OS08 IS WARM WINNING THE COLD WAR IN MACHINE PERFUSION?

OS419 NORMOTHERMIC REGIONAL PERFUSION (NRP) INCREASES ABDOMINAL ORGAN UTILISATION FROM CDCD DONORS

Gabriel Oniscu[1], Andrew Butler[2], Fiona Hunt[1], Stephen Large[3], Ian Currie[1], Jenny Mehew[4], Rhiannon Taylor[4], Christopher Watson[2]
[1]Edinburgh Transplant Centre; [2]University of Cambridge Department of Surgery, Addenbrooke's Hospital, Cambridge, UK; [3]Royal Papworth Hospital, Papworth Everard, Cambridge, UK; [4]Statistics and Clinical Studies, NHS Blood and Transplant, Bristol, UK

Background: Normothermic regional perfusion is increasingly being used in controlled donation after circulatory death (cDCD). We analysed the impact of NRP on organ utilisation in the UK.
Methods: First adult (≥16) transplants from UK DCD donors between 01/01/2011 and 6/9/2018, were stratified by individual organ donor risk scores and the impact of NRP on utilisation was assessed in multi-variate models.
Results: A mean of 3.4 organs were transplanted from a cDCD donor when NRP was used as compared to 1.8 organs per donor when NRP was not used. Table 1 shows the offering outcomes for the abdominal organs in the analysis.

		Abdominal NRP	No abdominal NRP
Liver	No. offered	112	4739
	No. transplanted (% offered)	94 (84%)	2000 (42%)
	No. transplanted (% offered)	72 (64%)	1206 (25%)
Kidney (at least one)	No. offered	112	5116
	No. transplanted (% offered)	109 (97%)	3550 (69%)
	No. transplanted (% offered)	100 (89%)	3121 (61%)
Pancreas (includes those offered for islets)	No. offered	67	1939
	No. transplanted (% offered)	50 (75%)	749 (39%)
	No. transplanted (% offered)	23 (34%)	327 (17%)

There were 4,872 donors in the cohort where the liver was offered. After adjusting for the UK liver donor index, a liver transplant was over 4 times more likely to result from donors that underwent abdominal NRP compared to those that did not undergo abdominal NRP (OR = 4.5, 95% CI: 3.0-6.8).

At least one kidney was offered from 5,245 donors in the cohort. The 2017 Mumford UK Kidney Offering Scheme Donor Risk Index was applied to each of these donors. After adjusting for kidney donor risk profile, abdominal NRP significantly increased the odds of a kidney transplant resulting from a donor where at least one kidney was offered. Specifically, a kidney transplant was 4.5 times (95% CI: 2.5-8.3) more likely to result from donors that experienced abdominal NRP.

There were 2,060 donors in the cohort where the pancreas was offered. When adjusting for the Axelrod PDRI, a pancreas was two times more likely to be transplanted (p = 0.007) when NRP was used at the time of procurement.
Conclusions: The use of NRP at the time of organ procurement in cDCD donors significantly increases the utilisation of the abdominal organs offered for transplantation.

OS07 DETERMINANTS OF OUTCOMES IN DECEASED DONOR KIDNEY TRANSPLANTATION

OS420 BRIEF INITIAL AND END-ISCHEMIC O_2 SUPPLY VIA BUBBLE AND PERFUSATE SURFACE OXYGENATION DURING STANDARD HMP DEMONSTRATED TO BE SIMPLE YET EFFECTIVE FOR IMPROVING EARLY RECOVERY OF RENAL FUNCTION IN AN ISCHEMIA-REPERFUSION PORCINE AUTOTRANSPLANT MODEL

Tom Darius[1], Martial Vergauwen[2], Thomas Smith[3], Jay Nath[4], Kamlesh Patel[4], Selda Aydin[5], Antoine Buemi[6], Martine De Meyer[6], Christian Ludwig[3], Pierre Gianello[2], Michel Mourad[7]
[1]Surgery and Abdominal Transplant Unit, University Clinics Saint Luc, Université catholique de Louvain, Brussels; [2]Pôle de Chirurgie Expérimentale et Transplantation, Université catholique de Louvain, Brussels; [3]The Institute of Metabolism and Systems Research (IMSR), University of Birmingham; [4]Department of Renal Surgery and Vascular Access, Queen Elizabeth Hospital Birmingham; [5]Department of Pathology, University Clinics Saint Luc, Université catholique de Louvain, Brussels; [6]Surgery and Abdominal Transplant Unit, University Clinics Saint Luc, Brussels; [7]Surgery and Abdominal Transplant Unit, University Clinics Saint Luc, Brussels,

Background: Static cold storage (SCS) and hypothermic machine perfusion (HMP) are today the gold standard for kidney preservation. The aim of this study was to determine the ideal start time and least complicated method for adding oxygen during HMP to improve early graft function in a porcine kidney ischemia-reperