) for organ preservation. By employing specific maneuvers, such as venting arch vessels, the study effectively precludes brain perfusion during NRP, aligning with the principle of death permanence. The findings offer reassurance regarding the ethical appropriateness of NRP, facilitating its global expansion and enhancing organ availability for transplantation. Despite the small sample size, the study's comprehensive measurements provide valuable insights into brain perfusion exclusion techniques, addressing concerns about NRP's compatibility with death diagnosis reversal.

Figure 2: Mean arterial blood pressure over time through 10 cases of NRP.

Figure 2: Mean arterial blood pressure over time through 10 cases of NRP.

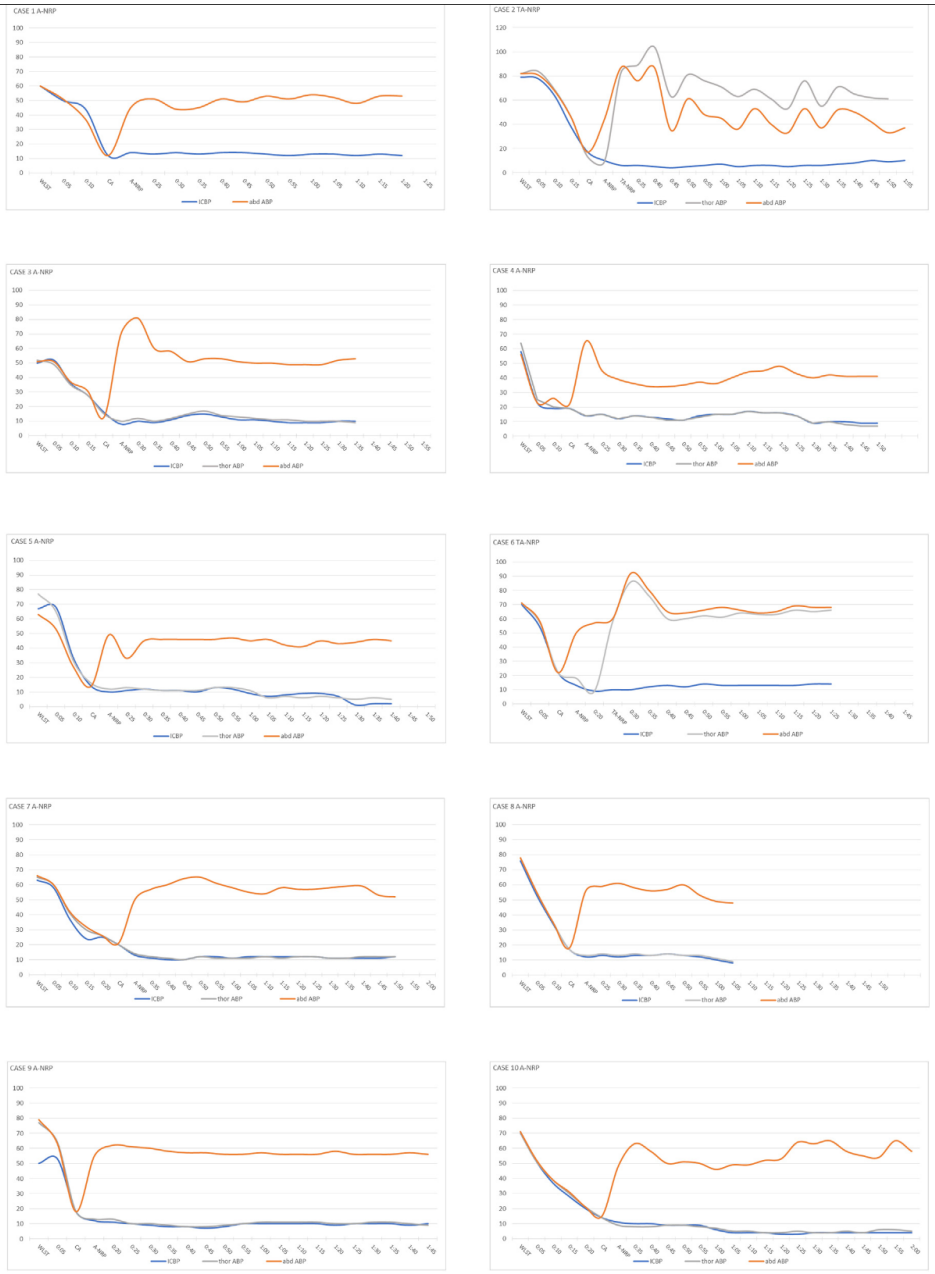

Figure 2. Mean intracranial blood pressure and mean blood pressure at the thoracic and the abdominal aorta (mmHg) for each individual case. The pressure at the thoracic aorta was not registered in case 1. A-NRP, abdominal normothermic regional perfusion; abd ABP, abdominal aorta blood pressure; CA, circulatory arrest; ICBP, intracranial blood pressure; thor ABP, thoracic aorta blood pressure; TA-NRP, Thoracoabdominal normothermic regional perfusion; WLST, withdrawal of life-sustaining therapy.

Figure 1: Location of intracranial arteral blood pressure catheter.

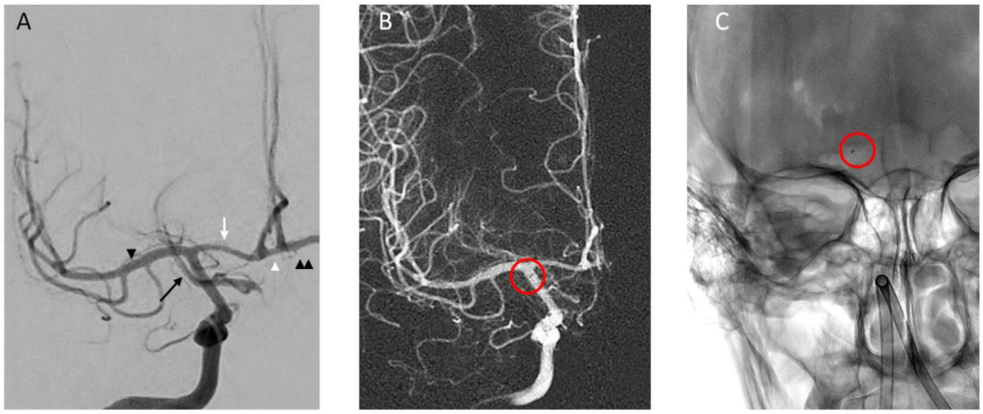

Figure 1. (A) Digital subtraction angiography, anteroposterior view. Black arrowhead, right middle cerebral artery; white arrow, right anterior cerebral artery; white arrowhead, anterior communicating artery; double arrowhead, left middle cerebral artery; black arrow, right posterior communicating artery. (B) Digital subtraction angiography, anteroposterior view: road-mapping; (C) Plain X-ray, anteroposterior view. Red circle, position of the tip of the microcatheter used for intracranial arterial pressure measurements.

3

Conflicts of interest
No conflicts declared

OP24 - END-OF-LIFE CARE - A PREREQUISITE FOR CDCD

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Background
In Slovenia, the DBD programme is very successful. In 2023 we have reached an impressive number of almost 31 actual donors pmp. In line with the progress, the integration of a controlled DCD program is a strategic goal. Step towards development was qualitative research among experienced intensivists across Slovenia. Their understanding of integration of DCD programs into end-of-life (EoL) care practises was evaluated.

Methods
In 2021, ten in-depth interviews with leading intensivists were conducted. Questions covered knowledge of approaches to EoL care in the ICU, decision predictions, discussion with relatives/carer, patient autonomy, ethical dilemmas, existing DBD programme, and the possibility of implementing specific DCD programme and ICU admission to facilitate organ donation (ICOD).

Results
Respondents emphasised the need for improved professional discussions and standards about the best interest of the patient in today's ICU. They observed that it is difficult for professionals to make confident decisions. The criteria for good palliative care in EoL care are often not sufficiently met. To avoid mistakes, there is a lack of external control mechanisms and audits to improve EoL processes. At a societal level, they miss public debates on refusal of treatment and patient autonomy.
Regarding the expansion of the national programme with DCD and ICOD, respondents are generally in favour of progress.

Conclusions
Compared to the 2012 survey (Avsec, Šimenc 2019), there are fewer reservations and better knowledge of DCD protocols. Majority sees the obstacles for the implementation of cDCD programme in Slovenia in the lack of staff and clear protocols, legislation that also protects doctors, and ethics committee approval for performing interventions at and after death. They also expressed concern about public support.

Conflicts of interest
No conflicts declared

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OP25 - BREAKING BARRIERS: PROMOTING DONOR POOL GROWTH IN ITALY THROUGH THE DCD HEART PROGRAM

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Background

The increasing prevalence of end-stage heart failure, coupled with a limited donor organ pool, creates a critical need for innovative strategies in heart transplantation. Donation after cardio-circulatory death (DCD) represents a promising alternative to expand donor pool. However, legal frameworks and technical considerations regarding DCD hearts variability have limited its widespread use. Italian legislation requires a prolonged 'no-touch' period for death declaration, raising concerns about organ preservation. This study presents the primary experience of a single Italian center performing heart transplantation from DCD donors using thoracoabdominal normothermic regional perfusion (TA-NRP).

Methods

We retrospectively analyzed six DCD heart transplants performed between August 2023 and March 2024. After a 20-minute asystolic period, TA-NRP with femoro-femoral extracorporeal membrane oxygenation (ECMO) was started at the donor center. We summaries our protocol for TA-NRP in Figure1. After meticulous evaluation of cardiac function, organ procurement proceeded.

Results

All six hearts were deemed suitable for transplantation during and after TA-NRP. Only in one case the donor was already present in our center, and procurement was done in our theatre. Significantly, there was a 100% patient survival rate at last follow-up, with no 30-day mortality, primary graft dysfunction or need for mechanical circulatory support. Postoperative echocardiography confirmed normal cardiac function in all recipients. Donor, recipient and intra-operative characteristics are summarized in Table1.

Conclusions

This study demonstrates the feasibility and efficacy of TA-NRP with ECMO in DCD heart transplant. This approach, applicable across donor centers, paves the way for expanding donor pool and improving patient outcomes in heart transplantation programs within Italy.

Donor characteristics							
Parameter	**Donor 1**	**Donor 2**	**Donor 3**	**Donor 4**	**Donor 5**	**Donor 6**	**Total**
Age	23	58	46	59	49	64	49,83 ± 14,74
Sex	M	M	M	M	M	F	Male 83,33 %
Distance from transplant center (km)	67	90	0	62	89	92	65,33 ± 34,19
Pre-NRP LVEF (%)	65%	60%	65%	55%	62%	56%	60,5 ± 4,32
Donor ischemic times and operative data							
Parameter	**Donor 1**	**Donor 2**	**Donor 3**	**Donor 4**	**Donor 5**	**Donor 6**	**Total**
Total warm ischemic time (WIT)	44	40	41	43	45	73	47 ± 12,87
Type of cannulation for NRP	Peripheral	Peripheral	Peripheral	Peripheral	Peripheral	Peripheral and central	
NRP duration	101	102	69	86	65	55	79,66 ± 19,65
Post-TA-NRP LVEF (%)	60	60	50	50	60		56 ± 5,47
TA-NRP to aortic cross clamp for procurement	36	45	48	33	83	109	59 ± 30,32
Cold ischemia time (min)	181	221	68	203	152	170	165,83 ± 53,73
Recipient characteristics							
Parameter	**Recipient 1**	**Recipient 2**	**Recipient 3**	**Recipient 4**	**Recipient 5**	**Recipient 6**	**Total**
Age	60	66	56	58	54	57	58,5 ± 4,18
Sex	M	M	M	M	M	F	Male 83,33 %
Redo cardiac surgery	No	No	No	Yes	Yes	No	33,3%
Recipient outcomes							
Parameter	**Recipient 1**	**Recipient 2**	**Recipient 3**	**Recipient 4**	**Recipient 5**	**Recipient 6**	**Total**
Total warm ischemic time (WIT)	44	40	41	43	45	73	47 ± 12,87
30-day mortality	No	No	No	No	No	No	
Primary graft failure	No	No	No	No	No	No	

Table 1: donor characteristics and operative data; Recipient characteristic and outcomes.

Values are reported as mean ± st. dev or percentage.

NRP: normothermic regional perfusion; LVEF: left ventricular ejection fraction; TA-NRP: Thoraco-abdominal normothermic regional perfusion;

Table 1: Main Donor, procurement and surgical data of the procedure

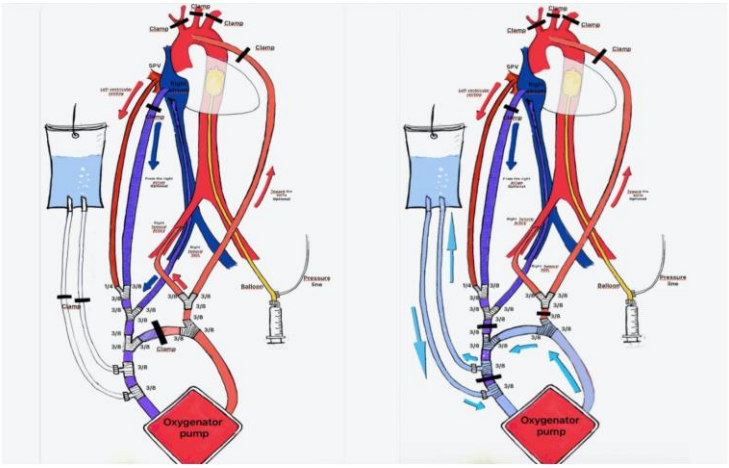

Figure1. TA-NRP ECMO setup.

Conflicts of interest
No conflicts declared

OP26 - OUTCOMES OF LIVER GRAFTS DONATED AFTER EUTHANASIA

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Background
In an attempt to relieve donor organ shortage, in some countries transplantation of organs donated after euthanasia (Donation After Circulatory Death Type V, DCD-V) is allowed. Similar to grafts from Donation After Circulatory Death Type III (DCD-III), DCD-V organs experience total donor warm ischemia time (tDWIT), which can lead to post-transplant complications. However, DWIT is significantly shorter in DCD-V donors, potentially resulting in improved outcomes. In contrast, euthanasia medications may be hepatotoxic, and higher donor risk associated with medication and lifestyle factors necessitate thorough evaluation.

Methods
In this retrospective cohort we analyzed all LTs performed in our center between 2013 and 2023 with DCD-V grafts. As comparator cohort, patients who received DCD-III grafts in the same period were analyzed. Minimal follow-up was 12 months to evaluate outcome. Primary outcomes were 1-year graft survival and biliary complications, including ischemic cholangiopathy (IC).

Results
Between 2013 and 2023, 30 DCD-V graft have been transplanted, with a median donor age of 51 (IQR34-58). tDWIT was 26 min (IQR 22-30). Indication for euthanasia was psychiatric illness in 47% (14/30), neurological or neurodegenerative disorder in 44% (13/30), and other indication in 9% (3/30). In the cohort of 211 DCD-III LTs, median donor age was 51(IQR 41-58, p=0.868) and tDWIT was 31 min (IQR 26-35, p<0.00).
In the DCD-V cohort 77% of the livers were treated with machine perfusion versus 55% in the DCD III cohort; p<0.001. 1-year graft survival rates were similar in the DCD-III and DCD V (87% vs 87%). At 1-year overall biliary complication rate was 47% in DCD-V vs. 40% in DCD-III p=0.274, including 20% IC in DCD-V vs 12% in DCD-III; p=0.212.

Conclusions
With the help of more machine perfusion, the outcome of DCD-V liver transplantation is comparable to DCD-III, representing a valuable source of donor livers to alleviate wait list mortality.

Conflicts of interest
No conflicts declared

OP27 - IMPROVING DONOR CARE UNIT IMPLEMENTATION AND ENHANCING PROTOCOLIZED CARE THROUGH SIMULATION INTEGRATION

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Background

Published studies indicate an increase in the number of organs transplanted in Donor Care Units (DCUs). To improve donation outcomes for patients, families, recipients, and the healthcare team, organ donation after brain or circulatory death (DBD or DCD) needs a specific workflow. Simulation training can help standardize the process, improve readiness, and introduce quality improvement cycles. To create a DCU at Mayo Clinic (MCF), simulation was used to train various stakeholders (Intensivists, surgeons, nurses, respiratory therapists, and Organ Procurement Organization (OPO) coordinators) and help develop and implement the protocol.

Methods

We conducted monthly simulation sessions for six scenarios. Each session consisted of pre-briefing, case presentation, skill demonstration and feedback. The sessions enabled participants to identify process gaps and specialty requirements. We developed a six-step checklist with a systematic approach and three additional checklists for interinstitutional transportation and normothermic regional perfusion. (Fig 1)

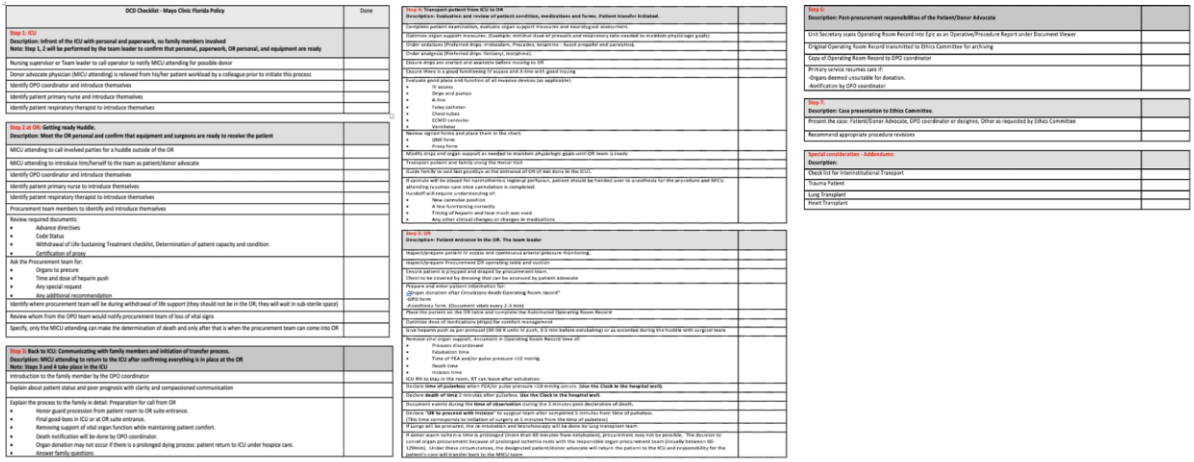
Results

A survey was administered to assess participants' satisfaction, the content's appropriateness, the training's quality, and the activity's effect on enhancing future performance (Fig 2). Overall, 78% strongly agree / 22% agree that the training objectives were well-defined, the content was suitable for their practice, and the case was realistic and relevant for the training (n=36). All (100%) participants would endorse the training and agreed it was vital for awareness and readiness for real scenarios.

Conclusions

Simulation training helped to create and apply a DCU protocol at MCF. It improved the consistency of the workflow, detected and solved process issues, and increased the skill and confidence of the multidisciplinary team. The participants were highly satisfied and felt that their future performance was impacted. Simulation training can be a useful method for other institutions that want to set up a DCU and enhance organ donation outcomes. MCF became a DCU in January 2023, and in 2024 received “Award of Excellence” from our OPO. Our DCU progress shows Mayo Clinic’s dedication to be a world leader in transplant care.

Figure No1
Integrating Simulation to Improve and Standardize Donor after Death process at Mayo Clinic Florida
Checklist



Conflicts of interest

No conflicts declared

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OP28 - SHOULD LIMITS IN ORGAN DONATION AFTER CIRCULATORY ARREST BE RECONSIDERED? THE ITALIAN EXPERIENCE OF PROLONGED WARM ISCHEMIC TIME

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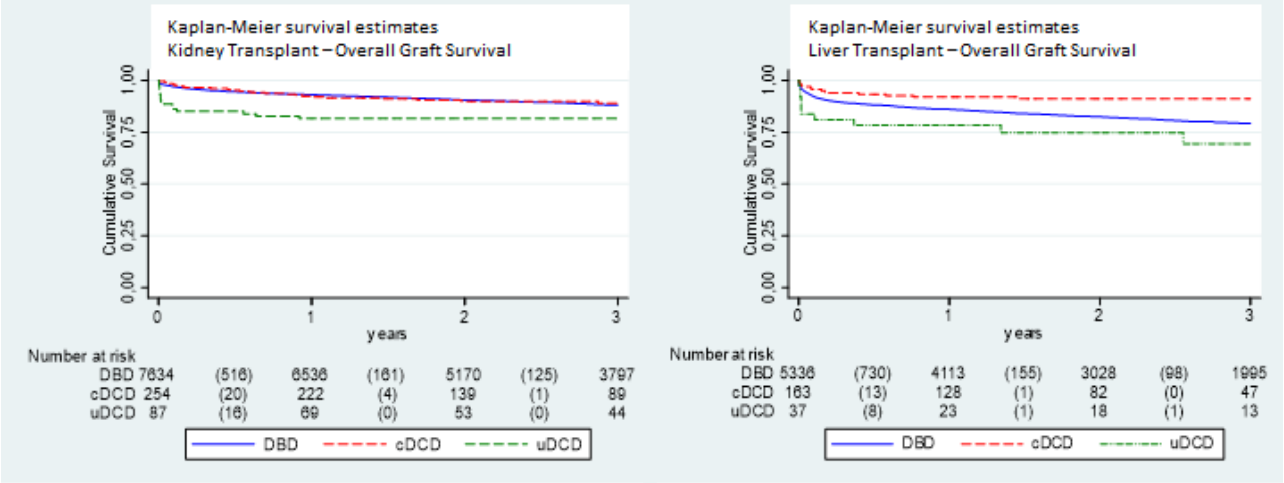
Background
Skepticism has pervaded clinicians about the possibility of achieving good results with DCD donation hampered by 20 min no-touch. Nevertheless, both controlled(c) & uncontrolled(u) DCD programs have been developed in Italy, using normothermic regional perfusion (NRP) in all the potential donors (Ds), with successful transplants (Txs), including liver & heart.
Aims:1)To compare 1 & 3-years DCD&DBD results; 2)To analyze factors influencing the cDCD conversion rate.

Methods
Data on deceased Ds have been prospectively collected in the national database (CNT/SIT). Kaplan-Meier survivals were estimated and logistic regressions for multivariable analyses were performed.

Results
In 5yrs(2017-21) 13145 potential Ds were referred with a progressive increase of DCD, leading to 6536 DBD, 206 cDCD and 69 uDCD utilized Ds. Median age of utilized Ds was: DBD 63yrs(0-97) cDCD 60(19-84) uDCD 51.5(30-65).
cDCD functional warm ischemic time(FWIT) was 46±15(25-155), >60 min in 15% utilized Ds. Ex-situ Machine Perfusion (MP) was used in 100%,90%,85% utilized lungs, kidneys (K) & livers (Li). Conversion rate was: DBD 51.7%, cDCD 79%, uDCD 31.4% with wide differences among centers (cDCD22-88%; uDCD17-49%). Out of 17480 Txs, 585 were from DCD: 344 K, 219 Li, 22 Lung. More than 80% utilized DCD organs were cDCD. 1-year cDCD graft survival rates (K 95%; Li 86%) were similar to DBD (Fig.1). Among eligible cDCD the odds of utilizing K or Li annually increased [OR=1.2(0.6-2.2) OR=3.0(0.99-9.5)]. Advanced age, obesity, prior-to-deathECMO were associated with reduced likelihood of Tx.

Conclusions
The Italian experience proves that FWIT limits, considered inviolable for DCD Liver suitability, can be reconsidered. cDCD efficacy seems not inferior to DBD. Quality treatment, including NRP&MP, can improve Tx numbers and results. Harmonization of procedures, based on death determination and organ preservation consensus, may overcome rules variability among countries and prolonged ischemic insult.

Figure 1. Kaplan-Meier Kidney and Liver overall graft survival



Conflicts of interest
No conflicts declared

OP29 - STEPWISE IMPLEMENTATION OF A TRANSPLANT CENTER-BASED ABDOMINAL NORMOTHERMIC REGIONAL PERFUSION DONATION AFTER CIRCULATORY DEATH LIVER TRANSPLANT PROGRAM

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Background

Normothermic regional perfusion (NRP) represents an innovative technology that improves the outcomes for liver and kidney recipients of donation after circulatory death (DCD) organs. However, NRP protocols for abdominal-only NRP (A-NRP) DCD donors are lacking in the US. A stepwise approach was utilized in the development of a single-center A-NRP DCD program that has grown in volume, geographical reach, and donor acceptance parameters.

Methods

Data was collected on cannulation technique, non-utilization reasons, and programmatic changes and presented as 4 eras of implementation.

Results

In the Implementation era, two donors were attempted and one liver graft was transplanted. (Figure 1) In the Local Expansion era, 33% of attempted donors resulted in transplantation and 42% of liver grafts from donors who died within the functional warm ischemic time fWIT limit were transplanted. In the Regional Expansion era, 25% of attempted donors resulted in transplantation and 50% of liver grafts from donors who died within the fWIT limit transplanted. In the Donor Acceptance Expansion era, 46% of attempted donors resulted in transplantation and 72% of liver grafts from donors who died within the fWIT limit were transplanted. 8 grafts demonstrated a potential opportunity for utilization based on criteria later used in the Expanded Donor Acceptance era for transplantation with A-NRP (Figure 2).

Conclusions

We demonstrate a stepwise approach to building an A-NRP program using multiple growth strategies that have increased liver acceptance and utilization.

Figure 1: Eras of implementation of A-NRP. Circles represent an A-NRP donor attempt: blue circles represent donors who exceeded functional warm ischemic time (fWIT), green circles represent transplanted livers, and red circles represent declined livers after initiation of NRP. The letters inside the circles represent the cannulation technique planned or used: F- femoral, C- central, and A- intraabdominal. Each row describes logistical, technical, donor acceptance criteria, or NRP equipment changes during each era.

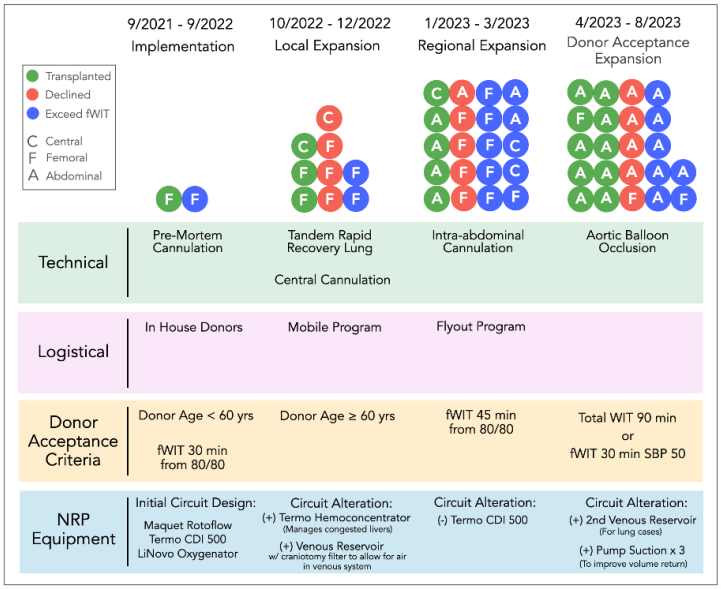

Figure 2: Identified opportunities for improvement for non-utilization of liver grafts from normothermic regional perfusion donors.

Decline # (Date)	Opportunity for Improvement	Programmatic Change
1 (09/2021)	**Decline**: fWIT >30 min from 80/80	None
2 (12/2022)	**Decline**: Visual Assessment Assessment: fWIT, cold flush, function acceptable	Use all variables for decision-making, avoid declines prior to cold flush if acceptable objective parameters
3 (12/2022)	**Decline**: fWIT> 30 min from 80/80 **Convert**: Rapid Recovery Kidney Only	↑ fWIT threshold to 45 min from 80/80 to go on NRP for evaluation of grafts
4 (12/2022)	**Decline**: Seg IV Discoloration on Flush **Assessment:** fWIT, function acceptable	Consider using grafts with acceptable functional assessment despite flush concerns
5 (01/2023)	**Decline**: Functional Assessment 30 min on NRP lactate stable, not ↓	↑ NRP run time for functional assessment to 1 hr
6 (03/2023)	**Decline**: X-clamp prior to decision Short NRP run time, and acceptance decision not made → CIT concern	Timing of X-clamp discussed between donor and implanting surgeon prior to giving heparin in donor
7 (03/2023)	**Decline**: fWIT> 45 min exceeded **Convert**: Rapid Recovery Kidney Only	↑ Total WIT threshold from extubated to 90 min
8 (06/2023)	**Decline**: Functional Assessment 60 min on NRP lactate stable, not ↓ Stayed on NRP for +1 hr after decline to reallocate and lactate ↓	↑ NRP run time for functional assessment to 2 hrs for cases where lactate isn't clearing but other parameters acceptable

Conflicts of interest
No conflicts declared

OP30 - NRP ECMO TEAM: HOW TO FACILITATE ECMO FOR DANATION TO SEVERAL HOSPITALS

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Background
Introduction: Normothermic regional perfusion with extracorporeal membrane oxygenation (NRP-ECMO) has been used in controlled donation after circulatory death (cDCD) with excellent results. It is a highly complex procedure not available in most hospitals in the Community of Madrid (CM).
Objectives: To ensure the use of the NRP-ECMO in all the hospitals of the CM with no possibility to achieve this technical procedure, through the creation of a specific group of experts and mobile devices. Group is constituted by 2 surgeons, 2 transplant coordinator with experience in DCD and 1 critical care nurse with experience in ECMO perfusion. They take care only of donor´s maintenance until organ donation.

Methods
Materials and Methods: The project began in July 2016 and it was divided into the following phases: 1. Drafting of the work protocol and presentation in the Regional Office of Transplant Coordination (ORCT) and in the ONT (National Transplant Organitation). 2. Training courses for the team members. 3. Presentation of the project in Servicio Madrileño de Salud (SERMAS). 5. Start the clinical phase in April 2017

Results
Results: The project is supported economically and institutionally by the SERMAS. The clinical phase began in April 2017. A total of 207 donors have been re-recruited in this period. Of these, 13 lungs, 92 livers, 307 kidneys and 6 hearts were removed.

Conclusions
Conclusion: 1) The creation of a mobile NRP-ECMO team has made posible improve organ donation in CM, allowing hospitals of first and second level to achieve this kind of organ donation. 17 of the 24 public hospitals in the CM have begun their own cDACD programs. 2) Its implementation has facilitated the use of this technique by professionals with experience, in any hospital of the CM. 3) It has facilitated the feasibility of improve organs for transplant, especially kidneys and livers. 4) Results of transplants are equal to those obtained in hospitals that have their own resources to develope a complete program of donor maintenace with PAN - ECMO

Conflicts of interest
No conflicts declared

OP31 - LIVER GRAFT ACCEPTANCE AND UTILIZATION FROM NORMOTHERMIC REGIONAL PERFUSION DONATION AFTER CIRCULATORY DEATH DONORS: A SINGLE CENTER ANALYSIS

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Background

Over the past decade, donation after circulatory death (DCD) has been the main driver of increased cadaveric organ donation in the US. When compared to rapid recovery DCD procurement, normothermic regional perfusion (NRP) allows for early liver graft functional, visual, and microscopic assessment that both improves utilization and recipient outcomes. This report shows how abdominal NRP (A-NRP) DCD program has expanded the donor pool at a single US center.

Methods

Retrospective review of donor, recipient and logistical characteristics of all A-NRP DCD liver grafts accepted for transplant and all transplanted thoracoabdominal NRP (TA-NRP) liver grafts at BSTI from September 1, 2021 through August 10, 2023.

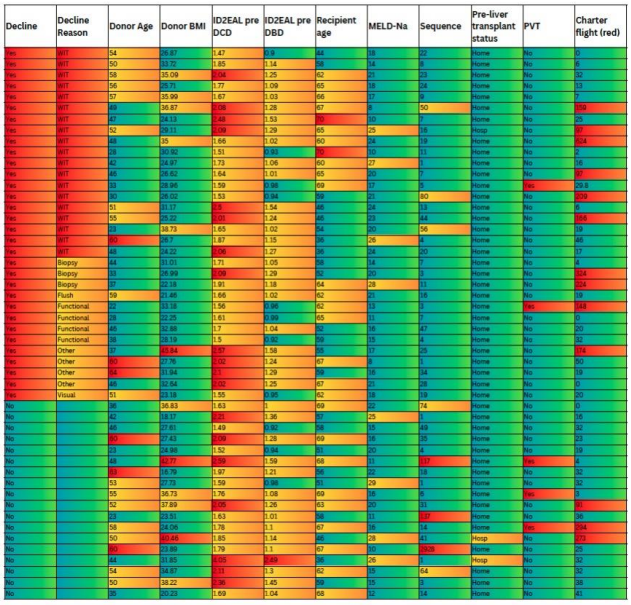
Results

Of the 50 accepted A-NRP liver grafts, 19 donors exceeded the warm ischemia time threshold for organ procurement, 31 progressed to death and were cannulated for NRP, and 18 were used for transplantation. Most accepted A-NRP donors or their intended recipients had at least one risk factor for worse recipient outcomes than a standard donor-recipient pairs. (Figure 1) Despite these risk factors, 18/31 (58%) grafts were used for transplantation, and to date, there is 100% patient and graft survival and no incidence of ischemic cholangiopathy. Figure 2 compares risk factors of transplants from A-NRP donors and thoracoabdominal (TA)-NRP donors.

Conclusions

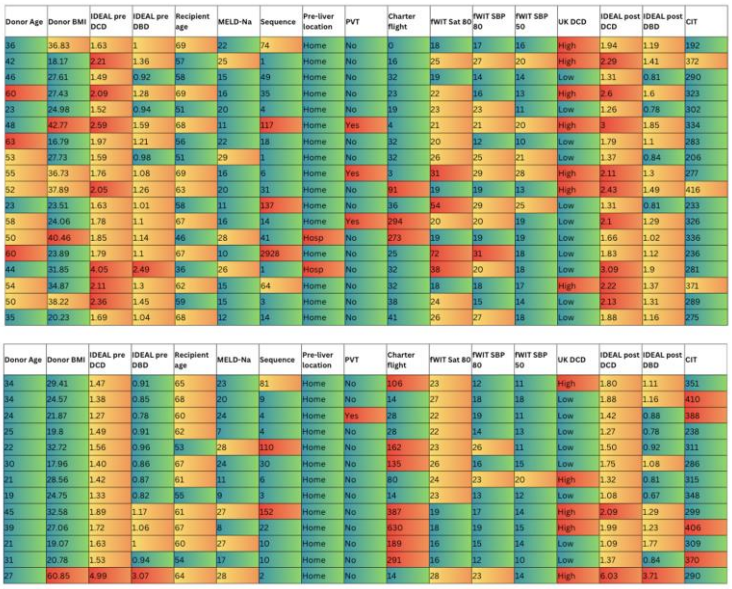
A-NRP is one of the most promising tools for expanding the utilization of DCD liver grafts while maintaining excellent outcomes.

Figure 1: Visualization of risk factors associated with all abdominal-only normothermic regional perfusion donation after circulatory death donors accepted by the Baylor Simmons Transplant Institute. The first column shows if a graft was utilized (non-utilized in red) and the second provides reasons for non-utilization (warm ischemic time in red, other in yellow). For all other columns, green represents low risk, yellow represents moderate risk and red represents high risk for donor and recipient factors. Red also represents high financial risk in the far-right column for those donors requiring charter flight transportation.



Decline	Decline Reason	Donor Age	Donor BMI	ID2EAL pre DCD	ID2EAL pre DBD	Recipient age	MELD-Na	Sequence	Pre-liver transplant status	PVT	Charter flight (red)
Yes	WIT	54	26.87	1.47	0.9	44	16	22	Home	No	0
Yes	WIT	50	33.72	1.85	1.14	58	14	8	Home	No	6
Yes	WIT	58	35.09	1.98	1.25	62	25	23	Home	No	32
Yes	WIT	56	28.71	1.77	1.09	65	18	14	Home	No	13
Yes	WIT	57	35.99	1.67	1.03	66	17	9	Home	No	7
Yes	WIT	49	36.87	2.08	1.28	67	8	50	Home	No	169
Yes	WIT	47	24.13	2.48	1.53	70	16	7	Home	No	25
Yes	WIT	52	28.11	1.98	1.29	65	25	16	Hosp	No	30
Yes	WIT	48	35	1.66	1.02	60	24	19	Home	No	104
Yes	WIT	28	30.92	1.51	0.93	70	10	11	Home	No	2
Yes	WIT	42	24.97	1.73	1.06	60	27	1	Home	No	16
Yes	WIT	46	26.62	1.64	1.01	65	20	7	Home	No	37
Yes	WIT	33	28.96	1.59	0.99	69	17	5	Home	Yes	25.8
Yes	WIT	30	26.02	1.53	0.94	59	25	80	Home	No	359
Yes	WIT	51	31.17	1.9	1.54	68	24	13	Home	No	6
Yes	WIT	55	25.22	2.01	1.24	66	23	44	Home	No	155
Yes	WIT	33	38.73	1.65	1.02	54	28	56	Home	No	19
Yes	WIT	60	36.7	1.87	1.15	66	26	4	Home	No	46
Yes	WIT	48	34.22	2.06	1.27	66	24	20	Home	No	17
Yes	Biopsy	44	31.01	1.71	1.05	58	14	7	Home	No	4
Yes	Biopsy	33	36.99	2.09	1.29	62	20	3	Home	No	124
Yes	Biopsy	37	32.18	1.91	1.18	64	28	11	Home	No	124
Yes	Flush	59	31.46	1.66	1.02	62	16	16	Home	No	19
Yes	Functional	22	33.18	1.56	0.96	62	13	3	Home	Yes	148
Yes	Functional	28	32.25	1.61	0.99	65	11	7	Home	No	0
Yes	Functional	46	32.86	1.7	1.04	52	16	47	Home	No	20
Yes	Functional	38	28.19	1.5	0.92	59	15	4	Home	No	32
Yes	Other	17	33.84	2.07	1.58	65	17	25	Home	No	104
Yes	Other	60	27.76	2.02	1.24	67	8	1	Home	No	90
Yes	Other	64	31.94	2.1	1.29	59	16	14	Home	No	19
Yes	Other	46	32.64	2.02	1.25	67	21	28	Home	No	0
No	Visual	51	33.18	1.55	0.95	62	18	18	Home	No	20
No		28	36.83	1.63	1	69	32	74	Home	No	0
No		42	18.17	2.21	1.36	67	25	1	Home	No	16
No		46	27.61	1.49	0.92	58	15	49	Home	No	32
No		60	27.43	2.09	1.28	69	16	35	Home	No	23
No		23	24.98	1.52	0.94	51	20	4	Home	No	19
No		48	42.77	2.59	1.59	68	11	117	Home	Yes	4
No		63	16.79	1.97	1.21	56	22	18	Home	No	32
No		53	27.73	1.59	0.98	51	29	1	Home	No	32
No		55	36.73	1.76	1.08	69	16	6	Home	Yes	8
No		52	37.89	2.05	1.26	63	20	31	Home	No	30
No		23	23.51	1.63	1.01	58	11	137	Home	No	36
No		58	24.06	1.78	1.1	67	16	14	Home	Yes	294
No		50	40.46	1.85	1.14	46	28	41	Hosp	No	273
No		60	23.89	1.79	1.1	67	19	2928	Home	No	25
No		44	31.85	4.05	2.49	36	26	1	Hosp	No	32
No		54	34.87	2.11	1.3	62	15	64	Home	No	32
No		50	38.22	2.36	1.45	59	15	3	Home	No	38
No		35	20.23	1.69	1.04	68	12	14	Home	No	41

Figure 2: Visualization of risk factors associated with A-NRP DCD liver transplants (top table) and TA-NRP DCD liver transplants (bottom table). Green represents low risk, yellow represents moderate risk and red represents high risk for donor and recipient factors. Red also represents high financial risk for those donors requiring charter flight transportation. Pre- and post-transplant ID2EAL scores were calculated for donor recipient pairs as both DCD donors and DBD donors.



Donor Age	Donor BMI	IDEAL pre DCD	IDEAL pre DBD	Recipient age	MELD-Na	Sequence	Pre-liver location	PVT	Charter flight	fWIT Sat 80	fWIT SBP 80	fWIT SBP 50	UK DCD	IDEAL post DCD	IDEAL post DBD	CIT
36	36.83	1.63	1	69	22	74	Home	No	0	18	17	16	High	1.94	1.19	192
42	18.17	2.21	1.36	57	25	1	Home	No	16	25	27	20	High	2.29	1.41	372
46	27.61	1.49	0.92	58	15	49	Home	No	32	19	14	14	Low	1.31	0.81	290
60	27.43	2.09	1.28	69	16	35	Home	No	23	22	16	13	High	2.6	1.6	323
23	24.98	1.52	0.94	51	20	4	Home	No	19	23	23	11	Low	1.26	0.78	302
48	42.77	2.59	1.59	68	11	117	Home	Yes	4	21	21	20	High	3	1.85	334
63	16.79	1.97	1.21	56	22	18	Home	No	32	20	12	10	Low	1.79	1.1	283
53	27.73	1.59	0.98	51	29	1	Home	No	32	26	25	21	Low	1.37	0.84	206
55	36.73	1.76	1.08	69	16	6	Home	Yes	8	31	29	28	High	2.11	1.3	277
52	37.89	2.05	1.26	63	20	31	Home	No	30	19	19	13	High	2.43	1.49	416
23	23.51	1.63	1.01	58	11	137	Home	No	36	64	29	25	Low	1.31	0.81	233
58	24.06	1.78	1.1	67	16	14	Home	Yes	294	20	20	19	Low	2.1	1.29	326
50	40.46	1.85	1.14	46	28	41	Hosp	No	273	19	19	19	Low	1.66	1.02	336
60	23.89	1.79	1.1	67	10	2928	Home	No	25	72	31	18	Low	1.83	1.12	236
44	31.85	4.05	2.49	36	26	1	Hosp	No	32	38	20	18	Low	3.09	1.9	281
54	34.87	2.11	1.3	62	15	64	Home	No	32	18	18	17	High	2.22	1.37	371
50	38.22	2.36	1.45	59	15	3	Home	No	38	24	15	14	Low	2.13	1.31	289
35	20.23	1.69	1.04	68	12	14	Home	No	41	26	27	18	Low	1.88	1.16	275

Donor Age	Donor BMI	IDEAL pre DCD	IDEAL pre DBD	Recipient age	MELD-Na	Sequence	Pre-liver location	PVT	Charter flight	fWIT Sat 80	fWIT SBP 80	fWIT SBP 50	UK DCD	IDEAL post DCD	IDEAL post DBD	CIT
34	29.41	1.47	0.91	65	23	81	Home	No	106	23	12	11	High	1.80	1.11	351
34	24.57	1.38	0.85	68	20	9	Home	No	14	27	18	18	Low	1.88	1.16	410
24	21.87	1.27	0.78	60	24	4	Home	Yes	28	22	19	11	Low	1.42	0.88	388
25	19.8	1.49	0.91	62	7	4	Home	No	28	22	14	13	Low	1.27	0.78	238
22	32.72	1.56	0.96	53	28	110	Home	No	162	23	26	11	Low	1.50	0.92	311
30	17.96	1.40	0.86	67	24	30	Home	No	135	26	16	15	Low	1.75	1.08	286
21	28.56	1.42	0.87	61	11	6	Home	No	80	24	23	20	High	1.32	0.81	315
19	24.75	1.33	0.82	55	9	3	Home	No	14	23	13	12	Low	1.08	0.67	348
45	32.58	1.89	1.17	61	27	152	Home	No	387	19	17	14	High	2.09	1.29	299
39	27.06	1.72	1.06	67	8	22	Home	No	630	18	19	15	High	1.99	1.23	406
21	19.07	1.63	1	60	27	10	Home	No	189	16	15	14	Low	1.09	1.77	309
31	20.78	1.53	0.94	54	17	10	Home	No	291	16	12	10	Low	1.37	0.84	370
27	60.85	4.99	3.07	64	28	2	Home	No	14	28	23	14	High	6.03	3.71	290

Conflicts of interest
No conflicts declared

OP32 - RESPIRATORY PHYSIOTHERAPY, A NEW TOOL TO INCREASE THE LUNG DONOR POOL IN DCD DONORS

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Background
Mechanical Insufflation-Exsufflation(MI-E) is a respiratory physiotherapy device that simulates a cough, aiding in the clearance of secretions and improving oxygenation. Although routinely used for respiratory physiotherapy in critically ill patients, no evidence is available regarding its use in the maintenance/optimization of solid organ donors. We aimed to evaluate the impact on oxygenation, and safety when used as a part of the donor management protocol in cDCD donors

Methods
A prospective multicentre randomized study was conducted in 4 Spanish centres. Ninety-four eligible donors were included. After undergoing a standardized maintenance procedure (OPT) according to Spanish national guidelines, patients were randomized to the control (C) or the interventional group (MIEg- four series of 5 MI-E cycles +40/-60 inspiratory/expiratory pressure-using Cough Assist®). A blood gas analysis (FiO2 1/PEEP 5 mmHg) was obtained before and after OPT, as well as 10 and 60 minutes after MIE (MIEg) or 60 minutes after OPT (C). The study measured PaO2 values, the percentage of eligible lung donors (ELD, defined as PaO2/FiO2 > 300 mmHg), and the presence of complications such as pneumothorax or hemodynamic instability resulting from the technique.

Results
Fifty-one cDCD donors were analysed and, non-eligible lung donors (NELD) due to Pa02/FIO2< 300mmHg(n=13) were analysed separately as well. MIE-g showed an increase in PaO2/Fi02 at 10 and 60 min post-intervention. MIE implementation increased the percentage of ELD at 10 and 60 min after intervention when compared with the control group. The NELD presented the same results. None of these differences were statistically significant. No complications derived from the technique were observed.

Conclusions
Respiratory physiotherapy using MI-E in cDCD donors seems to be a cost-effective and safe tool to increase the lung donor pool and optimize the donors' oxygenation. Routine inclusion of MI-E in lung cDCD donor management could be considered.

Table 1.

	cDCD			cDCD NELD		
	C n=33	MIEg n=18	p	C n=9	MIEg n=4	p
Initial PaO_2 (DS); mmHg	371 (118.6)	365.94 (102.05)	0.87	222.7 (68.98)	224.9 (49.43)	0.94
10minutes PaO_2 (DS); mmHg	387.53 (118.8)	370.9 (78.67)	0.5	255.1 (107.4)	300 (79.9)	0.38
60minutes PaO_2 (DS); mmHg	347.41 (107.1)	368.12 (82.42)	0.46	255.11 (92.31)	289 (83.59)	0.53
ELD 0	72.7	77.8	0.69	-	-	
ELD r	78.8	77.8	0.93	33.3	-	0.18
ELD 10' (%)	75.8	83.3	0.52	33.3	50	0.56
ELD 60' (%)	63.6	72.2	0.53	33.3	50	0.56

NELD: non-eligible lung donor; ELD: eligible lung donor.

Conflicts of interest
No conflicts declared

References
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Mútua Madrileña Fundation: Research Grant AP176932021

OP33 - ORGAN DONOR POTENTIAL AFTER EXTRACORPOREAL CARDIOPULMONARY RESUSCITATION FOR OUT-OF-HOSPITAL CARDIAC ARREST – A POST-HOC ANALYSIS OF THE INCEPTION-TRIAL

Hanne Verberght [1, 2]; Jody Lunsing [3]; Thijs Delnoij [3, 4]; Martje Suverein [3, 5]; Jos Maessen [6, 5]; Roberto Lorusso [6]; Marcel Van De Poll [3, 2, 1]; The Inception Investigators [3]
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Background
Extracorporeal cardiopulmonary resuscitation (ECPR) is a rescue support in refractory out-of-hospital cardiac arrest (OHCA). Due to ECPR, patients who otherwise would have died at the emergency department (ED) undergo ICU admission. Still, many of them die, frequently after withdrawal of life sustaining therapies. However, in these patients there is time to evaluate their potential suitability for organ donation. The aim of this study was to evaluate the impact of ECPR on the number of potential organ donors after refractory OHCA.

Methods
We performed a post-hoc analysis of the multicentre INCEPTION-trial that randomized 134 OHCA patients between conventional CPR (CCPR) and ECPR. A detailed patient report, including liver and kidney function on the day of death, details about the reanimation and medical history were presented to transplant physicians, who judged whether the liver and/or kidneys would have been acceptable for organ donation. In addition to the intention to treat analysis, we performed an “as-treated” analysis which was limited to patients arriving without return of spontaneous circulation (ROSC) at the ED.

Results
There were 70 and 64 patients randomized to ECPR and CCPR respectively. Of these, 13 (19%) and 4 (6%) were potential organ donors (X2, p=0.060). In the patients arriving without ROSC at the ED, the number of potential donors was 14/55 (26%) in patients actually treated with ECPR vs. 0/59 in patients treated with CCPR (p<0.001).

Conclusions
Although ECPR is currently used with life-saving intentions, it might simultaneously increases the number of potential organ donors after cardiac arrest.

Conflicts of interest
No conflicts declared

OP34 - DONOR TIME TO DEATH AND KIDNEY TRANSPLANT OUTCOMES: GLOBAL IMPLICATIONS FOR DCD STAND DOWN TIMES

Samuel Tingle [1, 2, 3]; Dik Hang Nicholas Chung [1]; Abdullah Malik [1, 4, 3]; Georgios Kourounis [5, 2, 3]; Emily Thompson [1, 4, 3]; Emily Glover [6, 4, 3]; Jennifer Mehew [7]; Jennifer Philip [8]; Dale Gardiner [9, 10]; Gavin Pettigrew [11]; Chris Callaghan [12]; Neil Sheerin [3, 4, 1, 6]; Colin Wilson [1, 3, 2]

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Background

Most organ procurement organisations internationally stand down from potential ‘donors after circulatory death’ (DCD) 1-2 hours after the withdrawal of life-sustaining treatment (WLST); the UK observes a threshold of 3 hours. We aimed to determine whether ‘time to death’ (TTD) was a predictor of kidney transplant outcome; secondary objectives were the assessment of the impact of subsequent ischaemic times.

Methods

This was a population-cohort study from 2013-2021 including data from 23 centres nationally extracted from the UK Transplant Registry. Adult recipients of DCD kidney transplants were included, and multi-organ and antibody incompatible transplants were excluded. The primary outcome was 12-month eGFR; secondary outcomes were delayed graft function (DGF) and graft survival censored at 5 years.

Results

7,183 kidney transplants were included. Donor TTD was not associated with recipient 12-month eGFR on adjusted linear regression; change per doubling of TTD = -0.25 (95% CI, -0.68 to 0.19, P=0.27; Figure 1). TTD (Log2-transformed) was also not associated with DGF (aOR=1.01; 95% CI 0.97-1.06, P=0.65) or graft survival (aHR=1.00; 95% CI, 0.95-1.07, P=0.92; Figure 2). These findings were confirmed with restricted cubic spline models and tests of interaction (including NRP, donor age, ischaemic times). Contrastingly, systolic time, cold ischaemic time, and reperfusion time were important independent predictors of outcome. UK stand-down policy (minimum 3 hours) has led to 14.1% and 4.4% more DCD transplants compared to 1- and 2-hour stand-down policies respectively.

Conclusions

Donor TTD does not impact on outcomes following DCD kidney transplantation, in contrast to subsequent ischaemic times. This has international ramifications - increasing to a minimum 3-hour stand-down time could safely increase the number of kidney transplants, addressing international organ shortages and long waiting times.

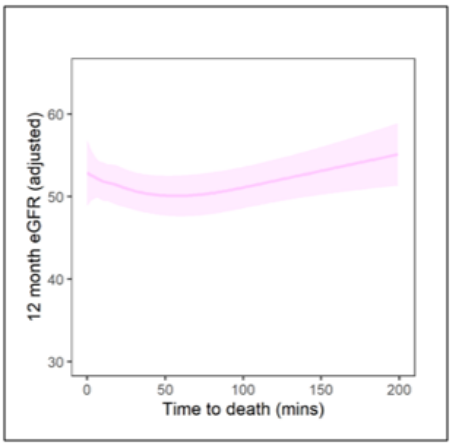

Figure 1: Restricted cubic spline model illustrating the relationship between TTD and 12-month eGFR adjusting for confounders.

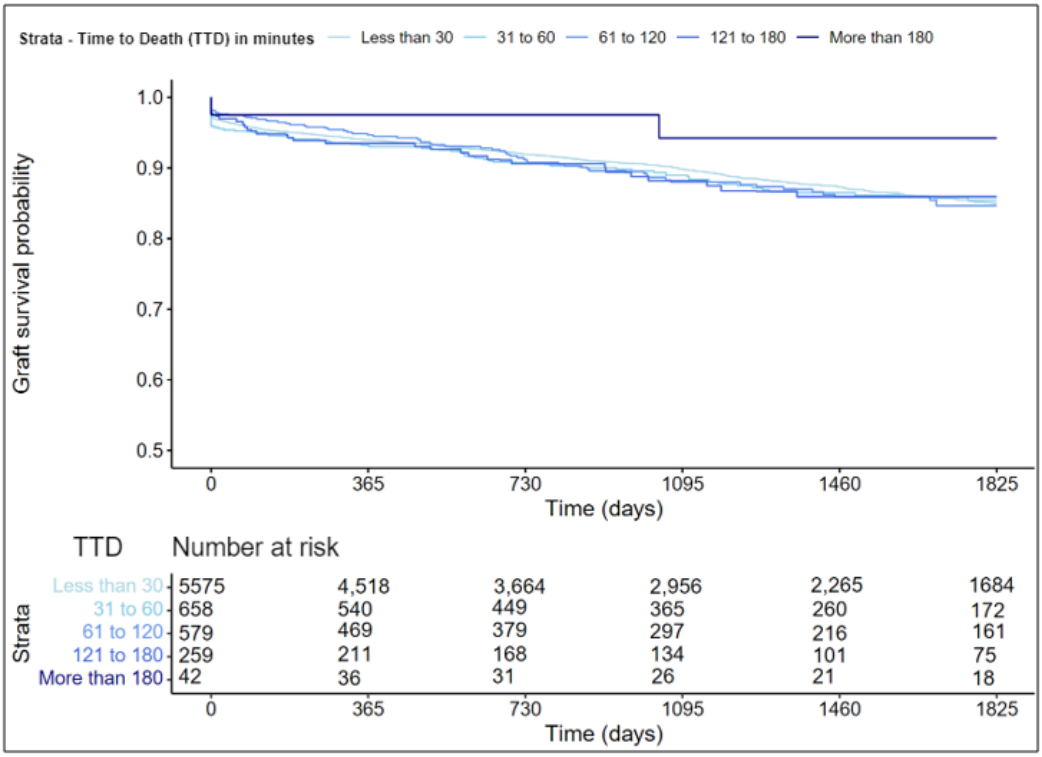

Figure 2: Kaplan-Meier plot for death censored graft survival stratified by TTD categories (minutes). Pooled data from 20 imputed datasets. Includes patients with complete graft survival follow up data (n=7113). Kaplan-Meier plot for death censored graft survival stratified by time to death categories (minutes). Pooled data from 20 imputed datasets. Includes patients with complete graft survival follow up data (n=7113).

Conflicts of interest
No conflicts declared

OP35 - ELIGIBLE DBD DONORS PROCEEDING VIA THE DCD PATHWAY; INCIDENCE, AETIOLOGY AND OUTCOMES IN THE UK

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Background
Donation after Circulatory Death (DCD) is increasing in incidence in the UK (1. 2) may occur where neurological death has been diagnosed rather than donation proceeding via the donation after brain death (DBD) pathway. Data on incidence, reasons for divergence from the DBD pathway as well as graft and recipient outcome in the UK is unknown.

Methods
We aimed to review all cases between 2012 and 2022 in the UK where elligible DBD donors proceeded via the DCD pathway. We specifically reviewed, the incidence, the stated reason for divergence from this pathway, organ utilisation rates in the cohort group Vs 'standard' DCD and DBD control groups as well as comparing kidney recipient graft and patient survival rates between these groups

Results
123 elligible DBD donors propceeded to donate via the DCD pathway in the UK over these ten years. A majority (76%) of these cases proceeded as DCD due to a familial desire to be present at the time of asytole. Other reasons included cardiac arrest prompting crash DCD. Examples of pertinient quotes by family members from clinical notes included the following; "I have been with him for his first breaths in the world and want to be with him when this ends". Overall a greater number of organs were donated and transplanted in the standard DBD group Vs the standard DCD group. The DBD to DCD cohort group donation and transplantation rates sit in between the two control groups. Median times to asytole were similar between the cohort and DCD control. whereas in the DCD group had several examples of prolonged time to asystole (maximum 235 minutes), whereas the in the cohort group the maximum was 28 minutes. Outcomes from kidney donation in the DBD to DCD cohort, in terms of Delayed Graft Function, graft and recipient survival are comparable to those who donate via the DBD pathway, with a trend towards improved outcomes Vs the standard DCD donors.

Conclusions
Elligible DBD donors proceeding to donate via the DCD pathway is a rare event in the UK and overwhelmingly occurs due to families wanting to witness their loved ones heart stopping. Organ utilisation rates as well as graft and recipient outcomes in this group are comparable to standard DBD donors.

Table 1 - Summary statistics for time to mechanical asystole for standard DCD and DBD to DCD cohort

Analysis Variable : TW_ASYS_MINS									
treatment	N	Median	Lower Quartile	Upper Quartile	Mean	Minimum	Maximum	Std Dev	N Missing Data
Standard DCD	336	15	12	24	28	0	235	34	5
DBD to DCD cohort	107	13	10	17	14	0	25	5	42

Table 2 – Logistic regression analysis for eGFR and DGF against DBD control

Analysis of cases in cohort and control (DBD 2:1)					
	DBD to DCD Cohort N (%)	Standard DBD N (%)	Total N (%)	Odds Ratio (95% CI)	p-value
eGFR<30 at 3 months / N	15/138 (10.9)	26/288 (9.0)	41/426 (9.6)	1.23 (0.63 - 2.41)	0.5501
eGFR<30 at 12 months / N	10/149 (6.7)	23/294 (7.8)	33/443 (7.4)	0.85 (0.39 - 1.83)	0.6713
DGF / N	38/166 (22.9)	57/310 (18.4)	95/476 (20.0)	1.32 (0.83 - 2.09)	0.2448
Note: eGFR at 3 months was missing for 56 (16.3%) cases in the control group and 35 (20.3%) in the cohort. eGFR at 12 months was missing for 51 (14.8%) cases in the control group and 23 (13.4%) in the cohort. DGF was missing for 34 (9.9%) cases in the control group and 6 (3.5%) in the cohort					

Table 2 – Logistic regression analysis for eGFR and DGF against DBD control

Conflicts of interest
No conflicts declared

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2. https://www.odt.nhs.uk/statistics-and-reports/annual-activity-report/
1. https://www.transplant-observatory.org/

POSTERS

PP01 - CHALLENGES IN DONOR ACQUISITION: ASSESSING THE EFFECTIVENESS OF STRATEGIES IN THE EMERGENCY DEPARTMENT

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Background
The Emergency Department (ED) of a hospital is one of the largest sources of potential donors, who can be of diverse types, and the place where donation processes are initiated. It is crucial to have professionals who are aware of donation, established work circuits, and qualified personnel to successfully execute these processes.
To analyse the number of donors generated in the Emergency Department of a tertiary hospital and compare it with the number of donors generated in the rest of the hospital. Several types of donors that can be generated. Quantify those organ donors detected and generated in emergencies, who are ultimately admitted to the hospital for the purpose of donation.
And assessing the need to establish a continuous surveillance network for patients arriving at the emergency department.

Methods
Registry of cadaveric donors detected and generated in a tertiary hospital. Prospective study of one year duration (01/01/2023 to 01/01/2024). 174 cases met inclusion criteria (116 Males/58 Females): 127(73%) Tissue Donors (TD), 14(8%) Brain Dead Donors (DBD), 20(11.5%) Donation after Controlled Cardiac Death (DCD), 13(7.5%) Donation after Uncontrolled Cardiac Death (uDCD).

Results
The registry allowed determining that 42(24%) of the cadaveric donations generated in the hospital were in the Emergency Department. These include TD 29/42(69%) and uDCD 13/42(31%). 3(21.4%) out of 14 DBD and 2(10%) out of 20 DCD donors were detected and generated with family consent in the Emergency Department before their admission to the Critical Care Unit, eventually becoming donors.

Conclusions
The registry confirms a significant incidence of donors in the Emergency Department. The results show different percentages of activity depending on the type of donor. Personnel with knowledge of the circuit and/or trained Promotes donation processes in the Emergency Department.
And consequently, strict control of patient admissions to the emergency department increases the early detection of potential donors.

Figure 1

Conflicts of interest
No conflicts declared

PP02 - SWEDISH INTENSIVE CARE NURSES' KNOWLEDGE AND ATTITUDES TO DONATION AFTER CIRCULATORY DEATH BEFORE A NATIONAL IMPLEMENTATION

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Background

An increasing population and a lack of identified potential organ donor patients make the waiting list for people needing a new organ constantly growing. Donation after Circulatory Death (DCD) is a method to achieve the demand for transplantable organs. However, it implies new challenges in nursing care and there is a lack of studies investigating nurses' attitudes and knowledge of DCD. The objective of this study was to determine and describe ICU-nurses knowledge and attitudes toward DCD before a national implementation.

Methods

The study has a mixed-method design. A convenience sampling method was used for this case study. A study-specific 26-item tool with fixed and free-text answers was developed and sent to *n*=145 intensive care nurses (ICNs) working in four intensive care units in Sweden. Data were analyzed descriptively, and correlation analyses were performed. The free-text answers were qualitatively analysed.

Results

Fifty-three percent of the participants had limited knowledge about the DCD process. Respondents who had previous education on DCD had significantly higher knowledge of DCD (r=.380, p = 0.006), followed the public debate regarding organ donation (r=.423, p=0.002), and thought about ethical perspectives of DCD (r=.386, p= 0.022). The qualitative analysis resulted in four categories: The importance of the team, Need for ethical discussions, Increased knowledge of DCD, and Unanswered questions and unmet needs.

Conclusions

Nurses with previous education in organ donor care had higher knowledge, displayed a more positive attitude towards implementing DCD in their units and followed the public debate on DCD. The importance of interprofessional teamwork and ethical perspectives were key aspects that were emphasized to facilitate DCD implementation. These findings may lead to higher motivation in identifying DCD donor patients and implementing the DCD process, which is needed due to a global lack of transplantable organs.

Conflicts of interest

No conflicts declared

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PP03 - BARRIERS AND OPPORTUNITIES FOR DONATION AFTER CIRCULATORY DEATH: ORGAN YIELD AND DONOR UTILIZATION IN THE UNITED STATES

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Background

Donation after circulatory death is the primary reason for the significant increase in deceased organ donation over the past decade in the US. Nonetheless, the organ yield per DCD donor remains significantly lower than for DBD, and there are more dry runs with DCD donors due to non-expiration of the donor. Understanding the reasons why the DCD yield is lower may help further expand organ availability and decrease the gap with DBD yield.

Methods

Data for overall DCD donation and organ yield per donor and dry runs were obtained from the UNOS database and data from Southwest Transplant Alliance in Texas and Lifeshare of Oklahoma on DCD utilization was collected.

Results

UNOS data show that DCD donors represented 36% of all US donors in 2023, with a 40.7% increase since 2020. The organ transplanted per donor from DCD donors was only 1.77 vs 3.17 in DBD donors. In 2 large OPOs, Southwest Transplant Alliance and Lifeshare of Oklahoma, the dry runs accounted for 58.8% and 46.8% of all attempts in 2023 vs 65.9% and 37.5% respectively in 2022. In 40% of cases, the reason for the dry run was the non-expiration of the donor within the allotted time, an increase from 29% in 2022.

Conclusions

Despite a significant increase in attempted DCD donations, the number of dry runs and the yield of organs per donor remains significantly lower than for DBD donation. The primary reason for this lower yield remains the non-expiration of the donor within the allotted time. There is a need to develop better prediction models for DCD expiration and to revisit the ethics of clinical intervention after end-of-life measures. Moreover, simple interventions such as increasing total warm ischemia time limits and standardizing the sue of normothermic regional perfusion has the potential to increase utilization rates of abdominal organs in particular.

Conflicts of interest

No conflicts declared

PP05 - ARE KIDNEY TRANSPLANT OUTCOMES OF RECEIVERS VARYING BY CATEGORIES OF DONORS? A SINGLE-CENTRE-DONATION-TEAM EXPERIENCE

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Background
Over the last decade, patients on the waiting lists for kidney transplantation are still increasing. In France in 2006, the yearly potential for uncontrolled Donation after Circulatory Death (uDCD) was around 400 donors, of which, only 20 (4%) are harvested (2019). Since 2015, the roll-out of controlled DCD (cDCD) procedures increased the number of kidneys grafted whereas those from uDCD were decreasing.
We evaluated the kidneys outcome associated with uDCD vs cDCD and Donor after Brain Death (DBD) based on transplantations.

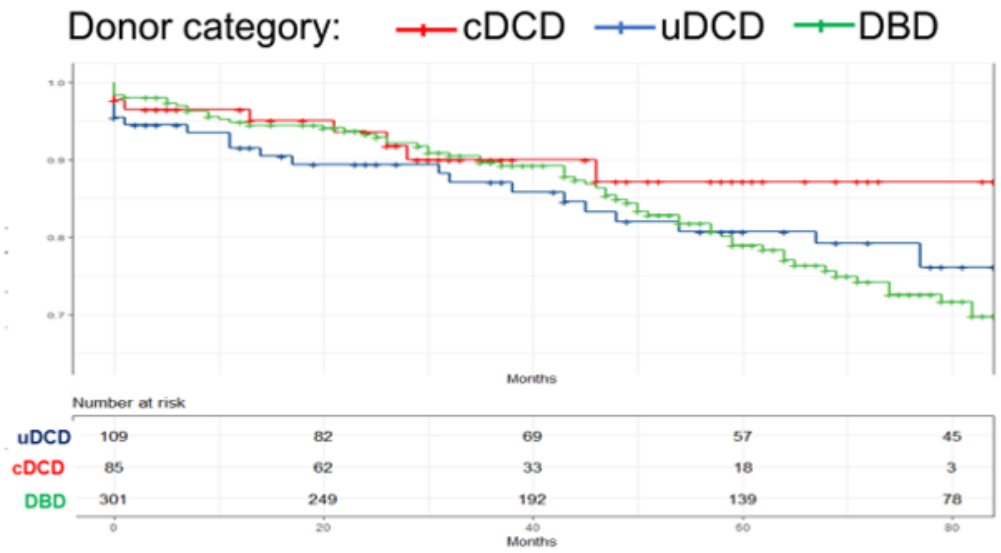
Methods
Single-centre registry-based analysis of outcomes for any donor category (cDCD, uDCD, DBD) from 2011 to 2021: early graft dysfunction rate, overall survival and without graft dysfunction 80 months after transplantation. We also estimated hospital costs associated with the donor's care

Results
Primary non-function (PNF) was similar between groups (*p*-value = 0.422). Hospital-cost was lower among uDCD donors than others (*p*-value < 0.001), Table.

Conclusions
Receivers from uDCD donors seem to have similar outcomes to those from another donor category, at a cheaper cost. As uDCD and cDCD require similar teams and organization, authorized cDCD centers may have skills to reimplant uDCD programs. If a national-based registry analysis confirms these results, uDCD procedures should be promoted to increase the availability of kidney grafts

	N donors	N recipients	PNF (N = 499)	Hospital costs (N = 269)
cDCD	44	87	2 (2.3%)	27,742 € [IQR, 22,391-36,489]
uDCD	63	110	5 (4.5%)	9,964 € [IQR, 9,365-10,279]
DBD	162	302	5 (1.7%)	11,433 € [IQR, 9,971-14,531]

Table: Donor category ; Primary Non Function (PNF) and average costs



Recipient kidney survival by donor catgory

Conflicts of interest
No conflicts declared

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Kidney Transplant From Uncontrolled Donation After Circulatory Death: Contribution of Normothermic Regional Perfusion;Transplantation 2020;104: 130–136

PP06 - CARDIAC PRESERVATION IN THORACOABDOMINAL NORMOTHERMIC REGIONAL PERFUSION IN TYPE III OR CONTROLLED ASYSTOLE DONORS WITH SEVERE HYPOXEMIC RESPIRATORY FAILURE

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Background
Heart transplantation from controlled asystole donors has expanded organ availability. The Spanish protocol involves normothermic regional perfusion (NRP), followed by in-situ cardiac validation and static cold preservation. This study aims to assess an alternative cardiac preservation strategy that could warrant adequate oxygenation for gradual weaning from extracorporeal support in donors with severe respiratory failure.

Methods
This observational, prospective and single-center analysis includes cardiac asystole type III donors who had hypoxemic respiratory failure before death. In addition to pre-mortem femoral vessel cannulation, the right jugular vein is cannulated. After withdrawing life support measures, cardiac arrest occurs, and after 5 minutes, death is certified. Subsequently, sternotomy, clamping, and sectioning of the supra-aortic trunks are performed, followed by the initiation of NRP. The donor is then reintubated. After restoring cardiac activity, gradual weaning from extracorporeal support is performed. In the presence of severe respiratory impairment, a Y-shaped bypass is integrated into the extracorporeal circuit, allowing transition to veno-venous support via the right jugular vein. Once the heart is validated, the ascending aorta is clamped, followed by cold cardioplegia and cardiectomy. This approach ensures optimal oxygenation conditions during the weaning process.

Results
At Virgen of Arrixaca Hospital, 3 NRP preservation procedures were conducted with the described characteristics. Functional warm ischemia time ranged between 13-20 minutes (Table 1). All recipients showed good graft function upon discharge.

Conclusions
In controlled asystole donors with hypoxemic respiratory failure, the usual cardiac preservation strategy is supplemented by the possibility of switching from veno-arterial support mode to veno-venous after regaining cardiac activity, thereby ensuring adequate oxygenation that facilitates organ validation, enabling a larger pool of asystole cardiac donors.

	Donor 1	*Donor 2*	*Donor 3*
Age (years)	51	33	42
Sex	Male	Male	Male
Cause of death	Interstitial pneumonia secondary to amyopathic dermatomyositis anti-MDA5	Severe polytrauma with bronchoaspirative pneumonia	Severe traumatic brain injury with bronchoaspirative pneumonia
Veno-venous ECMO in ICU (Yes/No; days)	Yes; 11	Yes; 36	No; 0
ICU stay (days)	12	39	11
Functional warm ischemia time (min)	13	20	18
Time from initiation of NRP to heartbeat (min)	1	0.5	4
NRP total time (min)	28	6	23

Table 1: Donors and preservation features. ECMO, extracorporeal membrane oxygenation; ICU, Intensive Care Unit; NRP, normothermic regional perfusion.

Conflicts of interest
No conflicts declared

PP07 - SPLIT LIVER TRANSPLANTATION FROM DONATION AFTER CIRCULATORY DEATH (DCD) PATIENT : A CASE REPORT

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Background
There are currently few reports involving split liver transplants using DCD grafts. Herein, we would like to share our experiences and insights regarding split liver transplants utilizing DCD grafts.

Methods
On August 3, 2022, we conducted a split liver transplantation using a DCD graft. The donor was a 37-year-old man with a BMI of 35.4 kg/m². He had experienced hypoxic brain injury and remained in the ICU for 24 days before becoming a donor without any vasopressors and inotropic agents. The graft looks healthy and has only mild fatty change. The reason that we would like to perform a split liver transplant is that the graft is too big for the first recipient. The warm ischemia time was 18 minutes, and the total weight of the liver graft was 2268 grams. The graft was split by cavitron ultrasonic surgical aspirator (CUSA) on the back table. Finally, the left lobe weighed 730 grams, while the right lobe weighed 1538 grams.

Results
The first recipient was a 57-year-old woman who underwent a deceased donor liver transplantation in 2016 for hepatocellular carcinoma. Unfortunately, she developed biliary anastomotic stricture that needed repeat ERBD replacement and then developed graft failure by recurrent cholangitis. MELD score was 20. The graft utilized was from the left lobe, and the cold ischemia time was 262 minutes. However, the patient experienced bowel perforation just 3 days after the liver transplant procedure and received surgery to repair bowel perforation. Tragically, the patient succumbed to intra-abdominal infection 3 months later. Importantly, there was no liver graft nonfunction or ischemic cholangitis during this period. The second recipient was a 37-year-old man diagnosed with alcoholic liver cirrhosis. MELD score was 14. In this case, the graft originated from the right lobe of the liver, resulting in a cold ischemia time of 736 minutes. Following the surgery, the patient's recovery was successful, and he was discharged in a stable condition without any biliary problems on postoperative day 21.

Conclusions
In the previous literature, there is no report talking about split liver transplantation being performed with DCD grafts in humans. However, based on our experiences, under appropriate conditions, split liver transplantation with DCD grafts is a viable option. Furthermore, it may even be worth considering utilizing specialized perfusion machines to enhance the feasibility of divided liver transplantation.

Parameter2	Category	Risk score	Recipient 1	Recipient 2
Donor age	≤60 yr	0	37yr	
	>60 yr	2		
Donor BMI	≤25kg/m2	0	35.4kg/m2	
	>25kg/m2	3		
Functional donor warm ischemia	≤ 20 min	0	18min	
	>20 to ≤30 min	3		
Cold ischemia time	≤6h	0	262min	736 min
	>6h	2		
Recipient age	≤60yr	0	57	37
	>60yr	3		
Recipient lab MELD	≤25 points	0	20	14
	>25 points	2		
Retransplantation	No	0	yes	no
	Yes	9		

Conflicts of interest
No conflicts declared

PP08 - LIVER TRANSPLANTATION FROM DCD DONOR WITH MELAS SYNDROME, A CASE REPORT AND A WORD OF CAUTION

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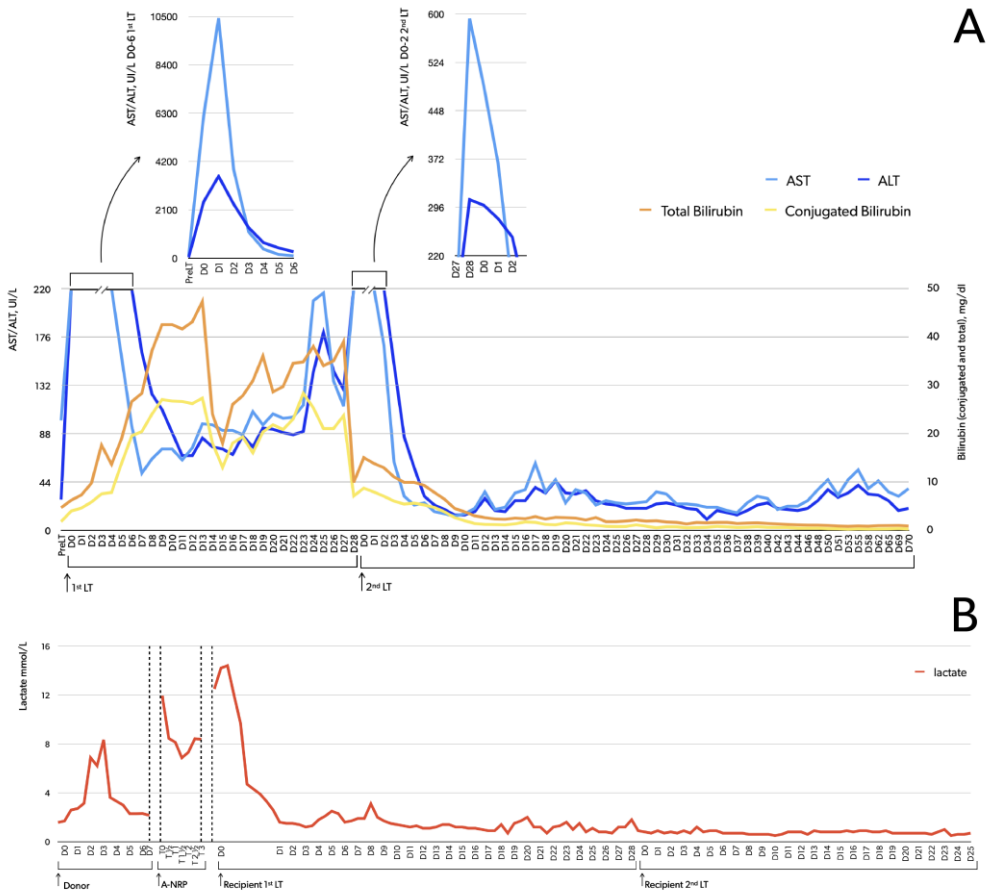
Background
Mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes (MELAS) syndrome is a mitochondrial disease (MD), mostly affecting muscles and nervous system. MELAS presents with seizures and/or dementia, lactic acidosis, and recurrent stroke-like episodes, leading to progressive brain injury. To date, no absolute contraindications exists to organ procurement from donors with MELAS and other MDs.

Methods
We report a first case of liver transplantation (LT) from a 57 year-old male donor with genetically confirmed MELAS syndrome undergoing circulatory determination of death (DCD) and abdominal normothermic regional perfusion (A-NRP). The liver was deemed suitable for transplantation after a 207-minute long NRP. After recovery, the graft underwent 202 minutes of static cold storage (SCS), and 288 minutes of hypothermic oxygenated liver perfusion (HOPE), with a total cold preservation time (CPT) of 490 minutes.

Results
After transplantation, early graft dysfunction (EGD) occurred, with persistently marked elevation of liver enzymes and bilirubin (figure 1). Portal vein thrombosis was detected. Transjugular liver biopsy showed centrilobular and periportal hepatocytic necrosis with cholestasis, focal cholangitis and endotheliitis. The recipient was re-listed, and received a graft from a DND donor on post-LT day 28. The graft utilized for the re-transplantation underwent 295 minutes of SCS and 65 minutes of HOPE, with a total CPT of 360 minutes. LT was successful, and early normalization of liver enzymes, bilirubin and lactate was observed. The patient was discharged home after 70 days

Conclusions
We report negative outcome for a LT from a DCD organ donor with MELAS syndrome. Re-transplantation was required due to early development of graft failure. Different confounding factors might have played a role, but we could not exclude the impact of this specific mitochondrial disease.
A diagnosis of rare disorder requires careful evaluation to define acceptability of associated risk and risk to benefit ratio in the selected recipients. Strict selection criteria should be implemented, with referral to duration of WIT, biopsy and laboratory results, to define the associated risk and properly matching recipients. Until more data will be available, utmost caution is advised when considering these potential donors, and when evaluating livers for transplantation.

Trend in blood lactate concentration in the donor before and during A-NRP, and in the recipient over post transplantation days (D) after first and second LT. B: Trend in liver enzymes, total bilirubin and conjugated bilirubin in the recipient over post transplantation days (D) after first and second LT. Steep, temporary decrease in bilirubin concentration post 1st LT D12 refers to implementation of hemabsorption therapy; as this was interrupted new increases was observed. A-NRP: abdominal normothermic regional perfusion; LT: liver transplantation; AST: aspartate transaminase; ALT: alanine transaminase.



Conflicts of interest
No conflicts declared

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PP09 - CAPNOMETRY LEVES AS AN INDICATOR OF RENAL GRAFT EVOLUTION AFTER CIRCULATORY DEATH

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Background
Donation in Non Controlled Asystole Death (NCAD) by the Emergency Medical Services is especially important. Capnometry is a non-invasive method, very useful for understanding cell metabolism. It is considered that renal graft recipients with higher capnometry figures obtain better renal outcome results after transplantation. Aim: The objective of the study is to analyze whether there is an association between the capnometry data of the NCADs and the shortterm evolution of renal function.

Methods
Observational, ambispective study that relates the capnometry levels of NCADs with the evolution of renal function from these donors during the first year after transplantation. Patients who underwent out-of-hospital cardiac arrest without response to advanced CPR maneuvers were selected as NCAD, without presenting exclusion criteria. The following variables were collected from the donors: age, sex, suspected cause of death, time to start CPR and capnometry levels at baseline, midway, and transfer, from the PCR. In the recipients, the following were collected: cause of renal failure (CRF), number of dialysis after transplantation, non-primary function, renal graft function delay, creatinine and proteinuria values after transplant. The study was accepted by Ethics Committee.

Results
Data were collected from 34 potential donors, of which 22 kidneys were transplanted. Differences in transfer capnometry were observed between patients who needed post-transplant dialysis versus patients who did not. In addition, a moderate but significant negative correlation was observed between the number of dialysis sessions and the value of capnometry in the transfer. Transfer capnometry correlated inversely and significantly with serum creatinine and proteinuria values at 15 days and 1 month.

Conclusions
Capnometry values in the transfer were positively correlated with creatinine and proteinuria levels at the first month, in such a way that grafts from donors with higher capnometry values had lower serum creatinine and proteinuria values

Conflicts of interest
No conflicts declared

PP10 - TRANSFER OF CANDIDATES TO DCD AFTER EUTHANASIA INITIATED AT HOME

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Background
The provision of aid to die (PAM), better known as euthanasia, is a procedure by which a patient will be provided, directly or indirectly, with the necessary medications to cause his death. This procedure is regulated in Spain by the Organic Law on March 24, 2021. Some of these patients, in addition to exercising their right to euthanasia, express the desire to donate their organs once death has occurred. The National Transplant Organization (ONT) has developed a consensus document where it makes a series of recommendations to articulate these two processes. On some occasions, moreover, it is the patient's wish that the last memory be that of their home address or the place where they have resided during their last days, so it is essential, and as stated in the ONT document, the implication of the emergency services in the transfer of these patients once the premedication for sedation has been administered. This article describes three transfers of this type of patient.

Methods
The transfers described are an example of patients who, having requested PAM, needed an individualized response at the time of managing their transfer to the hospital to try to guarantee their willingness to be organ donors.

Results
Described of the cases

Conclusions
We believe that the most important recommendations in this type of transfer should be that the procedure be known and previously discussed with the team involved, that human and material resources be used for the transfer "ex profeso" for it, that there be a meeting between all the actors involved (team responsible for the PAM, hospital coordination of transplants and the emergency service team) where all the details of the transfer and possible complications and solutions are assessed.
Joint work, with exquisite planning for this type of transfer, makes synergy between the teams responsible for patient care, transplant coordinators and emergency teams essential.
The objective is to respect the wishes and rights of patients and their families and at the same time take care of the organs so that the donation can be a success.

Conflicts of interest
No conflicts declared

PP11 - CDCD IN SWEDEN - FROM A PILOT PROJECT TO NATIONAL IMPLEMENTATION – THIS IS HOW WE DID IT

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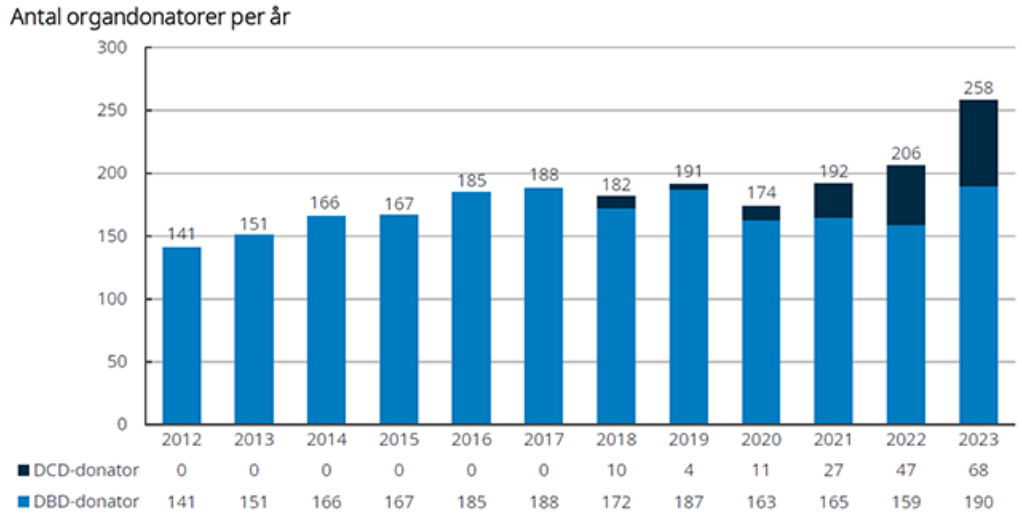
Background
Background: cDCD, as a complementary organ-donation process, gives more people the opportunity to become organ donors, and more organ transplants can take place. An inventory in 2016 showed that there was a potential to increase the number of organ-doners by 20-40% per year in Sweden, if cDCD was successfully implemented. A national, multidisciplinary project-group was put together and instructed to: Write national guidelines,test the guidelines in the clinical setting at six pilot hospitals, analyse health economics. Arrange two conferences: One on the ethics of organ donation from deceased donors, one on the diagnosis of death in the context of cDCD.S**uggest the way in which this new process should be introduced!**

Methods
The project-group trained local DCD teams at the six pilot hospitals and coordinated the implementation. All transplantation centres in Sweden took part in the DCD pilot. After the pilot had shown good results the DCD-teams from the pilot-hospitals successively educated more hospitals in their regions. All using the same strategy: One day of lectures, one day of making checklists and practicing as a team.

Results
The results of the DCD implementation are positive from the perspective of health care, intensive care and operating theatre professionals, and from the perspective of donor relatives. And finally, from the perspective of the recipients

Conclusions
Implementing cDCD in Sweden was a success due to *how* we did it. Local support, national consensus, national guidelines, transparency and loads of communication! And the number of DCD-donors has gradually increased! Number of organ-donors per year in Sweden



Conflicts of interest
No conflicts declared

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Source: Swedish National Board of Health and Welfare
https://vavnad.se/wp-content/uploads/2020/03/dcd-slutrapport-hemsidan.pdf

The National Council for Organs, Tissues, Cells and Blood, part of the Swedish Association of Local Authorities and Regions (SKR)

PP12 - ETHICAL AND PSYCHOSOCIAL IMPLICATIONS OF IN-SITU AND EX-SITU PERFUSION TECHNOLOGY FOR ORGAN TRANSPLANTATION: A SCOPING REVIEW

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Background
Perfusion technology enhances organ viability by circulating blood or preservation solutions through organs, improving transplant outcomes. Both in-situ and ex-situ perfusion techniques are increasingly utilized, especially for donation after circulatory death, where organs are more prone to ischemic injury. However, different perfusion techniques raise distinct ethical considerations which must be considered in ongoing deliberations about their implementation. Perspectives of patients, their families, and the public can indicate psychosocial effects and illuminate the pertinence of ethical issues. This review aims to map the discussion in the literature on the ethical and psychosocial implications of organ perfusion technology, comparing in-situ and ex-situ techniques.

Methods
We employed a scoping review method to search Embase, Medline (all), CINAHL, PsycINFO, and Google Scholar for discussions on ethical issues or patient/family/public perspectives of perfusion technology in organ transplantation, with no date limits. Peer-reviewed journal articles, book chapters, and relevant grey literature in English were included. Thematic analysis was utilized to extract and synthesize ethical and psychosocial themes, identifying controversies and gaps.

Results
Our search identified 2343 records. Preliminary results show that most of the articles addressed the impact of in-situ perfusion techniques on the determination of death. Few articles covered ex-situ perfusion, but acceptability and accessibility were discussed. Informed consent and the appropriate level of information to share about perfusion technology came up regularly. Patient preference research was lacking.

Conclusions
Ex-situ perfusion has sparked less ethical debate than in-situ perfusion, but its implications require attention, especially considering the potential to deliver novel therapies to organs ex-situ. These findings can inform regulatory discussions and direct future research.

Conflicts of interest
No conflicts declared

References
This project falls under the Flagship ‘Organ Transplantation: making unsuitable donor organs suitable’ which has received funding from the Health & Technology Convergence of Technical University Delft, Erasmus University Rotterdam, and Erasmus Medical Center

PP13 - IMPACT OF NATIONAL LEGISLATION FOR CONSENT AND DCD RATES. DATA FROM IRODAT REGISTRY

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Background
Donation after Circulatory Death (DCD) has grown as a novel source for improving deceased donation. Legal systems for donor consent may be an Opt-in system (donor registry or family consent), an Opt-out system (presumed consent), or a mixed system (combining components of both). Only 16 countries in Europe reported DCD activity in 2022. The rest are not active, it is still not legalized, it is not set up, or it is even forbidden. This study analyses the relationship between national legislation and DCD rates.

Methods
We conducted a retrospective cohort study using data extracted from the IRODAT registry, and the legislation system reported in the 8th edition of the EDQM Guide to the quality and safety of organs for transplantation. The main objective is to analyse the relationship between different donation consent systems and the DCD donation activity. The countries were divided into three groups: Opt-out, Opt-in, and Mixed systems. An analysis using the ANOVA test has been used to compare the different systems and their DCD donation rates per million population (PMP).

Results
Out of the 44 European countries, 42 were included in this study. 24 countries have an opt-out system, 14 have an opt-in system, and 4 are considered a mixed system. When evaluating countries with active DCD programs (Figure 1), the mean donor rates per million population (PMP) varied across different legislative systems. Opt-in systems had a mean of 2.9 donors PMP (SD 3.80), Opt-out systems had a mean of 5.82 donors PMP (SD 6.12), and Mixed systems had a mean of 7.12 donors PMP (SD 3.56). Despite these variations, the differences were not statistically significant ($p = 0.6$).

Conclusions
The analysis indicates that while there are differences in mean DCD rates among countries with different legislative frameworks, these differences are not statistically significant. This suggests that legislative frameworks alone may not be the primary determinant of DCD rates. Other factors, such as healthcare infrastructure, public awareness, and clear policies on end-of-life care, likely play a critical role. Policymakers should consider these additional factors when designing strategies to enhance organ donation rates. Future research should investigate non-legislative factors that contribute to successful DCD programs.

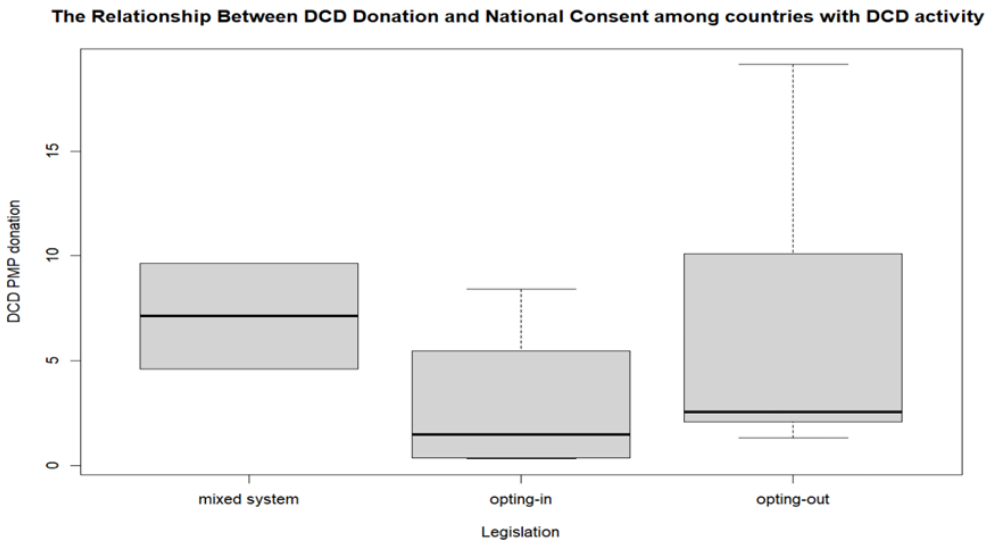

Figure 1: Analysis of the relationship between DCD donation and national legislation among those countries with an active DCD program.

Conflicts of interest
No conflicts declared

References
2. IRODAT registry (www.irodat.org)
1. European Committee on Organ Transplantation. Guide to the quality and safety of organs for transplantation. 8th Edition. European Directorate for the Quality of Medicines and Healthcare (EDQM) 2022.

PP14 - REGIONAL GROWTH OF DONATION AFTER CIRCULATORY DEATH IN THE US

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Background
Despite a significant increase in overall donation and a record number of transplants performed in the US in 2023, the growth potential for organ donation is real and resides mostly in donation after circulatory death (DCD). To understand the growth potential, we must first understand how the various types of donation are growing regionally in the US.

Methods
Data were collected from the UNOS database including the number and types of donors in each region from 2020 to 2023. The percentage of change in donor number by type of donation from 2020 to 2023 was calculated in each region.

Results
From 2020 to 2023 organ donation increased by 29.7% nationwide in the US. Donation after brain death (DBD) increased by 11.5%, from 9364 to 10442, living donation (LD) by 21% from 5726 to 6958 and DCD increased by 82% from 3224 to 5894 donors. Increases in total organ donors occurred in all 11 regions ranging from a maximum of 78% in Region 9 to 14% in Region 2. In all regions, the increase was significantly higher in DCD than in DBD donation with a maximum of 170% in Region 9 to 26% in Region 8 vs a maximum of 49% in Region 9 and 3% in Regions 6, 7 and 8. (Figure 1)

Conclusions
The past 4 years have witnessed a constant growth US organ donation led by DCD. Notably, growth in DCD occurred despite the variability in workflows and regulation and without universal utilization of normothermic regional perfusion and ex-situ machine perfusion technology. It is foreseeable that through the adoption of standard practices and the elimination of existing barriers to DCD donation such as policy variability, DCD donation will become the most common organ donation method in the in the next decade so OPOs and transplant centers should align to develop best practices and workflows to maximize yield and utilization of organs from DCD donors.

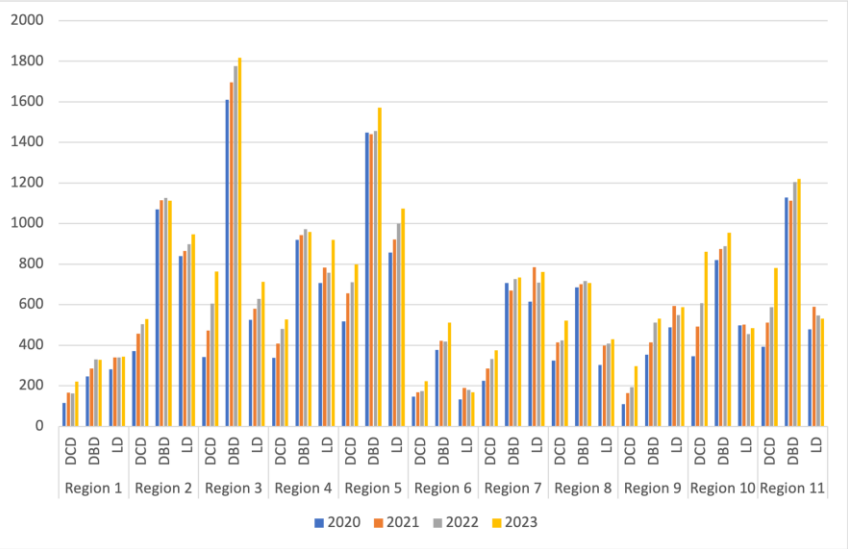

Figure 1: Annual number of DCD, DBD and LD in each region in the US from 2020 to 2023

Conflicts of interest
No conflicts declared

PP15 - ELIMINATION OF VARIATION IN INDIVIDUAL ORGAN PROCUREMENT ORGANIZATION PERFORMANCE IN DONATION AFTER CIRCULATORY DEATH WILL SIGNIFICANTLY INCREASE ORGAN TRANSPLANTATION IN THE US

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Background

DCD donation has been fueling the increase in transplantable organs in the US. We hypothesize that there are still significant differences among organ procurement organization (OPO) performance and that these differences are not due to differences in death rate or population density.

Methods

SRTR data on OPO performances from 07/2018 and 06/2023 for all 58 OPOs in the US were analyzed including the number of DCD Donors, death rates per 1000 inhabitants, and population density of each OPO donor area.

Results

In all OPOs but HIOP (Hawaii) the number of DCD donations from 07/18 to 06/23 increased by an average of 200% with a range of 20 % to 1,183%. In the period between 06/22 to 06/23, 42 OPOs increased DCD donation by an average of 35%, ranging 1.1% to 114%, and 14 OPOs had a decline in DCD donation. The death rate per 1,000 inhabitants was not significantly different between the OPOs with increases and the ones with declines in DCD donations, 9.8/1000 vs 8.9/1000. Most interestingly, decreases in DCD donation occurred in one OPO with high population density (25% drop in NJTO, New Jersey population density 1611persons /mi2) and in one OPO serving the same state as another OPO with a substantial increase in DCD donations (18% drop in OHOV vs 84% increase in OHLB).

Conclusions

These data suggest that OPO performance with DCD donation varies significantly. Although the overall trend between 2018 and 2023 shows a nationwide increase, in the period between 6/22 and 6/23, 14 OPOs were not able to increase the number of DCD donations. The reason for decreases in the DCD donation rates is not explained by significant differences in death per 1000 persons or population density. The reasons for the donation drop may derive from OPO organizational and workflow issues. Standardizing DCD workflows, policies, and guidelines, and aligning low-performing OPOs with best practices from high-performing OPOs will increase the number of organs available for transplantation.

Conflicts of interest

No conflicts declared

PP16 - FEASIBILITY OF ORGAN TRANSPLANTATION FROM DONORS WITH PRIMARY MALIGNANT NEOPLASIA OF THE NERVOUS SYSTEM

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Background
There are patients on the waiting list for heart or liver transplants who die without finding a suitable donor. Similarly, young patients who need a kidney transplant find it increasingly difficult to find a donor with their characteristics. Patients with malignant neoplasms of the central nervous system present a low risk of transmitting their disease, making them excellent candidates for donation due to the few comorbidities they usually have. Each year, patients with this type of pathology die without being previously offered the possibility of donation, which could lead to a reduction in organ transplant waiting lists.

Methods
A prospective, experimental study of high-grade primary brain tumor donors has been conducted from October 2021 to the present at the Universitary Hospital Virgen de la Arrixaca, with their organs implanted in the same center. Demographic and clinical variables, organ traceability, and risk of metastatic disease transmission were collected.

Results
A total of 27 donors were registered: 23 donated after controlled asystole and 4 after brain death. The average age of the donors is 52 years; 22 had a glioblastoma, 4 had an anaplastic astrocytoma, and 1 had a medulloblastoma. There are a total of 45 recipients, of which: 21 liver, 18 kidney, and 6 heart recipients. Follow-up includes complete CT and tumor DNA every 6 months. The average follow-up is 19 months, with no suspicion of oncological disease transmission. Five recipients have died (3 from sepsis and 2 in the immediate postoperative period). Organ function is normal in all cases.

Conclusions
Patients with high-grade malignant primary brain tumors can donate certain organs with very low risk of metastasis. This constitutes a new source for obtaining donors with the aim of expanding new donation scenarios.

Conflicts of interest
No conflicts declared

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PP17 - THE STATE OF PAEDIATRIC DECEASED-ORGAN DONATION AT A SOUTH AFRICAN TERTIARY PUBLIC-SECTOR HOSPITAL: A 14-YEAR ANALYSIS

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Background
Solid-organ transplantation (SOT) has been proven to be a highly effective and life-saving treatment modality for adults and children suffering from end-stage organ failure. High paediatric waiting-list mortality Children may suffer irreversible physical and deleterious psychological effects if transplants are not done timeously.

Methods
A retrospective descriptive study of consecutive deceased-donor referrals at Red Cross War Memorial Children's Hospital over a 14-year period, from 1 January 2007 to 31 December 2020.

Results
Ninety-three of the 1 581 patients (5.9%) were referred to the on-call transplant co-ordinator as potential organ donors, of whom 69% had been involved in a traumatic accident, including 52% in road traffic collisions. The mean age of the potential donors was 7 years with 60.2% being boys. On initial assessment, 67 of the 93 potential donors (72%) were assessed as eligible for donation of at least one solid organ. The transplant co-ordinator attempted to approach all families for consent; however, five families/next of kin could not be located despite multiple attempts. Among the remaining 62 eligible donors, 44 families/next-of-kin declined consent for solid-organ donation, resulting in a consent rate of 29% (*n*=18). Several families refused consent for religious reasons. One of the consented donors did not proceed to procurement as there were no suitable recipients. Seventeen donors proceeded to theatre, the intention being solid-organ procurement, but in 2 donors the organs were assessed as being unsuitable for transplant. From the remaining 15 donors, a total of 46 organs were procured and successfully transplanted: 14 livers, 30 kidneys and 2 hearts.

Conclusions
During the 14-year study period, only 15 deceased donors could be utilised for SOT, as a result of low in-hospital referral (5.9%) and consent rates (29%). The reasons for low referral and consent rates are complex and often multifactorial, which the current study was not designed to investigate in sufficient detail. Future studies should be designed to further interrogate our findings, while accommodating for nuances specific to the paediatric deceased-donor population and their families.

Conflicts of interest

No conflicts declared

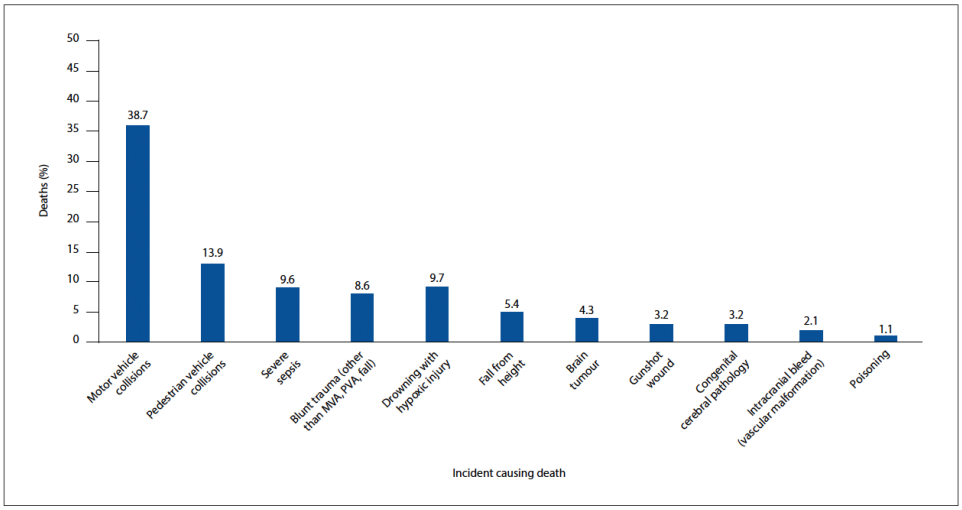

Fig. 1. Cause of death in 93 potential donors.

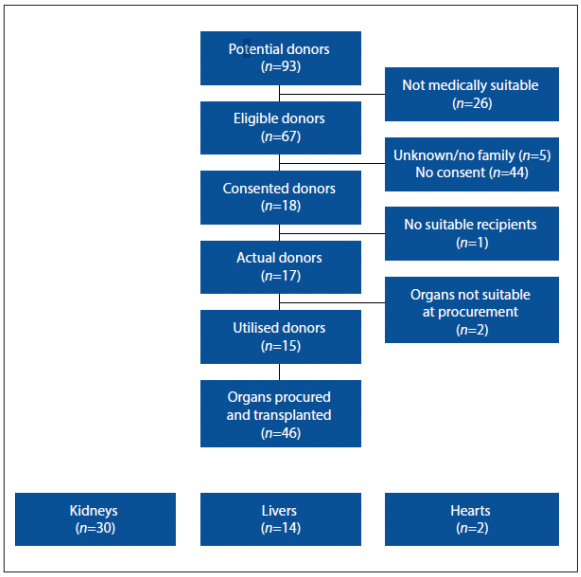

Fig. 2. Flow diagram highlighting the key factors that prevented potential donors from becoming utilised donors.

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PP18 - PREEMPTIVE KIDNEY TRANSPLANTATION ALSO WITH DCD

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Background
Preemptive kidney transplantation has been related to better graft and patient survivals; however, its performance with DCD kidney grafts may increase the fear of primary non-function among transplant teams and reduce their use for preemptive kidney transplantation. Our objective was to analyze our experience in the use of DCD kidney grafts in comparison to DBD in preemptive kidney transplants.

Methods
Series of 98 preemptive kidney transplants performed since 2016 in our center. We excluded 15 LDKT and 2 cases of pediatric blocks.Finally, 81 transplants from deceased donors were studied.

Results
We compared 48 (59,3%) preemptive kidney transplants from DBD versus 33 (40.7%) from DCD. Mean follow-up was 35.2±21.9 months (r:6-84), similar in both groups. No differences were found in the analysis of the demographic characteristics of the recipient (age, sex, cause of kidney disease, smoking or pre-transplant HLA sensitization or blood group). There was a higher percentage of patients with high blood pressure history in the DCD group (100%vs79,5% p=0,023). No differences in donor characteristics (age, sex, high blood pressure, diabetes, serum creatinine) as well as cold ischemia or vascular anastomosis time were found. Stroke as death case was less frequent in DAC than in DBD (41,9%vs60,4%, p=0,056). DAC recipients receive more induction with thymoglobuline (88,5%vs59,1%, p=0,002) and a greater number of thymoglobuline doses (2,4±2,4vs1,6±0,7, p=0,024). Delayed graft function was similar, but acute rejection in the first 6 months was higher in the DAC group (29,2%vs9,5%) but with no statistical differences. Graft and patient survival were similar (p=0,197, p=0,869 respectively). In DAC group 3 patients presented graft loss (1 acute rejection, 2 deaths with functioning graft, one of infectious origin and a massive stroke). No cases of primary non-function were observed in both groups.

Conclusions
Preemptive transplantation with DCD kidney grafts, despite their higher risk of DPI described in the literature, did not present differences in graft or patient survival. The greater knowledge in the management of these grafts has favored comparable survival results to those from DBD with similar characteristics. Our experience, although limited, could encourage other teams to use them and benefit both patients and health system from preemptive kidney transplants advantages.

Conflicts of interest
No conflicts declared

PP19 - EARLY AND MID-TERM RESULTS OF SOLID ORGAN TRANSPLANTATION FROM CONTROLLED CARDIAC DEATH DONORS AFTER 20-MINUTE NO-TOUCH PERIOD: AN ITALIAN SINGLE CENTRE 3-YEAR EXPERIENCE

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Background

The use of controlled donation after circulatory death (cDCD) significantly increased during the past decades to expand the donors pool. However, warm ischemia may result in detrimental effects on graft function. In Italy, a no-touch period of at least 20 min is required, that is much longer compared to the 5 min accepted in other European countries.

Methods

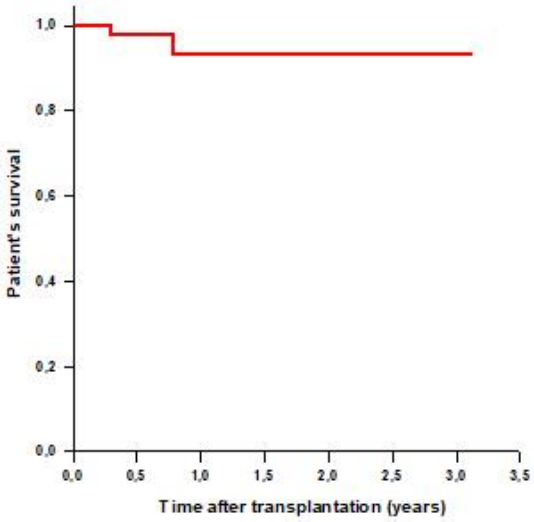
This is an Italian single-centre retrospective review of all cDCD procedures from April 2021 to April 2024. cDCD was considered in patients with devastating brain injury undergoing withdrawal of life sustaining therapy (WLST). After cardiac arrest and a no-touch period of 20 minutes, organ reperfusion was performed using abdominal (A) or thoraco-abdominal (TA) normothermic regional perfusion (NRP) through femoral vessels cannulation. The primary endpoint was 30-day graft survival; secondary endpoints included: incidence of primary non function (PNF) and Nonanastomotic biliary stricture (NAS) in liver Tx, PNF and delayed graft function (DGF) in kidney Tx, primary graft dysfunction (PGD) in heart and lung Tx, and patient's survival.

Results

30 patients (23 [77%] males, median age 72 [63–75]) underwent WLST following cerebro-vascular accident (n=11, 37%), anoxia (n=13, 43%) and trauma (n=6, 20%) and were included in the cDCD program. Median functional warm ischemic time (WIT), total WIT, and asystolic time were 38 [36-40], 41 [38-43] min and 24 [23-26] min, respectively. Median NRP duration was 188 [165-222] min. A total of 76 organs (26 livers, 42 kidneys, 4 hearts and 4 lungs) were procured and transplanted in 72 recipients. Ex-situ machine perfusion was used in 12 (50%) liver Tx and in 10 (45%) kidney Tx. 30-day graft survival was 100% in liver, heart and lung recipients. One (5%) kidney recipient underwent graft loss for septic arteritis 25 days after Tx. PGD occurred in 2 (100%) lung recipients; no PNF/PGD was recorded in liver, kidney and heart Tx. NAS was recorded in 1 (4%) liver recipients and DGF was recorded in 1 (5%) kidney recipient. One (4%) liver and one (50%) lung recipient died during the follow-up (fig. 1).

Conclusions

Tx using cDCD donors is feasible and provides excellent early and mid-term results also with longer donor asystolic times. Larger data and longer follow-up are required to confirm these promising results.



Conflicts of interest
No conflicts declared

PP20 - THE IMPACT OF TIME TO DEATH IN DONORS AFTER CIRCULATORY DEATH ON RECIPIENT OUTCOME FOLLOWING LIVER TRANSPLANTATION

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Background
In the UK, donor hepatectomy is stood down if functional warm ischaemia (FWIT) time exceeds 30 minutes. There is little evidence to support when procurement teams should stand down in relation to donor time to death (TTD). We assessed what impact TTD and FWIT had on outcomes following DCD liver transplantation.

Methods
Data were extracted from the UK Transplant Registry on DCD liver transplant recipients from 2006-2021. TTD was from withdrawal of life-sustaining treatment to asystole and FWIT was from donor systolic BP and/or SpO2 falling below 50mmHg and 70%, respectively, to in situ aortic perfusion. The primary endpoint was 1-year graft survival. Potential predictors were fitted into Cox proportional hazards models. Adjusted restricted cubic spline models were generated to further delineate the relationship between TTD and outcome. FWIT was modelled separately to avoid collinearity.

Results
1558 recipients of a DCD liver graft were included. Restricted cubic splines revealed that the risk of graft loss was significantly greater when TTD <14 minutes (figure 1). After 14 minutes, there was no impact on graft loss. Similarly, recipient mortality risk at 1-year was significanly impaired with grafts from donors with TTD <7 minutes, with no impact on mortality risk after 7 minutes (figure 2). Prolonged hepatectomy time was significantly associated with graft loss (HR 1.87, 95% CI 1.23-2.83, p=0.003), however FWIT had no impact (HR 1.00, 95% CI 0.44-2.27, P>0.9).

Conclusions
A very short TTD was associated with increased risk of graft loss, possibly due to donors being more unstable and/or experiencing brainstem death as well as circulatory death. While this should not, in isolation, be a contraindication to graft utilisation, TTD could be included in risk assessment of grafts to guide viability testing with machine perfusion. Expanding stand down times may increase utilisation of donor livers and improve access to transplantation without impairing graft outcome, warranting prospective evaluation.

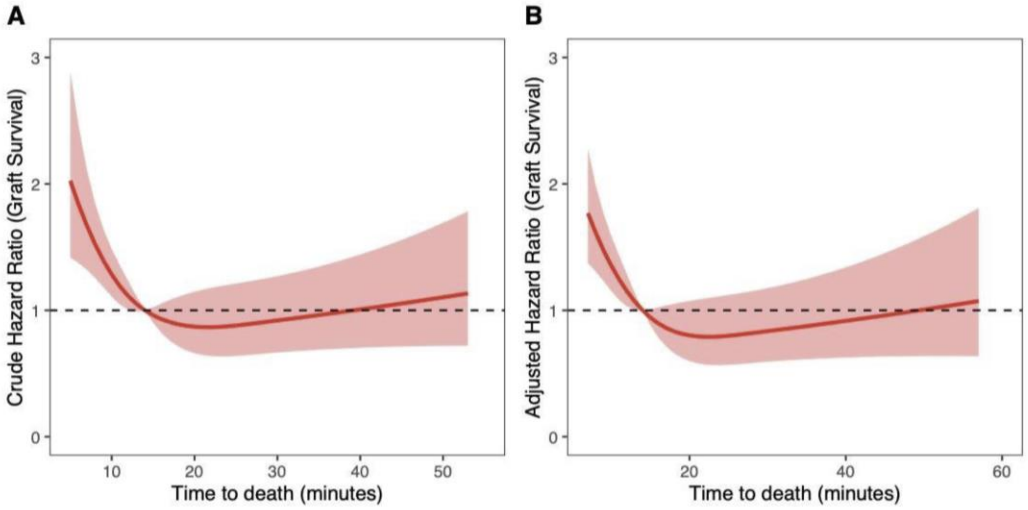

Figure 1 – Restricted cubic splines modelling with 4 knots A) crude graft survival, and B) adjusted graft survival as a function of time to death

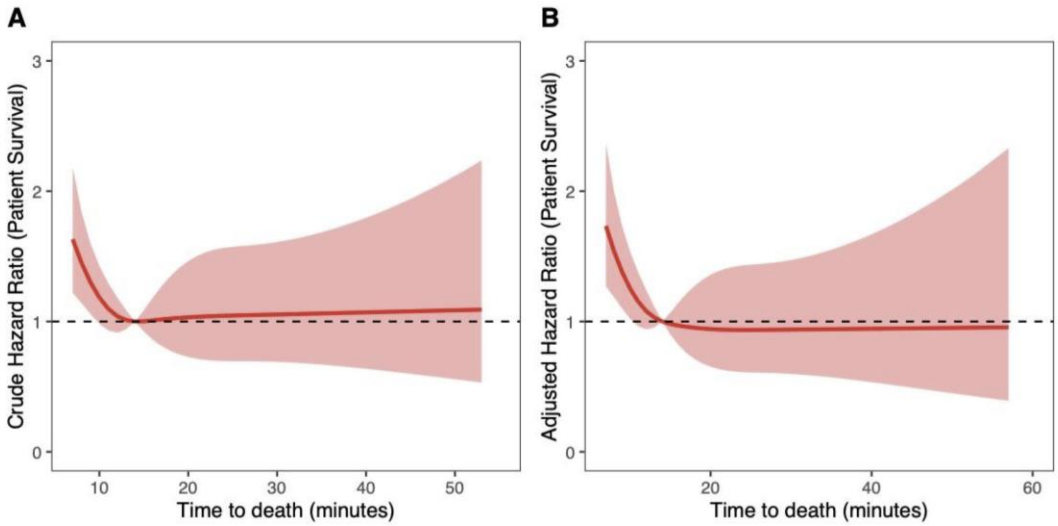

Figure 2 – Restricted cubic splines modelling with 4 knots A) crude patient survival, and B) adjusted patient survival as a function of time to death

Conflicts of interest
No conflicts declared

PP21 - EVALUATION OF OVINE DCD LUNGS VENTILATED DURING WARM ISCHEMIA FOLLOWED BY EX-VIVO LUNG PERFUSION

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Background

Lung transplantation is one of the last options to treat end-stage diseases. To expand the donor pool and to decrease the waiting list, further studies on marginal organs are necessary. Several countries already use donation after circulatory death (DCD), which can be controlled and uncontrolled. One variable that changes in these categories is ventilation. Thus, this study aimed to investigate the effect of ventilation during the warm ischemia period in sheep lungs that underwent ex vivo lung perfusion (EVLP).

Methods

Sheep lungs were procured from local abattoir. A warm flush (37oC) was performed. The lungs were divided into two groups: ventilated (V) or not ventilated (NV) during 120 minutes of warm ischemia. Followed by 120 minutes of static cold storage. Finally, EVLP was performed during 240 minutes with low-flow (20% of cardiac output) approach, pressure-controlled ventilation with an innovative self-made perfusion solution. Lung biopsies and perfusate samples were collected. Histopathology was analysed. Ventilatory parameters and perfusion pressures were recorded. Hourly gas analyses were performed. Cell damage markers were measured in perfusate.

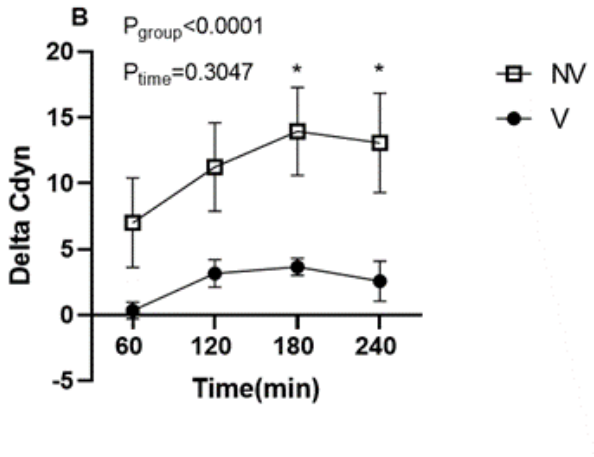
Results

NV presented a more expressive increase after 240 min of EVLP in the delta dynamic compliance (deltaCdyn) (P<0.0001), delta pO2 (P=0.0082) and delta lactate (P=0.0011) than the V group. There were no differences between the groups in delta pCO2 (P=0.8828). Histopathology analysis indicates that there are more units of hemorrhage in NV (P=0.0848) than V. Hemorrhage decreases from the ischemia time to the end of EVLP (V P=0.0031; NV P=0.0457). During the perfusion ASAT and LDH did not differ between the groups (P=0.7828 and P=0.9749).

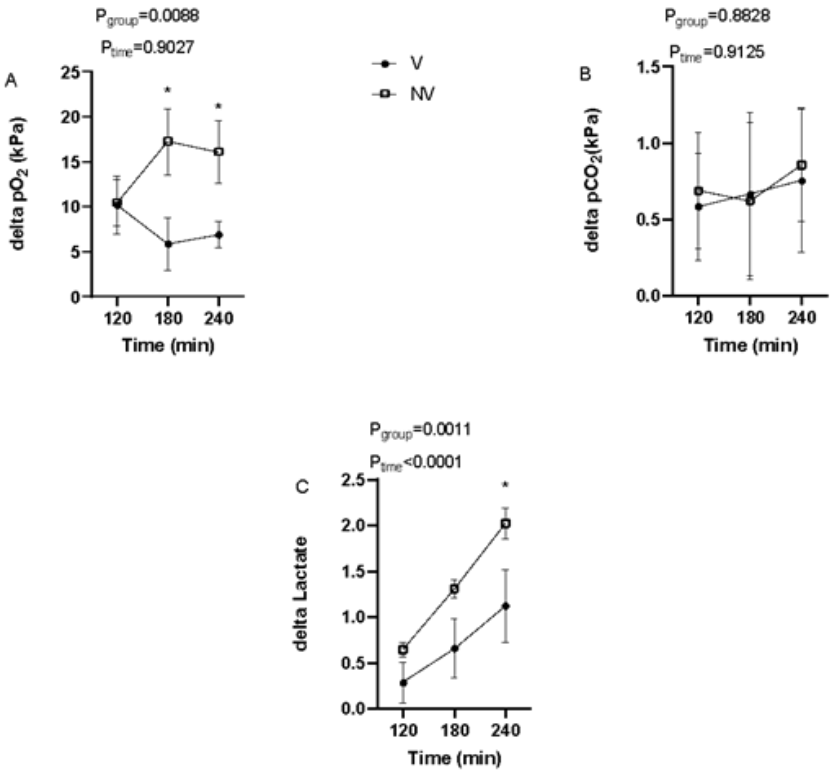
Conclusions

Lungs that were ventilated during 120 minutes of warm ischemia presented similar outcomes to lungs that were not ventilated during this period. Therefore, ventilation does not improve the organ quality in the evaluated parameters.

delta dynamic compliance (deltaCdyn) (*P*<0.0001)



delta pO2 (*P*=0.0088), delta pCO2 (*P*=0.8828) and delta lactate (*P*=0.0011)



Conflicts of interest
No conflicts declared

References
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PP22 - EARLY OUTCOMES OF LIVER TRANSPLANT AFTER IMPLEMENTATION OF ABDOMINAL NORMOTHERMIC REGIONAL PERFUSION FOR DONATION AFTER CIRCULATOR DEATH: A SINGLE-CENTER US EXPERIENCE WITH OLDER DONORS

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Background
This study describes the early outcomes of liver transplants at our center after implementation of abdominal normothermic regional perfusion (A-NRP) for controlled donation after circulatory death (cDCD) donors in donors >65 years of age. Prior to implementation of A-NRP, our center did not accept cDCD donors >65 years old.

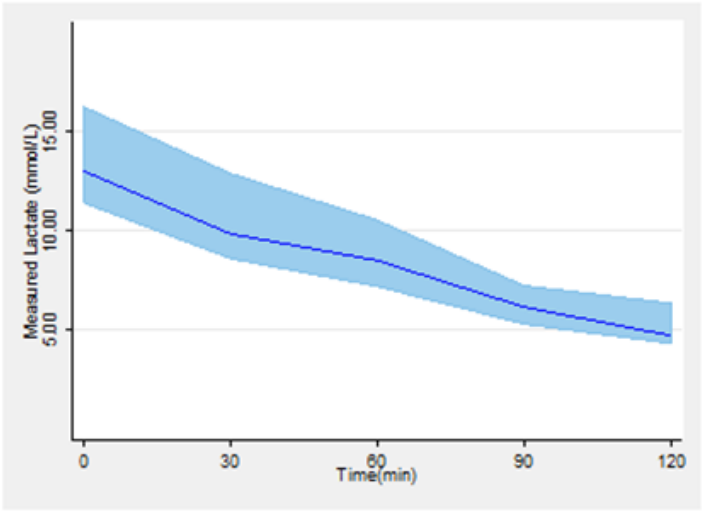
Methods
After initiation of A-NRP at our center in August 2023, all liver allografts from cDCD donors were retrieved using A-NRP. Following IRB approval, donor and recipient data were retrospectively collected. Functional warm ischemic time (fWIT) was defined as the interval between donor systolic blood pressure <50mmHg and initiation of pump. Total warm ischemic time (tWIT) was defined as the interval between donor withdrawal and initiation of pump. Donor data included demographics, fWIT, tWIT, total time on A-NRP, and lactate and liver enzymes measured every 30 minutes while on pump. Recipient data included demographics, MELD score at transplant, etiology of liver disease, cold ischemic time, primary non-function, early allograft dysfunction (EAD), ICU and hospital length of stay and biliary complications.

Results
From August 2023 to May 2023, 40 livers were retrieved using A-NRP in cDCD donors from a total of 67 potential cases. 14 allografts were retrieved from donors >65 years old. 7 donors (50%) were older than 70 years of age. Median fWIT was 24 minutes [20-32], median tWIT was 38 minutes [34-60] and the mean time on pump was 126±10 min. Lactate results during pump time decreased and the trends are shown in figure 1. Mean recipient age was 61±10 years and median MELD at transplant was 18[15-22]. EAD occurred in 3 patients (21%), there was no PNF, there was only 1 (7%) biliary stricture and no ischemic cholangiopathy has been identified. To date no patient has required re-transplantation. Median ICU and hospital stay was 2[1-3] and 7[7-9] days respectively. The median follow-up was 65 days [38-109].

Conclusions
The implementation of A-NRP at our center has demonstrated good early graft and patient outcomes with older cDCD donors similar to experiences described in the UK and Europe. A-NRP appears to be an effective means to improving the outcomes of liver transplantation and increasing the utilization of livers in cDCD organ donors in the United States.

Conflicts of interest
No conflicts declared

FIGURE 1. Lactate Trends on A-NRP Pump



Medians and interquartile ranges at each draw are represented.

PP23 - VISUAL ASSESSMENT OF LIVER STEATOSIS AT RETRIEVAL PREDICTS LONG TERM LIVER TRANSPLANT OUTCOMES IN DONATION FOLLOWING CIRCULATORY DEATH

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Background

The demand for liver transplantation is rising, as is the prevalence of steatotic liver disease. Steatotic grafts have inferior outcomes post-transplantation, due to increased sensitivity to ischaemia-reperfusion injury. We aimed to formally evaluate the impact of visually assessed liver steatosis in grafts donated following brainstem (DBD) versus donors after circulatory death (DCD).

Methods

The NHS Blood and Transplant registry on adult liver transplantation was reviewed retrospectively (2006-2019). We used multiple-imputation for missing data, adjusted regression models with interaction terms to compare the impact of visually assessed donor graft steatosis on transplant outcome. Liver steatosis was assessed macroscopically by the retrieval surgeon at the time of organ procurement.

Results

9217 adult recipients of deceased donor grafts were included (DBD=7349; DCD=1868). Multivariable Cox regression revealed that the negative impact of steatosis differed between DCD and DBD livers (interaction P=0.01 and P=0.04). In DCD livers steatosis reduced graft survival significantly (aHR=1.85, 1.30-2.65, P=0.001 for moderate and aHR=5.43, 1.72-17.09, P=0.004 for severe steatosis). In contrast, visually assessed steatosis did not predict graft survival in the DBD cohort. Kaplan-Meier plots (Figure 1) looking at the DBD and DCD cohorts separately, reinforced that visually assessed liver steatosis significantly increased 3-year and long term graft loss in DCD livers.

Conclusions

Visually assessed steatosis has short and long term effects on DCD graft survival, which is less apparent in DBD transplantation. Novel strategies are required to safely transplant steatotic DCD livers.

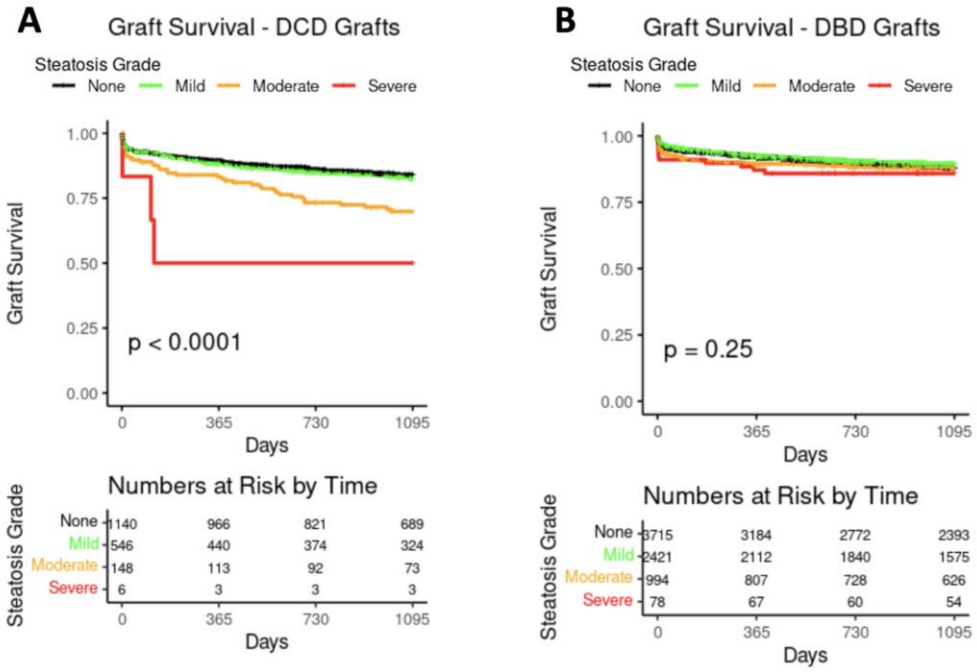

Figure 1. Kaplan Meier plots comparing graft survival between A) DCD (p= <0.0001) and B) DBD grafts (p= 0.25), separated by graft steatosis grading. DCD – Donor after Circulatory Death; DBD – Donor after Brainstem Death.

Conflicts of interest
No conflicts declared

PP24 - DCD LIVER TRANSPLANTATION WITH AN ELDERLY DONOR IN A SETTING OF 20 MINUTES NO-TOUCH TIME: FIRST CASE WITH A 92 YEARS GRAFT

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Background
DCD liver grafts are increasingly used to expand the donor pool for adult transplantation. To improve outcome after DCD liver transplantation, subsequntly to Normothermic regional perfusion (NRP), ex situ machine perfusion is used as an alternative organ preservation strategy, with the advantage of dynamic evaluation of the graft. We here report an unprecedented transplantation of an elderly DCD liver graft after hypothermic oxygenated machine perfusion (D-HOPE) in a setting of 20 minutes no touch-time.

Methods
The graft was retrieved from a 92 y.o woman. The total Warm Ischemia Time (tWIT) was 49 minutes while the functional one (fWIT) was 47 minutes. After the retrieval the graft function was evaluated during D-HOPE for 350 minutes. Lactates were stable, the last value was 1.7 mmol/L. Arterial and portal perfusion showed a progressive improvement in flow and drop of resistance. The recipient was a 59 y.o. male with dysmetabolic liver cirrhosis complicated by portal vein thrombosis, refractory ascites and portal-systemic encephalopathy. The MELD score was 21 and the Child-Pugh was C11.

Results
The transplantation was performed with cava preservation technique and an end-to-end biliary anastomosis. At the end of the surgery lactates were 2.9 mmol/L. The total Cold Ischemia Time (CIT) was 480 minutes.
Postoperative AST, ALT, INR and total bilirubin normalized within a few weeks. AST and ALT peak was reached at day 1 and was 270 and 161 U/L respectively. The patient was monitored for 3 days in ICU for an Acute Kidney Injury resolved without renal replacement. The patient was discharged after 19 days. Four months after transplantation he is in good condition with a completely normal liver function. The control MRI showed no sign of Ischemic type biliary stricture (ITBS).

Conclusions
This case is the first report of successful transplantation of an elderly DCD liver graft in a high risk setting due to a long no-touch period. It underlines the role of the sequence NRP-D-HOPE in expanding the donor pool and improving outcome after DCD transplantation.

Conflicts of interest
No conflicts declared

PP25 - OUTCOME OF DCD LIVER TRANSPLANTATION IN A HIGH-LEVEL TRANSPLANT CENTER: ANALYSIS OF PROGNOSTIC FACTORS

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Background
In the setting of organ shortage, donation after circulatory death (DCD) provides an opportunity to expand the donor pool of liver grafts. The use of the Normothermic regional perfusion (NRP) in sequence with ex situ hypothermic machine perfusion (D-HOPE) after the retrieval minimizes the rate of graft failure. However, use of DCD grafts still remains a marginal practice, above all in Italy with a no-touch period of 20 minutes.

Methods
From 2017 to 2024, 34 DCD LT were performed in our Centre. Medium functional Warm ischemia time until normothermic regional perfusion (NRP) was 39 minutes. All grafts underwent hypothermic machine perfusion (D-HOPE). Clinical data of donor, recipient and postoperative period were collected. We analyzed retrospectively this cohort data with univariate and multivariate analysis (Cox regression analysis) in order to research impact factors on liver transplantation outcome.

Results
Overall survival of DCD grafts was with Kaplan Meyer at 87% at 5 years, with a significatively difference between DCD Type 2 (Maastricht classification) and DCD type 3. At univariate analysis the presence of AntiHbC (p = 0.03), high level of potassium (K) of the donor (p= 0.03), longer total Warm Ischemia Time (WIT) of the graft (p = 0.03) , blood and plasma transfusion during surgery (p = 0 0.02), INR at postoperative day (POD) 1(p= 0.03), AST at POD1 (p= 0.02), vascular complication (p= 0.01) and post-transplant infection (p = 0.07). AntiHbC positivity and high serum K level of the donor showed a statistical correlation at multivariate analysis.

Conclusions
Although DCD grafts are still considered as marginal ones, our analysis showed a great outcome in terms of patient survival, comparable with DBD grafts. In particular we found that AntiHbC positivity and high serum K level of the donor are important prognostic factors. Despite the small number of cases, our data encourage the use of DCD grafts after NRP-D-HOPE evaluation in a setting of long no-touch time.

Conflicts of interest
No conflicts declared

PP26 - SINGLE CENTER EVOLUTION OF DCD UTILIZATION FOR LIVER TRANSPLANTATION: FROM PERCEIVED MARGINALITY TO ROUTINE AND BEYOND

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Background

Donation after circulatory determination of death (DCD) has raised concerns in the past due to adjunctive donor warm ischemia, which can have detrimental effects on liver graft function. In Italy those grafts have been long considered marginal, as the legislation imposes 20 minutes of no-touch time before harvest. The aim of this study is to assess DCD donor utilization for liver transplantation at a single center from the beginning of DCD program, to evaluate if increasing experience has influenced the utilization of those organs.

Methods

Consecutive recipients of liver transplant from DCD donors have been prospectively enrolled for the study from 2016 to 2023. The patients have been categorized in two eras, from 2016 to 2021 and after 2021, and compared to assess donor and recipient characteristics, as well as liver transplantation outcomes.

Results

Seventy-two [72] recipients have been enrolled, 43 of which (59.7%) have been transplanted in the second era. During the second era, we transplanted recipients with higher Liver Transplant Risk Score (1 [0-2] vs. 1 [0-1], p=0.016); also, more recipients with MELD>25 (9.3% vs. 3.4%) and less patients with HCC (46.5% vs. 62.1%) have been transplanted in the second era, although these differences were not statistically significant. In the second era, we used more often extended criteria donors (95.3% vs. 75.9%, p=0.014) and donors with higher age (median 71 vs. 62, p=0.027), number of extended criteria (median 2 vs. 1, p=0.004) and EuroTransplant Donor Risk Index (median 3.05 vs. 2.55, p<0.001). Donor management was similar between the two eras, with comparable fWIT (43 [39-49] minutes vs. 40 [36-45] minutes, p=n.s.) and NRP duration (214 [182-244] minutes vs. 212 [186-232] minutes, p=n.s.). The second era had a lower rate of early allograft dysfunction (7.3% vs. 20.7%) and PGNF (2.4% vs. 10.3%), although these differences wrrre not statistically significant. Graft survival at one year resulted comparable, being 86.2% for the first era and 90.1% for the second era (p=n.s.).

Conclusions

With increasing experience in managing DCD donors and recipients - even in a complex setting as the Italian one - it was possible to utilize more marginal donors and perform transplantation in recipients at higher risk, maintaining similar functional outcomes and survival rates.

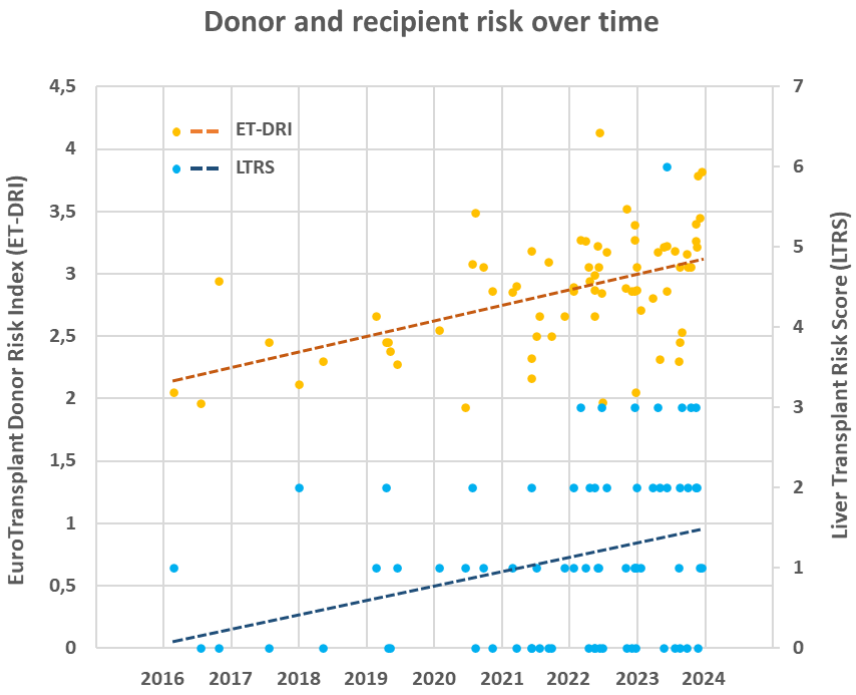

Figure 1. Trends of recipient Liver Transplant Risk Scores and EuroTransplant Donor Risk Index since DCD liver transplant program initiation.

Conflicts of interest
No conflicts declared

PP27 - BILIARY COMPLICATION AFTER DCD LIVER TRANSPLANTATION: MULTIVARIATE ANALYSIS OF PREDICTIVE FACTOR IN A HIGH-LEVEL TRANSPLANT CENTER

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Background
Biliary complications are common among donation after cardiac death (DCD) liver transplantation (LT) recipients and may require multiple surgical or endoscopic intervention or lead to loss of the graft. We evaluated the risk factors associated with development of biliary complications in DCD LT recipients in a setting of 20 minutes no-touch time.

Methods
From 2017 to 2024, 34 DCD LT were performed in our Centre. Medium functional Warm ischemia time until normothermic regional perfusion (NRP) was 39 minutes. All grafts underwent hypothermic machine perfusion (HOPE). Clinical data of donor, recipient and postoperative period were collected. We performed statistical analysis of these data with the application of the GLM model in order to identify predictive factors of biliary complication.

Results
4 of the 34 (12%) DCD LT performed in our Center developed a biliary complication: 3 non anastomotic strictures and 1 fistula. At the univariate analysis significatively pre-transplant parameters were diabetes ($p=0.065$) and last creatinine ($p= 0.036$) of the donor, portal vein flow at the end of HOPE ($p=0.05$) and plasma transfusion during transplant ($p=0.05$); post-transplant ones were postoperative AST until day 7 ($p<0.05$), renal replacement ($p=0.004$) and Early allograft dysfunction (EAD) ($p =0.06$). Multivariate analysis showed significant association between biliary complication and last AST of the donor, PV resistance at the end of HOPE and EAD.

Conclusions
Biliary complication occurs frequently in DCD LT recipients and may be associated with impairment of renal function, both of donor and recipient post-transplantation. A worsening of Portal vein parameter during HOPE associated with a higher AST level of the donor could be a pre-transplant predictive factor of subsequent development of biliary complication.

Conflicts of interest
No conflicts declared

PP28 - EVALUATION OF A SWEDISH NATIONAL PILOT PROTOCOL OF CONTROLLED DCD LIVER TRANSPLANTATION USING NORMOTHERMIC REGIONAL PERFUSION

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Background

Liver transplantation using donors after controlled circulatory death (cDCD) is linked to lower graft survival rates and a higher occurrence of non-anastomotic biliary strictures (NAS) compared to transplants from brain dead donors (DBD). Employing normothermic regional perfusion (NRP) during cDCD procurement has the potential to enhance post-transplant outcomes and decrease NAS incidence. In Sweden, cDCD liver transplantation was initiated under a national pilot protocol requiring mandatory NRP. This study aims to assess the outcomes of cDCD liver transplantation during this national pilot phase.

Methods

Donor and recipient data for all cDCD liver transplants were prospectively collected during the pilot period from 2020-2022. Outcomes such as NAS incidence, patient and graft survival, early allograft dysfunction, acute kidney injury, and the comprehensive complication index were compared to a matched DBD cohort (n=104).

Results

Eighteen patients received liver transplants from cDCD donors using NRP during the study period. The mean functional warm ischemia time was 29±6 minutes. During NRP, the mean lactate reduction was 8.7±2.4 mmol/L, and the end NRP perfusate ALT was 1.4±1 µkat/L. Comparing cDCD liver transplant recipients to those who received DBD livers, there were no significant differences in the incidence of NAS (0% vs 2.9%), patient and graft survival, comprehensive complication index, early allograft dysfunction, nor acute kidney injury. Additionally, study protocol MRCP in cDCD patients showed no signs of subclinical biliary strictures.

Conclusions

Evaluation of the Swedish national pilot of cDCD liver transplantation with mandatory NRP shows comparable outcomes to a matched DBD cohort with excellent patient and graft survival and no incidence of NAS within the first year.

Conflicts of interest

No conflicts declared

References

This work was supported by Research Strategy Committee Karolinska Institute and The Stockholm County Council and the regional agreement on medical training and clinical research (ALF) between Stockholm County Council.

PP29 - PRELIMINARY EXPERIENCE ON DONATION AFTER VOLUNTARY ASSISTED DYING (VAD) IN LIVER TRANSPLANTATION

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Background

Organ donation after VAD could help alleviate the current organ shortage. In Spain, euthanasia was legalized in 2021. One year later, the Organ Donation protocol was published by National Transplant Organization (ONT).

Methods

Our goal was to describe our experience on organ donation after VAD. After circulatory arrest has been declared by the physician, the DCD procedure commences in a similar way as control DCD. Focus on viability graft during NRP. We collected the variables related to the donors and recipients.

Results

Uniform to aid-in-dying law, National Organ Donation Protocol in Spain, and ethics committee of our hospital, between 2022-2023, three liver transplants after euthanasia/DCD performed in our center, all of which were multi-organ donations. The causes of the application for the aid-in-dying benefit were hereditary ataxia, spinal cord injury and amyotrophic lateral disease. The donors were male with an average age of 46.3 years (45- 48), BMI was 21.13 (17.73-24.41); the three patients were blood type O+. the functional warm ischemia time was 12.6 minutes (7-21) and average cold ischemia 305 minutes (245-390). The recipients were three male patients, with an average age of 54.3 years (46-63); with a MELD of 15 (10- 22); the main indication of transplantation was alcohol related cirrhosis, primary sclerosing cholangitis (PSC) and cirrhosis due to hepatitis B virus (HBV). The patient who underwent transplantation for alcohol-related cirrhosis had chronic kidney disease as a comorbidity due to type I diabetes mellitus, so combined liver-kidney transplantation was perform. None suffered primary non-function or vascular complications. The liver-kidney recipient required reoperation to treat hemoperitoneum and biliary leakage with excellent results. ICU stay was 5 days (4-6); hospital stay average of 21 days (14-30). During follow-up at discharge, the patient with PSC was the only one who presented hospital readmissions that resolved without invasive interventions. All three patients are alive with normal functional liver graft.

Conclusions

VAD/DCD has proven to be effective in increasing the availability of safe organs for transplantation. The acceptance and strict compliance of the protocol will allow its expansion. Always respecting the wishes of the donors who enable the organ donation and save lives.

Conflicts of interest

No conflicts declared

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PP30 - ADVANCED PERFUSION TECHNIQUES MITIGATE THE RISKS AND IMPROVE THE EARLY OUTCOMES OF KIDNEY TRANSPLANTATION USING ORGANS FROM DONORS AFTER CIRCULATORY DEATH

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Background
Donation after circulatory death (DCD) re-emerges as a valuable source of transplantable organs although the warm ischemic injury occurring during the agonal period and between cardiac arrest and cold perfusion remains a significant concern. Although results are traditionally believed to be inferior to those following donation after brain death (DBD), rigorous donor selection and various interventions (normothermic regional perfusion - NRP, perfusion preservation - PP) may positively impact the early and late outcomes of kidney transplantation (KTx) from DCD. Herein, we summarize our experience with controlled DCD at a large Swedish transplant centre and analyse the results with respect to the development of delayed graft function (DGF) and other prognostic variables (age, cold ischemia time, kidney donor profile index –KDPI, kidney donor risk index- KDRI).

Methods
We reviewed all KTx performed between January 2020-May 2024 using DCD grafts (n=88) and we compared these results with an unselected cohort of DBD-KTx (n=91) transplanted during 2021. All DCD kidneys underwent oxygenated PP and 34 grafts were obtained from donors undergoing NRP.

Results
Donor age, BMI and last creatinine were similar between the two groups. DGF occurred in 17 (21%) DCD-KTx and 16% of DBD-KTx. Among DCD, there was a trend towards lower DGF in recipients of NRP-DCD grafts (11,7% vs 24%, p=0.15). DCD had slower post-transplant reduction in creatinine levels than DBD than in DCD but similar outcome (creatinine, eGFR) after one year. One-year graft (DBD 95,6% vs. DCD 96,2%) and patient survival (DBD 98,9% vs DCD 100%) were similar between groups. We found a higher rate of transplant-related complications following DCD transplantations (p=0.019). Mean KDPI was higher in KTx with DGF but neither KDPI nor KDRI did correlate with the early results.

Conclusions
Although graft function resumed slower and the rate of complications was higher in DCD, graft and patient survival as well as graft function after one year were similar between DBD and DCD. These results suggest that the outcomes of DCD and DBD are similar and that the utilization of DCD is well motivated and safe.

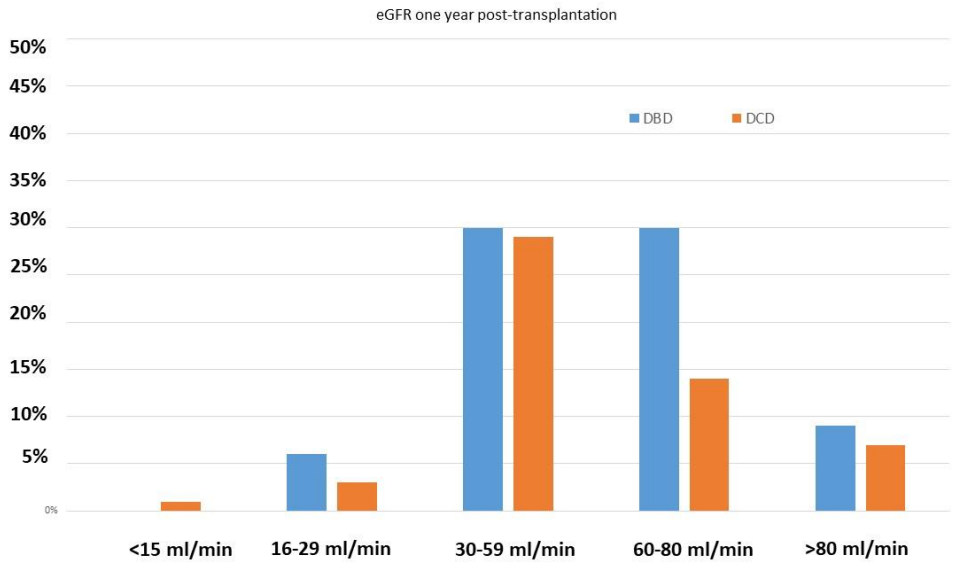

Figure 1. Estimated glomerular filtration rate (GFR) one year after transplantation

Conflicts of interest
No conflicts declared

PP31 - DCD LUNG TRANSPLANTATION AT A LARGE SWEDISH TRANSPLANT CENTRE AFTER THE SUCCESSFUL IMPLEMENTATION OF DCD DONATION IN SWEDEN

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Background
In 2020, Donation after Circulatory Death (DCD) was widely introduced in Sweden after a national pilot project during 2018 that investigated the possibility to implement DCD nationwide. The pilot project included six hospitals and the protocol was primarily developed to procure kidneys from DCD donors. However, Sahlgrenska University Hospital saw the opportunity and benefits of also implementing lungs transplants from DCD as rapid recovery for both lungs and kidneys was feasible and international studies showed equivalent results after lung transplantation (LuTx)following DCD and DBD.

Methods
Transplant Coordinators at Sahlgrenska UH led the work that included #1 Identifying key components for the guidelines for lung DCD and #2 training programs containing theoretical knowledge and simulation exercises to develop practical skills. These included specific instructions regarding lung DCD (donor management, logistical issues before and during procurement) of the lungs.

Results
A complete set of routines was developed, from task assignments and protocols to practicalities and logistics. The donor mean age was 54,2 (range 15-72). Nine lung procurement has been performed by direct recovery simultaneously with abdominal Normothermic Regional Perfusion A-NRP. Procurements were carried out both at large and smaller hospitals. The process has resulted in 19 LuTx at Sahlgrenska UH. One year survival for the first 16 LuTx the 12-month survival is 100%. For the remaining three the follow-up is shorter than 12 months.

Conclusions
A protocol for DCD lung transplantation is implemented nationwide and can be used to facilitate the lung DCD process. All procured lungs have been accepted and transplanted with excellent results, including. the direct recovery and perfusion of lungs during abdominal NRP. The training concept has also improved safety, transparency and confidence for all professionals involved in the DCD process.

Table 1: Total numbers of lung procurement 2018-2024 (15th of May). During the pilot project in 2018 just one donor hospital included. 2020 start of national implementation of DCD and also start of A-NRP

	2018	2019	2020	2021	2022	2023	2024*
DCD RR	1	0	0	0	4	4	1
DCD A-NRP	0	0	0	2	1	5	1

RR, rapid recovery, A-NRP, Abdominal Normothermic Reginal Perfusion

Conflicts of interest
No conflicts declared

References
This work would not have been possible without our dedicated colleagues at the other Transplant Centres in Sweden, as well as dedicated teams in all the intensive care and operating units at the donor hospitals. Our deepest gratitude is also expressed to all the donors who gave their consent to organ donation.

PP32 - DCD-III AND LIVER DISCARD: ANY ROLE FOR THE METABOLIC STATE?

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Background

Nowadays organ procurement from deceased donors is only able to meet 10% of global needs, and there is a growing interest in donation after cardiac death (DCD)[1]. Italian legislation provides for a 'no-touch period' of 20', with a consequent prolonged total warm ischemia time (tWIT) and the need to counteract abdominal organ ischemic damage with in situ normothermic regional perfusion (nRP). To date there are no specific recommendations on the parameters to maintain for organ preservation during nRP. This study aims to identify the correlation between nRP settings and liver discard at the end of regional perfusion.

Methods

Upon completion of cardiac death assessment, femoral cannulae and aortic blocker were placed and nRP started, with an ideal blood flow indexed (BFi) between 1.7 and 3 L/min/m2. tWIT, BFi, DO2i (Oxygen Delivery indexed), VO2i (Oxygen Consumption indexed), blood glucose and lactate were measured every 30'. Drugs administered during nRP were recorded. At the end of the procedure, the liver was recovered or discarded at the discretion of the transplanting surgeon, based on an intraoperative evaluation, non-decreasing lactate trend or a transaminase peak level >2500 IU/L.

Results

22 Maastricht-3, livers from DCD procedures were included; at the end of nRP, 19 (84.2%) livers were recovered and 3 (15.8%) were discarded (Table 1). Italian conversion rate 77%, local conversion rate 86%[2]. In discarded donors blood glucose was significantly higher and more insulin was administered (Table2).

Conclusions

Subjects whose livers were eventually discarded were older, with a higher body weight and with illnesses different from post-anoxic state. While we were unable to identify any specific nRP parameter associated with liver discard, during nRP, despite significantly more insulin administered, blood glucose was significantly higher in subjects whose livers were not recovered.

Table 1. Comparison between the two groups before nRP start.

	Transplanted (N=19)	Discarded (N=3)	p
Characteristics of subjects included			
Age (years)	*59±8*	*72±10*	*0.033*
Male sex	11 (58.9%)	3 (100%)	0.159
Actual body weight (kg)	*72.4±12.2*	*86.7±7.6*	*0.046*
Height (cm)	166.6±7.7	174.0±1.7	0.118
Body surface area (m^2)	1.82±0.19	2.04±0.08	0.064
Admission diagnosis			*0.020*
Postanoxic state	13 (68.4%)	0	
ICH	5 (26.3%)	1 (33.3%)	
TBI	1 (5.3%)	1 (33.3%)	
Stroke	0	1 (33.3%)	
Blood gas and biochemistry			
FiO_2 (%)	42.4±18.5	55.0±7.1	0.538
pH	7.46±0.09	7.47±0.02	0.746
PaO_2 (mmHg)	139.5±62.5	121.7±33.5	0.639
$PaCO_2$ (mmHg)	37.7±9.5	38.3±2.1	0.915
Hb (g/100mL)	10.3±1.5	11.5±2.2	0.228
Lactate (mMol/L)	1.7±2.1	1.1±0.3	0.634
AST (IU/L)	96.3±81.5	42.0±28.2	0.276
ALT (IU/L)	105.1±135.5	28.3±10.3	0.349
Glucose (mg/dL)	146.2±37.6	154.5±6.4	0.766

Table 2. Comparison of nRP settings, drugs administered and biochemical parameters between the two groups.

	Transplanted (N=19)	Discarded (N=3)	p
Warm Ischaemia Time (min)	*50.9±10.8*	*64.3±7.0*	*0.043*
nRP parameters			
Warm Ischaemia Time (min)	*50.9±10.8*	*64.3±7.0*	*0.043*
nRP (min)	219.0±32.1	221.5±25.1	0.717
Average blood flow indexed (l/min/m^2)	1.71±0.37	1.63±0.29	0.729
Average O_2 delivery indexed (l/min/m^2)	21.7±5.5	21.7±4.2	0.986
Average O_2 consumption (ml/min)	287.4±58.7	273.1±22.4	0.688
Average VO_2/DO_2 ratio	0.71±0.18	0.58±0.04	0.302
Drugs administered			
Packed red blood cells (U)	7±4	4±2	0.230
i.v. crystalloids (ml)	1357±1750	833±288	0.617
Bicarbonate 8.4% (mL)	165.8±115.5	233.3±57.7	0.339
33% glucose (mL)	9±27	0	0.584
Insulin (U)	*22.6±10.2*	*81.7±51.1*	*0.001*
Biochemical parameters			
Maximum blood glucose (mg/dl)	350.7±90.5	390.3±59.7	0.106
Average blood glucose (mg/dl)	*219.0±49.2*	*288.9±6.9*	*0.026*
Minimum blood glucose (mg/dl)	*133.3±27.1*	*167.0±22.1*	*0.045*
Maximum lactate (mMol/L)	*12.1±1.9*	*15.2±4.2*	*0.042*
Average lactate (mMol/L)	*7.9±1.6*	*11.8±3.7*	*0.005*
Minimum lactate (mMol/L)	*5.7±2.2*	*11.4±2.8*	*0.001*

Conflicts of interest
No conflicts declared

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PP33 - LIVER TRANSPLANTATION FROM DONORS AFTER CIRCULATORY DEATH IN PRIMARY SCLEROSING CHOLANGITIS: IS STILL DEBATE?

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Background

Primary sclerosing cholangitis (PSC) is a progressive fibroinflammatory cholangiopathy for which liver transplantation (LT) is the only life-extending intervention highly successful. It is therefore possible that donation after cardiac death (DCD) livers incrementa ly increase the risk of graft loss in PSC.

Methods

Clinical outcomes were prospectively evaluated in PSC patients undergoing LT from 2016 to 2021 stratified by donor type DCD and Donor after Brain Death (DBD) in a single Catalonian transplant center.

Results

A total of 15 adult LT PSC patients and their donors were analyzed, 12 from DBD and 3 from DCD. The DBD were 69 years old (27-84) and the gender distribution was equaly with normal weight. The three DCD were assessed for viability in normothermic regional perfusion after premortem cannulation. The cause of death was stroke (73 and 62 yo) in two patients and one trauma brain injury (72 yo). ICU stay was 5.6 days. Total Warm Ischemia Time was (WIT) 21.3 minutes (1824) and functional WIT was 14 minutes (9-21). Normothermic Regional Perfusion (NRP) for 154.5 minutes (147-162), and al cases meet viability criteria. Recipients age was 55.8 years (43–67) and 47 years (40-51) for DBD and DCD recipients, respectively. Median lab-MELD score was 22.6 for DBD (12–29) vs 14.6 for DCD (13-15). Most patients suffered inflammatory bowel disease as a concomitant comorbidity in both groups (66%). The type of biliary reconstruction was hepaticojejunostomy in 11/12 recipients for DBD group and 2/3 for DCD group. Biliary complications were anastomotic strictures in 4/12 DBD and 3/3 DCD. Most of them were treated by interventional radiology or ERCP. Only one patient (DBD) needs relaparotomy to treat stenosis. PSC recurrence presented in 2 patients of DCD group. Two patients died from sepsis (DBD group), one suffered primary nonfunction and other cholangiopathy after due late artery thrombosis. Al recipients from DCD donors are alive with normal functional graft after 3-year of folow up.

Conclusions

Proper donor selection and strict viability assessment ensures optimal results in LT. Adequate pre-transplant bile duct evaluation is mandatory to design the best surgical strategy to ensure short and long-term outcomes. Prospective multicenter studies are needed to demonstrate appropriate results of DCD + NRP in these patients.

Conflicts of interest

No conflicts declared

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PP35 - CONTROLLED AND UNCONTROLLED DONATION AFTER CIRCULATORY DEATH PROGRAM: CLINICAL RESULTS OF LUNG TRANSPLANTATIONS FROM DONORS WITH EXTENDED ISCHEMIC TIMES MANAGED WITH SIMPLE VENTILATION

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Background

Lung transplantation (LT) from donation after circulatory death (DCD) donors presents several challenges concerning organization, preservation, and graft evaluation. These led to different protocols around the world. In order to face the required 20 minutes of no-touch period, we developed an original approach without topical cooling. We report the results of our DCD program including uncontrolled (uDCD) and controlled (cDCD) donors.

Methods

We collected data on patients undergoing LT at our centre from DCD donors managed with our protocol. We employ an in-situ open and ventilated normothermic lung preservation with normothermic abdominal perfusion in case of combined organs procurement, followed by an ex-situ assessment.

Results

From 2014 to 2024, we performed 26 bilateral LT from DCD donors (14 uDCD, 12 cDCD) (*Table 1*), procured in 12 hospitals. Mean total ischemic time was 701 (SD 142) and 908 minutes (SD 152) for the first and second lung, respectively. Recipients achieved a good pulmonary function.

For the uDCD group we tracked down the number of referrals, recovery and transplants (*Fig 1*). In particular, 30 potential donors were approached while 22 were ruled out mainly due to severe smoking habits (17,30%), the opposition to donation (7,69%), long ischemic times at the referrals (5,76%) and logistical issues in organizing graft recovery or EVLP (7,69%). After an initial on-site evaluation, 23 organs were recovered. 7 grafts were considered unsuitable for transplantation at the end of EVLP and two were rejected because of the donor's bronchoalveolar lavage (BAL) positivity to Covid-19. 14 lungs were ultimately used for transplants.

Conclusions

Despite prolonged ischemic times and a high rate of primary graft dysfunction, the outcomes of our DCD cohort are satisfactory and support the feasibility of LT with DCD donors using our original and easily managed protocol. This opens the door to a large diffusion of lung donation from DCD, even in peripheral hospitals.

	uDCD (n = 14)	cDCD (n= 12)	DCD (n= 26)
Donor			
Sex: M (n, %)	13 (92,85%)	8 (66,66%)	21 (80,76%)
Age, mean (years)	53,7 (11,62)	55,9 (7,63)	54,7 (9,85)
Oto Score			
Smoking history, median	0 (0)	0 (0)	0 (0)
Bronchoscopy, median	0 (0,75)	0,5 (1,75)	0 (1)
Chest X-Ray, median	0 (0,75)	0,55 (2)	0 (1,75)
$paO_2/pFiO_2$, mean	NA	2,5 (2,5)	
Procurement			
Cardiac arrest – cold flush, mean (min)	246 (44)	NA	
Cardiac arrest – reperfusion first lung/second lung, mean (min)	1128 (198) / 1332 (223)	NA	
WLST – cold flush, median (min)	NA	22 (14)	
Systolic BP < 50 mmHg – cold flush, mean (min)	NA	148 (12)	
Total ischemic time first lung/second lung, mean (min)	684 (92) / 889 (115)	711 (188) / 930 (193)	701 (142) / 908 (152)
Recipient			
Sex: M (n, %)	11 (78,57%)	5 (41,66%)	16 (61,53%)
Age, mean (years)	50,1 (12,9)	48,3 (14,8)	49,3 (13,6)
Disease: CF (n, %)	4 (28,57%)	6 (50%)	10 (38,46%)
COPD (n, %)	3 (21,42%)	0 (0%)	3 (11,53%)
ILD (n, %)	7 (50%)	6 (50%)	13 (50%)
PGD3 within 72h (n, %)	1 (7,14%)	4 (33,33%)	5 (19,23%)
Airway anastomotic complications (n, %)	2 (14,28%)	1 (8,33%)	3 (11,53%)
CLAD (n, %)	2 (14,28%)	3 (25%)	5 (19,23%)
Retransplant (n, %)	0 (0%)	1 (8,33%)	1 (3,84%)
Best FEV1%, mean	2,55% (0,93)	2,63% (0,97)	2,59% (0,93)
Follow up, mean (days)	1113 (983)	1359 (859)	1223 (921)
Alive at follow-up (n, %)	10 (71,42%)	10 (83,33%)	20 (76,92%)

Table 1 Quantitative variables are expressed ad mean (standard deviation) ore median (interquartile range). WLST: withdrawal of life-sustaining therapy; BP: blood pressure; CF: cystic fibrosis; COPD: chronic obstructive pulmonary disease; ILD: interstitial lung disease; PGD: primary graft dysfunction; CLAD: chronic lung allograft dysfunction; FEV1: forced expiratory volume in the first second.

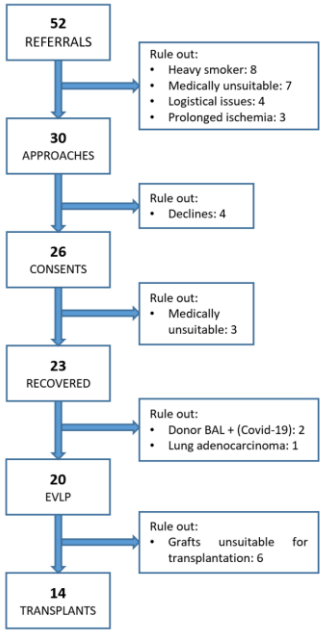

Figure 1 Uncontrolled DCD program diagram at Policlinico of Milano (2014-2024).

BAL: bronchoalveolar lavage; EVLP: ex vivo lung perfusion.

Conflicts of interest
No conflicts declared

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PP36 - THE ORGAN CARE OPERATOR'S ROLE IN DONOR AFTER CIRCULATORY DEATH(DCD) HEART RETRIEVAL

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Background
Our centre recognizes the value of nursing involvement in utilizing the organ perfusion device for DCD heart retrievals to ensure a reliable service and demonstrate the vital role nurses play in assessing heart function post donation after circulatory death. In the context of DCD heart retrieval, the organ care operator plays a crucial role in ensuring the success of hearts donated after circulatory death.

Methods
The methodology employed in this abstract involved training Donor Care Physiologists (DCPs) in DCD retrieval through a structured competency program developed by the hospital. Following a formal training session conducted by Transmedics, in-house cascade training was initiated to ensure proficiency among DCPs. The hospital developed an ongoing training program and a standard operating procedure (SOP) to efficiently educate new members of the team.

Results
As a result, the DCPs were involved in a high number of successful DCD heart retrievals. The DCPs are responsible for various tasks, setting up single-use equipment at the donor hospital, setting up the cell saver and washing red cells for the OCS machine, preparing medication and fluids used for DCD heart retrieval, monitoring the heart on the OCS machine, checking blood gases according to protocol, documenting on the DCD Passport, maintaining continuous communication with the surgical team and recipient hospitals, and performing other tasks as needed.

Conclusions
To summarize, the use of OCS by trained DCPs has been demonstrated to be successful in the context of heart transplantation. By delegating crucial tasks related to OCS retrieval to DCPs, hospitals have the potential to improve efficiency, data accuracy, and ultimately enhance a streamlined retrieval service that can consistently provide highly trained staff for DCD heart retrieval. The abstract emphasizes the substantial contribution of non-medical practitioners in advancing organ retrieval in the field.

Conflicts of interest
No conflicts declared

PP37 - PARALLEL DEVELOPMENT OF PERFUSION AND SURGICAL EXPERTISE IN NORMOTHERMIC REGIONAL PERFUSION (NRP) OPTIMISES LIVER UTILISATION

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Background
Development of a successful NRP service requires surgical and perfusion teams to build new expertise. Satisfactory NRP organ utilisation also requires transplant teams to build familiarity and confidence with NRP organs. However, it is unclear which strategy, namely enhancing the perfusion team or NRP surgical team, yields the most transplants. The effects of increasing perfusion and/or surgical NRP rota cover to increase NRP attendances and the parallel effects on liver utilisation were determined.

Methods
A single-centre retrospective cohort study was undertaken which looked at rota cover from December 2020 to March 2024 separately for NRP advanced perfusion specialists (APS) and NRP surgeons. This was analysed by linear regression to establish the relationship between different aspects of rota cover, NRP activity and NRP liver utilisation. Data analysed included days covered per month by an APS, by an NRP surgeon and by both specialists. The number of NRP attendances and liver transplants were also collated.

Results
We attended 225 Donation after Circulatory Death (DCD) retrievals of which 181 proceeded to donation using abdominal NRP. 110 Livers were retrieved with 90 of them resulting in transplantation. Regression analysis showed that increasing APS cover alone or NRP surgeon cover alone brought no significant benefit (p=0.23; p=0.70 respectively). By contrast, combined availability of an APS and an NRP surgeon brought a significant increase in NRP attendances over time (P=0.01; Figure 1). Increasing attendances over time resulted in higher NRP liver utilisation which reached marginal significance (p=0.052; Fig 2).

Conclusions
These data illustrate successful implementation of an NRP program requires equal investment in APS and NRP surgeons. It further demonstrates that there is an interaction between the number of NRP procedures and the confidence (utilisation) to perform liver transplantation with NRP grafts.

Fig 1

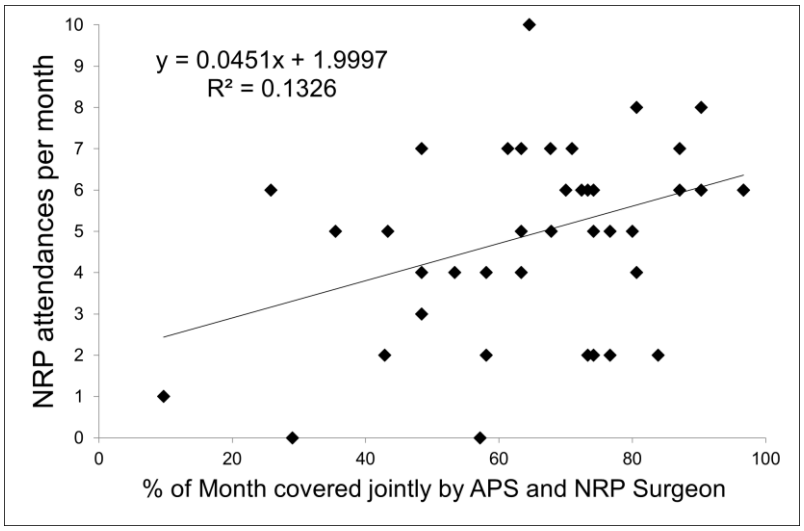
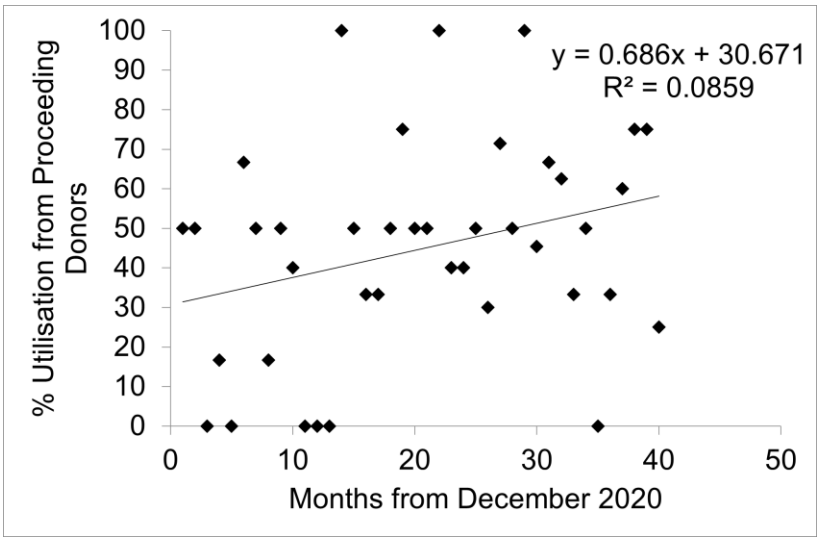


Fig 2



Conflicts of interest
No conflicts declared

PP38 - DECODING DCD AND MARGINAL LIVER LANDSCAPES AT SINGLE CELL RESOLUTION

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Background
A decline in organ donors results in the increase utilization of marginal livers including DCD, which pose a higher risk of complications. A significant portion of marginal livers originate from organs donated after brain death (DBD) or cardiac death (DCD). The objective of this study is to utilize single-nuclei RNA sequencing (snRNAseq) to delineate the cellular alterations linked to each condition both pre- (L1) and post- (L2) transplantation.

Methods
Methods: 52,449 single nuclei from two human livers (DBD vs DCD) collected at L1 and L2 underwent processing on the 10x Genomics Chromium platform, followed by the Seurat pipeline and UMAP clustering. Manual curation of distinct clusters utilized highly variable genes, with calculation of signification DEGs (FDR≤0.05 and FC≥1.5) and pathway-enrichment analysis.

Results
Results: 11 cell clusters representing parenchymal and immune compartments were identified. DCD exhibited a non-localized stress response across multiple cellular compartments, specifically elevated in hepatocytes and endothelial cells. This response was paired with an infiltration of macrophages (i[1]MΦ) that was unique to DCD. Pathway enrichment of i-MΦ revealed a phenotypic shift towards M2-polarization through the overexpression of BDNF[1]signaling. DBD more highly effected parenchymal cells with hepatocytes exhibiting activation of complement cascades and metabolic dysfunction.

Conclusions
DBD is believed to be characterized by the triggering of systemic inflammation, contrasting with localized hypoxia in DCD. While our study supports these differences, there exists molecular nuances between these two conditions that remain unexplored. These findings contribute to a deeper understanding of the molecular intricacies of marginal livers from different donor conditions, providing a foundation for targeting interventions aimed at optimizing organ preservation and transplantation outcomes in the face of declining donor availability.

Fig. 1

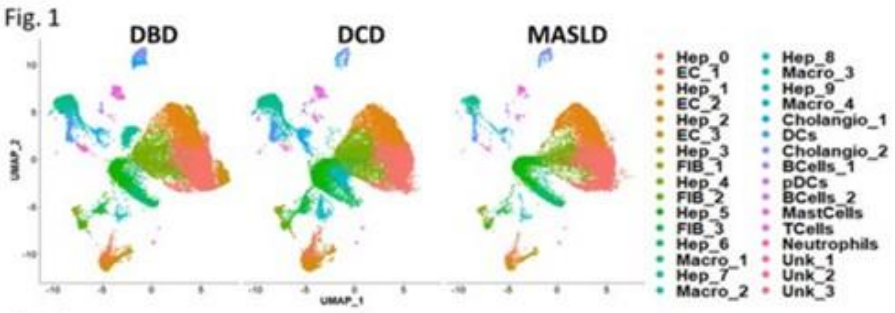
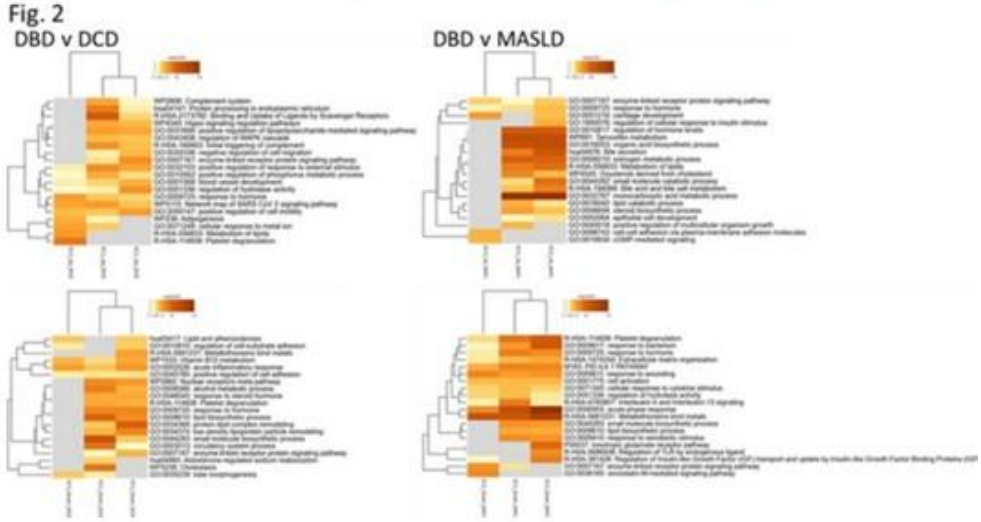


Fig. 2



genes (Fig. 2).

Fig. 1: Determination of molecular and cellular landscape of extended criteria donors (ECD). Post-ischemia biopsy samples were collected from transplanted liver allografts from different ECD donor types, i.e. donation after cardiac death (DCD), and fatty liver (MASLD), and compared to standard criteria donor, i.e. donation after brain death (DBD). More than 35,000 nuclei were collected, sequenced, and analyzed using Seurat. 10 main cell types forming 32 clusters were observed.

Fig. 2: Pathway enrichment analysis of differentially expressed genes of the endothelial cell cluster. Metascape was used to identify the enriched pathways using the observed differentially expressed genes. DEGs were selected based on FC >|2| and adj. p-value < 0.05.

Conflicts of interest
No conflicts declared

PP39 - UTILIZATION OF DCD LIVER GRAFTS BY PROCUREMENT TYPE AND STORAGE MODALITY: A COMPARISON OF CARDIAC AND NON-CARDIAC DONORS IN THE US

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Background
Utilization of donation after circulatory death (DCD) liver grafts has evolved with in situ and ex sit machine perfusion technology. In the US, in situ perfusion, or normothermic regional perfusion (NRP) is mostly provided by cardiac recovery centers while ex-situ machine perfusion is available for any DCD graft. We evaluated how these technologies are used for liver grafts across the US in cardiac and non-cardiac DCD donors.

Methods
All adult (≥ 18 years old) DCD donors in which the liver was used for transplantation in the US from October 1, 2020, to September 30, 2023, categorized by cardiac versus non-cardiac donor and then by procurement technique (NRP versus super rapid recovery [SRR]) and storage strategy (es-MP versus static cold storage [SCS]).

Results
84 centers transplanted at least one liver graft from a cardiac DCD donor. Of these, 40 used both NRP and SRR donors, 14 exclusively used NRP donors, and 30 exclusively used SRR donors. Of the 29 centers that did more than 5 DCD liver transplants during the study period, 28 (97%) transplanted livers from both NRP and SRR DCD donors. 27 (32%) centers used a combination of es-MP and SCS, 2 (2%) used es-MP only (one that did one transplant and one that did 2 transplants) and 55 used SCS only. 100 centers transplanted at least one liver graft from a non-cardiac DCD donor, 33 used both NRP and SRR donors, 1 used only NRP, and 66 used only SRR. 55 used es-MP for at least 1 graft while 45 used SCS only.

Conclusions
Perfusion technologies are increasingly being used for DCD liver grafts. In the US, cardiac DCD donors use NRP with SCS more commonly while non-cardiac donor liver grafts use es-MP more commonly. This is likely due to the limited availability of NRP for noncardiac donors. There is an opportunity to further expand the utilization of liver grafts from non-cardiac donors by increasing the availability of NRP for DCD donation.

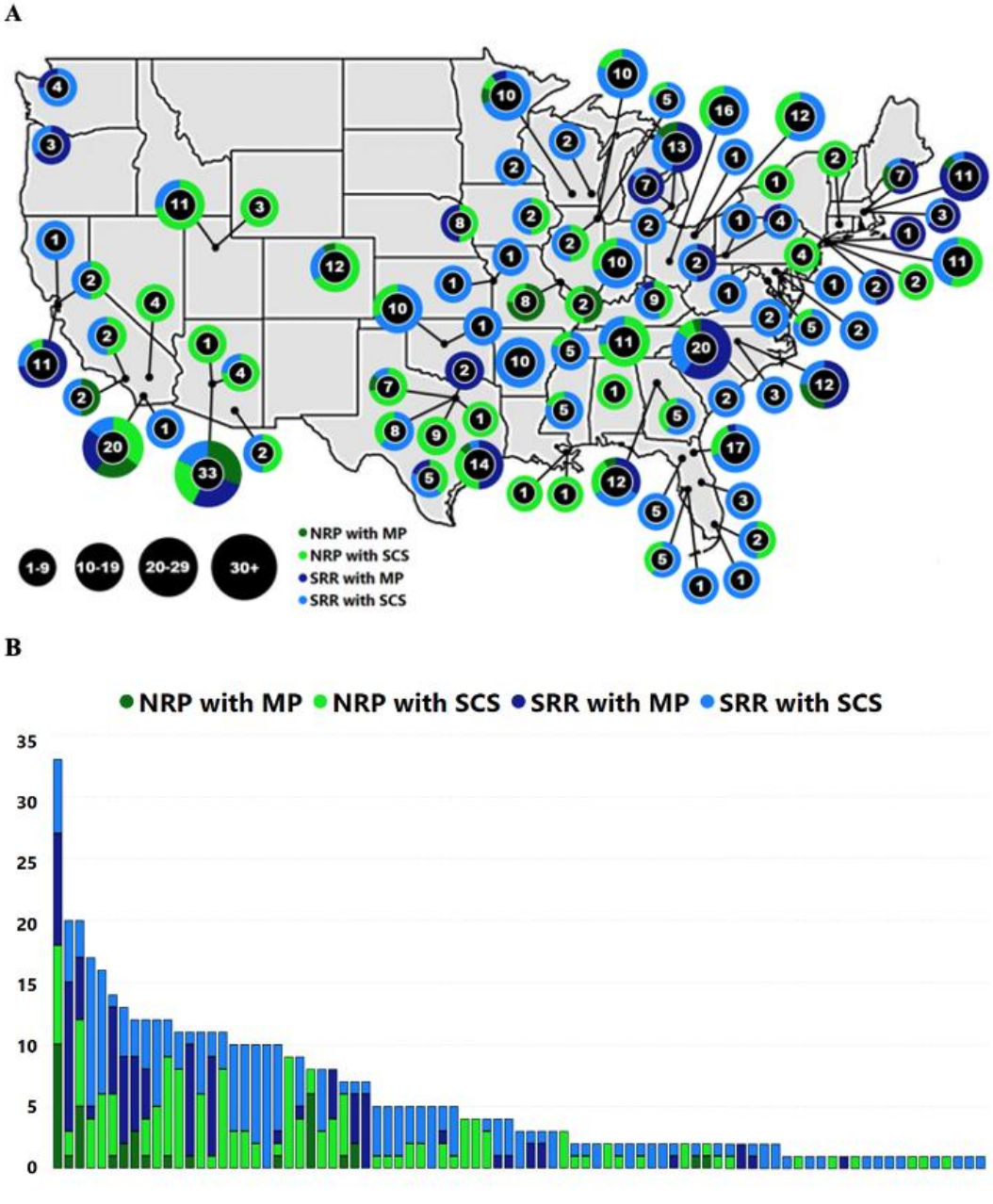

Figure 1: Center distribution of DCD liver grafts by procurement technique and storage modality for cardiac donors. Panel A: Geographic visualization of liver graft utilization by center. Panel B: Numerical distribution of utilization by procurement type and storage modality by center.

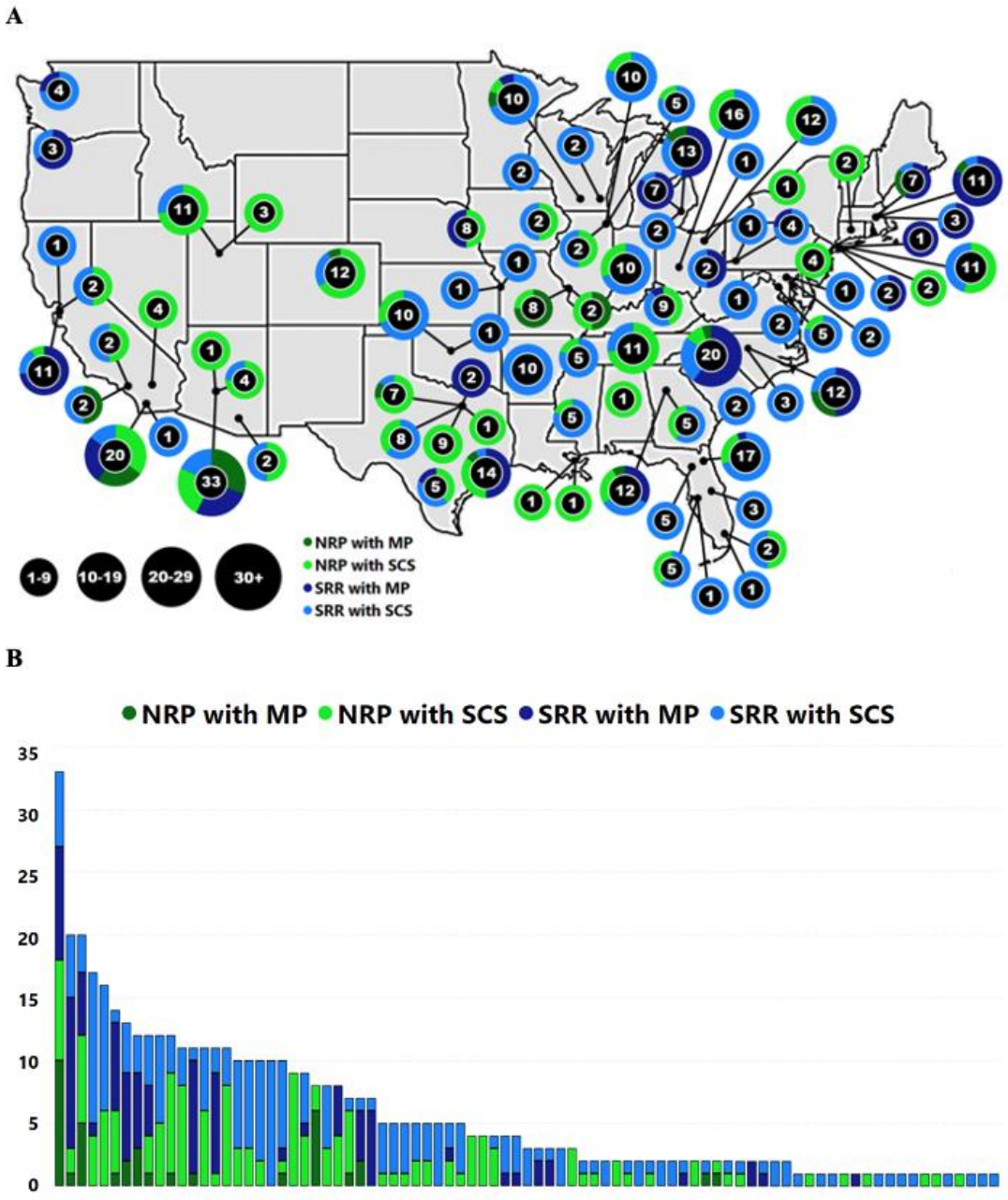

Figure 2: Center distribution of DCD liver grafts by procurement technique and storage modality for non-cardiac donors. Panel A: Geographic visualization of liver graft utilization by center. Panel B: Numerical distribution of utilization by procurement type and storage modality by center.?

Conflicts of interest
No conflicts declared

PP40 - IMPACT OF LARGE-FOR-SIZE GRAFTS PRESERVED WITH HYPOTHERMIC OXYGENATED MACHINE PERFUSION ON POST-LIVER TRANSPLANT OUTCOME

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Background

Large liver grafts might be associated with post-reperfusion syndrome, insufficient portal flow, liver hypoxia, and abdominal compartment syndrome due to size mismatch. However, the definition of large-for-size graft is currently lacking. In addition, despite introduction of ex-situ perfusion, the negative impact of these graft in post-transplant (LT) outcomes could not be mitigated by this technology. This study aims to investigate the impact of hypothermic oxygenated machine perfusion (HOPE) on post-LT results using large-for-size grafts.

Methods

Patients transplanted with HOPE perfused livers at Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico (Milan) and Azienda Ospedaliero Universitaria Città della Salute e della Scienza (Turin) from 2018 to 2021 were enrolled. All the DCDs underwent normothermic regional perfusion. Recipients were divided into two groups using a graft-to-recipient weight ratio (GRWR) threshold of 2%.

Results

Among 91 transplanted recipients, 47 received a graft with a GRWR<2 (liver weight 1351±257 g), and 44 with GRWR≥2 (liver weight 1679±309 g, p<0.001). Donors were older in the GRWR<2 group (p=0.022). No differences in graft histology or recipient characteristics were found. Median Cold preservation and HOPE time were 380 [260-690] min and 185 [60-495] min, respectively. Despite not reaching statistical significance, graft loss was 6% in GRWR<2 and 23% in GRWR>2 (p=0.114). In a subgroup analysis restricted to DCD grafts (n=42), early allograft dysfunction (EAD) occurred in 10% of the GRWR<2 group, whereas it occurred in 37% of GRWR≥2 cases (p=0.048). Notably, necrosis tended to be higher in large grafts (0-5% vs. 5-15%; p=0.068).

Conclusions

In conclusion, grafts with GRWR≥2 could represent a risk factor for poor post-LT outcomes despite the adoption of HOPE and a higher selection based on donor age. In DCD grafts, GRWR≥2 is associated to higher necrosis at histology and EAD incidence. A more advanced reconditioning strategy is suggested for these grafts.

Conflicts of interest

No conflicts declared

PP41 - HEPATOCELLULAR CARCINOMA RECURRENCE AFTER TRANSPLANTATION OF CDCD LIVER GRAFTS UNDERGOING NORMOTHERMIC REGIONAL PERFUSION: A MULTICENTER COHORT STUDY

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Background

Hepatocellular carcinoma (HCC) is the main oncological indication for liver transplantation (LT) with notable overall survival rates, yet tumor recurrence has a significant impact on recipient survival. Studies have shown that the risk of HCC recurrence is higher after LT of grafts from donation after circulatory death (DCD). However, to date there is no study focusing on oncological outcomes with the use of normothermic regional perfusion (NRP) during controlled DCD procurement.

Methods

This is a multicenter retrospective observational study on consecutive recipients undergoing cDCD LT after NRP for pathologically proven HCC between 2016 and 2019 at five LT centers. The study endpoints included oncological outcomes including 2-year HCC recurrence rates and overall and recurrence free survival. Potential risk factors for HCC recurrence for HCC recurrence were identified using multivariable analysis.

Results

Among 53 cDCD NRP LT recipients included in the study, the median pre-LT AFP level at listing was 5 µg/L and 75% of recipients were within Milan criteria. The 2-year HCC recurrence rate was 11%. After a median follow-up of 44 months, overall and recurrence-free survival rates were 83% and 87%, respectively. Satellite nodules on the liver explant were the only independent risk factor for HCC recurrence (p=0.025, HR 14.52). Notably, NRP duration, total donor warm ischemia or donor age were not associated with HCC recurrence. In patients with HCC recurrence, the site of recurrence was extrahepatic only in 43% (n=3), intrahepatic only in 14% (n=1) or both in 43% (n=3) of cases. Recipients with HCC recurrence had a median survival of 24.6 months.

Conclusions

This study is the first specifically investigating oncological outcomes after NRP cDCD LT. Satellite nodules emerged as the only significant risk factor for HCC recurrence, underscoring the importance of careful recipient selection. Donor characteristics including warm ischemia did not affect oncological outcomes in the context of NRP. Further investigations are warranted to refine predictive models specific to cDCD LT and validate these findings in larger cohorts

Table 1 : Recipient and donor characteritics

		HCC recurrence		
	N = 53[1]	No N = 46[1]	Yes N = 7[1]	p
Recipient characteristics				
Recipient age	60 (57, 63)	60 (57, 64)	60 (57, 62)	0.5
BMI	27 (24, 31)	28 (24, 31)	26 (25, 28)	0.5
Liver disease				0.5
Alcohol	22 (42%)	17 (37%)	5 (71%)	
NASH	4 (7.5%)	4 (8.7%)	0 (0%)	
NASH + Alcohol	10 (19%)	10 (22%)	0 (0%)	
Other	3 (5.7%)	3 (6.5%)	0 (0%)	
Viral	14 (26%)	12 (26%)	2 (29%)	
MELD	10 (8, 13)	10 (8, 13)	9 (7, 12)	0.7
Time on Waiting list, days	144 (93, 241)	148 (85, 264)	127 (106, 148)	0.5
Tumor characteristics at listing				
Lesion number, n (%)	2 (1, 3)	2 (1, 3)	2 (2, 3)	0.5
Size of biggest tumor, cm	15 (10, 27)	15 (10, 27)	19 (10, 24)	>0.9
Milan Criteria In, n (%)	40 (75%)	34 (74%)	6 (86%)	0.7
AFP levels, µg/L	5 (4, 13)	5 (4, 12)	15 (8, 24)	0.10
AFP score > 2, n (%)	2 (3.8%)	2 (4.3%)	0 (0%)	>0.9
Pre-transplant treatment, *n (%)*	42 (79%)	37 (80%)	5 (71%)	0.6
TACE, n (%)	22 (42%)	18 (39%)	4 (57%)	0.4
Ablation, n (%)	8 (15%)	8 (17%)	0 (0%)	0.6
Resection, n (%)	2 (3.8%)	2 (4.3%)	0 (0%)	>0.9
TACE + Resection, n (%)	4 (7.5%)	4 (8.7%)	0 (0%)	>0.9
TACE + Ablation, n (%)	3 (5.7%)	2 (4.3%)	1 (14%)	0.4
Resection + Ablation, n (%)	3 (5.7%)	3 (6.5%)	0 (0%)	>0.9
Donor and transplant characteristics				
Donor Age, years	50 (38, 58)	51 (40, 58)	47 (33, 59)	>0.9
Donor BMI, kg/cm2	24 (21, 27)	24 (22, 28)	21 (20, 22)	0.018
Donor ICU stay (d)	10 (6, 14)	10 (7, 16)	6 (6, 9)	0.054
TDWI, min	30 (26, 33)	30 (26, 34)	27 (24, 30)	0.4
NRP duration, min	180 (150, 200)	180 (160, 199)	178 (150, 204)	>0.9
Static cold ischemia time, hrs	6 (5, 7)	6 (5, 7)	4 (4, 5)	0.083
Total preservation time, hrs	8 (8, 9)	9 (8, 9)	7 (7, 8)	0.13
Tumor characteristics liver explant				
Number of nodules (n)	3 (2, 4)	2 (2, 4)	4 (4, 4)	0.031
Active nodules (n)	2 (1, 3)	2 (1, 3)	3 (2, 4)	0.061
Biggest tumor (mm)	20 (15, 35)	20 (15, 30)	30 (23, 42)	0.13
Active nodules	42 (79%)	36 (78%)	6 (86%)	>0.9
Satellite Nodules	10 (19%)	6 (13%)	4 (57%)	0.018
Microvascular invasion	8 (15%)	5 (11%)	3 (43%)	0.061

1 Median (IQR); n (%)

2 Wilcoxon rank sum test; Fisher's exact test

Table 1: Recipient and donor characteristics

Conflicts of interest
No conflicts declared

PP42 - LIVER TRANSPLANTATION FROM DCD DONORS OVER 70 YEARS USING ABDOMINAL NORMOTHERMIC REGIONAL PERFUSION – A TWO EUROPEAN CENTRES EXPERIENCE

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Background

Despite an increased utilization of donors after circulatory death (DCD), donor age remains an important risk factor for post-transplant graft failure. However, with the use of abdominal normothermic regional perfusion (aNRP), the donor pool might be safely expanded even further. This study reports the outcomes of liver transplantation from elderly donors above 70 years old following aNRP, with at least one year of follow-up (FU) in two European centres.

Methods

Retrospective analysis of data from Sweden and the Netherlands on outcomes of 70+ donor livers, treated with aNRP prior to LT between 1/5-18 and 17/3-24. Numbers are expressed as means or percentages.

Results

In the study period, 22 donors, (45% male), with a mean age of 72 years (range 70-76) were considered for aNRP. In 21/22 (95%) aNRP could be initiated, after a functional warm ischemia time of 34 minutes, including 12 minutes of canulation time. aNRP duration was 101 minutes for the whole group, with flows between 0,6 to 2,5 L/min. From 14 donors, the liver was accepted for transplantation, reflecting an organ utilization rate of 14/22 (64%). Reasons for discard were insufficient time to test due to blood loss n=3, and failed viability test n=4; 2 based on hepatocyte criteria, 1 based on cholangiocyte criteria, and 1 on mixed criteria.

Recipients were 60 years old, had 12 lab MELD points and the indication was mainly HCC. Cold ischemia time was 358 minutes, blood loss 3,4L and 2 recipients (14%) experienced a post-reperfusion syndrome. Post-transplant biliary complications occurred in 2 patients (14%), comprising of 2 anastomotic strictures, one in combination with biliary leakage. Non-anastomotic strictures were not seen at a FU of 15 months. One-year graft and patient survival rates were 100%. At three years, this was 100%, and 93% respectively, due to recurrent HCC in one recipient.

Conclusions

aNRP allows for a significant expansion of donor utilization criteria, enabling successful transplantation of DCD donor livers from donors over 70 years old with good clinical outcomes.

Conflicts of interest

No conflicts declared

PP43 - CANNULATION TECHNIQUES FOR ABDOMINAL NORMOTHERMIC REGIONAL PERFUSION DONATION AFTER CIRCULATORY DEATH ORGAN PROCUREMENT: TECHNICAL CONSIDERATIONS, INDICATIONS, AND CONTRAINDICATIONS

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Background
Abdominal NRP (A-NRP) represents a realistic opportunity to significantly expand DCD utilization while improving overall outcomes. This abstract describes all technical approaches to DCD A-NRP utilized at a single transplant program to maximize liver allograft yield and quality.

Methods
Three cannulation techniques successfully utilized in A-NRP DCD procurements are presented in detail with technical considerations, indications, and contraindications.

Results
Schematics of the three cannulation techniques are presented in Figure 1. The Central Cannulation technique typically requires 2 trained surgeons, takes on average 4 minutes from incision to flow on pump, is indicated for donors with a hostile abdomen or morbid obesity, and is contraindicated when the thoracic team performs rapid recovery. The Abdominal Cannulation (AC) technique can be used with a supra-celiac clamp (SC), or initially with an intra-aortic balloon occlusion (IBO) catheter. AC-SC requires a surgeon and ideally 2 assistants, one of which could open the chest to clamp the descending aorta for expediency. AC-IBO requires one surgeon and one assistant. AC techniques take on average 7 minutes from incision to flow on pump, are indicated when pre-mortem intervention is not allowed and when thoracic rapid recovery is planned. AC is contraindicated when the donor has a hostile abdomen. Femoral cannulation uses pre-mortem femoral sheath placement with post-mortem cannulation. It requires a surgeon and an assistant, takes 3 minutes on average from incision to flow on pump, is indicated for donors that are morbidly obese, have a hostile chest or abdomen, and when a thoracic rapid recovery is planned.

Conclusions
Centers developing A-NRP programs should establish expertise in multiple cannulation techniques to allow for a tailored approach dependent on donor characteristics, procurement logistics with thoracic teams, and OPO or hospital policy limitations.

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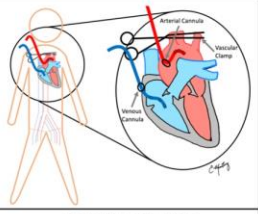
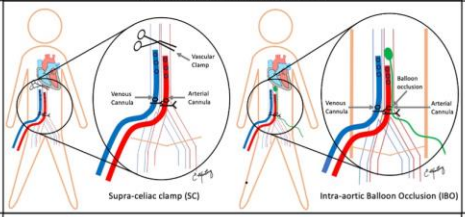
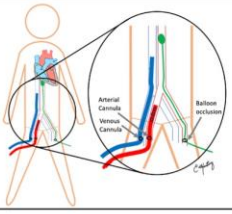
Cannulation Techniques			
Organs perfused	**Thoracic:** Heart, Lungs **Abdominal:** Liver, Intestine, Pancreas, Kidneys	**Abdominal:** Liver, Intestine, Pancreas, Kidneys	**Abdominal:** Liver, Intestine, Pancreas, Kidneys
Surgical Personnel (Minimum ; Typical)	Surgeon: 1 ; 2 Assistant: 1 ; 1	Surgeon: 1 ; 1 Assistant: 1 ; 2	Surgeon: 1 ; 1 Assistant: 1 ; 2
NRP Instrumentation (Avg Time Incision-to- Flow)	Arterial & Venous Cannulas Vascular Clamp (4 minutes)	Arterial & Venous Cannulas Vascular Clamp **or** Intra-aortic Balloon Occlusion (IBO) catheter (7 minutes)	Arterial & Venous Cannulas IBO catheter (3 minutes)
Cannulation Location	**Arterial**: Ascending Aorta **Venous**: Right Atrial Appendage	**Arterial**: Distal Abdominal Aorta **Venous**: Caudal Inferior Vena Cava	**Arterial**: Common Femoral Artery **Venous**: Common Femoral Vein
Clamp Location	Occlusion of Aortic Arch Vessels	**With or Without** prior IBO, Clamp the Descending Aorta – Thoracic **or** Supra-Celiac	**After** IBO, Clamp the Descending Aorta – Thoracic **or** Supra-Celiac;
Indications	Obese, Hostile abdomen	Pre-mortem sheath placement not permitted Thoracic supra-rapid recovery planned	Obese, Hostile chest or abdomen, Thoracic supra-rapid recovery planned
Contraindications	Hostile chest, Thoracic supra-rapid recovery panned	Hostile abdomen	Pre-mortem sheath placement not permitted

Figure 1: Cannulation techniques for abdominal normothermic regional perfusion (A-NRP) with details of organs perfused, surgical personnel needed, instrumentation and time, cannula location, clamp location, indications and contraindications.

Conflicts of interest
No conflicts declared

PP44 - THE ROLE OF MACHINE PERFUSION IN PREVENTING RECURRENCE AFTER LIVER TRANSPLANT FOR HEPATOCELLULAR CARCINOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background
There is increased risk of cancer recurrence associated with ischemia-reperfusion injury (IRI) after liver transplantation. The use of dynamic preservation techniques such as machine perfusion of liver graft is associated with reduced IRI. We performed this systematic review and meta-analysis to compare the recurrence of HCC in patients that had liver graft preservation with static cold storage vs dynamic machine perfusion during liver transplantation.

Methods
Two independent researchers searched for literature in the following databases: PubMed (Medline), Cochrane Central Register of Controlled Studies (CENTRAL), google scholar and Scopus (ELSEVIER) databases (last search: November 2023). The search terms used were: “dynamic perfusion”, “normothermic perfusion”, “hypothermic perfusion”, “liver transplantation”, “liver cancer”, “static cold storage”, “NMP”, “HOPE”, “extended criteria grafts”, “Machine perfusion”, “HCC”, “hepatocellular carcinoma”, “recurrence” and “ischemic reperfusion injury”. Related articles and reference list were searched to completeness of the search. Conflict was resolved by involving third researcher.

Results
Four studies published from 2018 to 2023 were included in this meta-analysis. Our meta-analysis revealed that recurrence is higher in the SCS group when compared to DMP group but the difference is not statistically significant with Risk ratio (RR) =1.57 and P=0.12. In the same vein we found that more patients in machine perfusion group tend to have microvascular invasion (RR=3.12, P=0.002) and are more likely outside Milan criteria (RR=2.81. P=0.005)

Conclusions
Machine perfusion of liver graft is does not significantly affect the risk of recurrence after liver transplant for HCC.

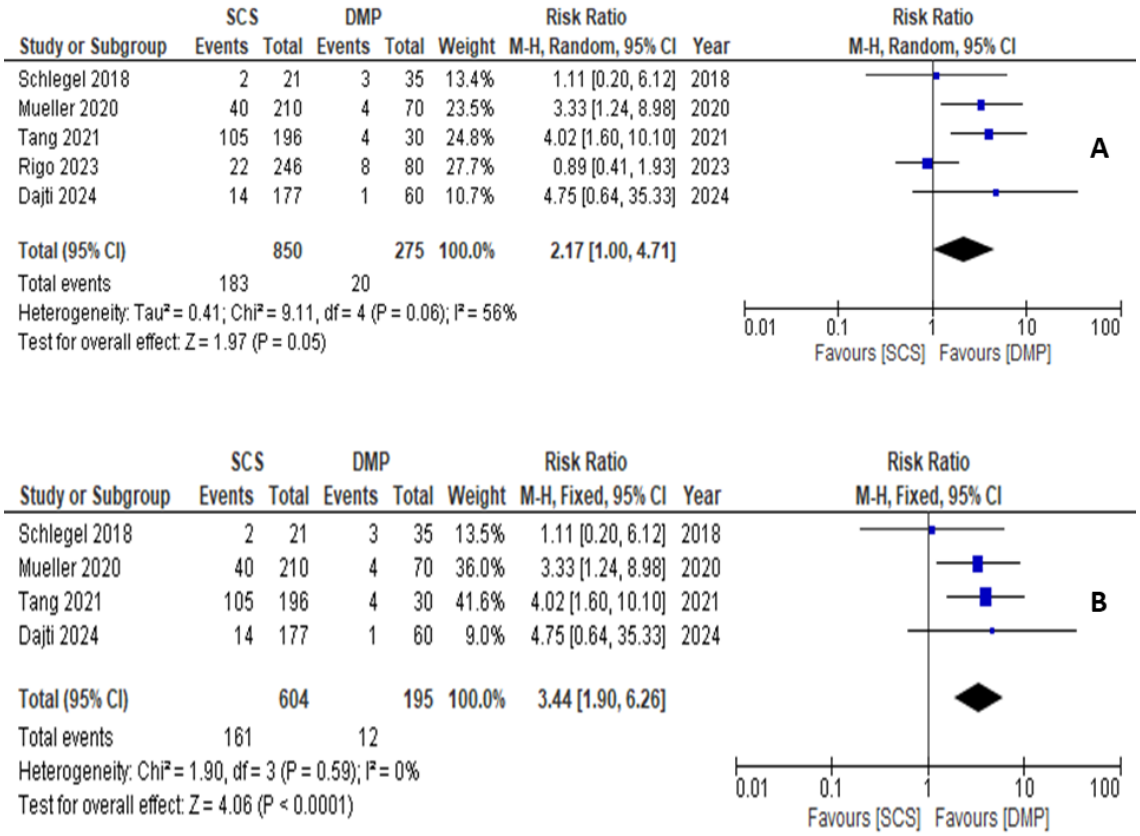

Figure 1: A: Meta-analysis comparing recurrence rate after Liver transplantation in all studies. **B:** Meta-analysis comparing recurrence rate after Liver transplantation in studies without heterogeneity.

Conflicts of interest
No conflicts declared

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PP45 - PEDIATRIC DONATION AFTER CARDIAC DEATH IN ITALY: A PILOT EXPERIENCE

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Background
Pediatric donation after cardiac death (pDCD) is globally rare, but encouraging results using in-situ or ex-situ organ perfusion techniques have been recently reported. When the donor is very small, adopting such techniques may be problematic. This represents a key issue in Italy, where the asystolic warm ischemic time (WIT) is affected by a no-touch period of 20 min, and normothermic regional perfusion (NRP) is mandatory. Our institution pioneered pDCD in Italy and, being an excellence center for pediatric intensive care and transplantation, was appointed to develop a national program. We present our protocol and report the first pDCD in Italy.

Methods
As per protocol, abdominal NRP (femoral venoarterial cannulation and balloon occlusion of the thoracic aorta) was converted to thoracoabdominal (TA) NRP after ligation of the supra-aortic trunks, and TA NRP was complemented by left ventricular venting (figure 1). After NRP weaning, circulation was sustained by the resuscitated heart.

Results
Donor age and weight: 16 years and 33 kg. Procedural data: time from abdominal to TA NRP of 5 min; functional and asystolic WIT of 32 and 21 min for abdominal organs, of 37 and 26 min for the heart; duration of TA NRP of 91 min; time from TA NRP suspension to aortic cross-clamping of 139 min.
The heart and liver were successfully transplanted at our institution into two pediatric recipients, after static cold preservation; the procurement and transplant teams coordinated with each other to limit the cold ischemic time. The kidneys were successfully transplanted at different institutions into two pediatric recipients, after ex-situ dynamic preservation. Data on the heart and liver recipients and transplant outcomes are shown in figure 2.

Conclusions
In expert hands, pDCD seems to be safely feasible, even when the donor is very small. The prompt establishment of an adequate in-situ perfusion is crucial for the function of these organs, especially in the presence of a long legally obliged asystolic WIT.

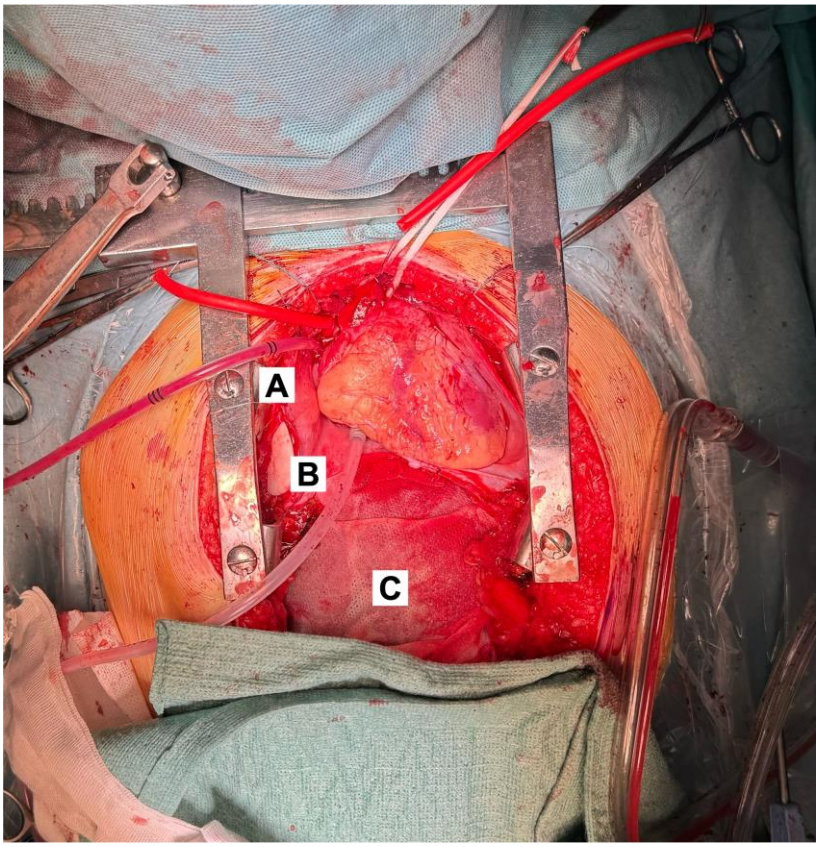

Figure 1 – Donor heart during TA-NRP. A: Left ventricular vent. B: Suction line for TA-NRP (cardiopulmonary bypass). C: Gauze covering the donor liver.

	Heart transplantation	Liver transplantation
Recipients' characteristics		
Age (years)	7	15
Weight (kg)	24	34
Sex	Male	Male
Retransplantation	No	Yes
Disease	Dilated cardiomyopathy	Chronic rejection
Transplant-related data		
Cold ischemic time (min)	62	208
Implantation time (min)	34	49
Outcomes		
Duration (days) of:		
Invasive ventilation	3	4
Inotropic support	4	0
Intensive care unit stay	6	7
Hospital stay	30	21
At 6 months:		
Complications	No	No
Transplanted organ function	Normal	Normal
Quality of life	Good	Good

Figure 2 – Characteristics of the heart and liver recipients, transplant-related data, and short-term outcomes.

Conflicts of interest
No conflicts declared

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PP46 - WORKING TOWARDS A CONCEPTUAL MODEL FOR ECONOMIC EVALUATIONS IN MACHINE PERFUSION TECHNOLOGIES FOR SOLID-ORGAN TRANSPLANTS: A SCOPING REVIEW

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Background
Despite increasing societal awareness of organ donation, the persistent shortage of organs remains a challenge. While transplantation often offers the most cost-effective treatment compared to alternatives, there's a lack of studies assessing the cost-effectiveness of new technologies like machine perfusion. This gap reduces accessibility and reimbursement. One of the key issues lies in the absence of a standardized methodology tailored specifically for organ transplantation. A standardized model for cost-utility studies in organ transplantation could streamline assessments by uniformly integrating costs and outcomes in an efficient manner. Hence, the aim of this scoping review is to develop a conceptual model to allow for more organ transplant-tailored economic evaluations that permit comparisons, contributing to the development of more informed decision-making in health technology assessments within the field.

Methods
Following the JBI methodology and PRISMA-ScR checklist, this scoping review adopted a systematic approach to inventory and synthesize the comparators, methodologies, and patient outcomes measured in studies that assess the cost-effectiveness and clinical benefits of machine perfusion. Searches encompassed EMBASE, Medline, and Web of Science.

Results
The review identified 759 references. Preliminary results reveal a scarcity of cost-utility studies and availability of quality-of-life values. Benefits include reduced discard rates, improved assessment time, and comparable clinical outcomes to static cold storage, albeit with higher direct costs.

Conclusions
Ultimately, this scoping review lays the groundwork for a framework that can be used in future economic evaluations and improve the comparability of cost-effectiveness results for reimbursement decisions.

Conflicts of interest
No conflicts declared

References
N/A
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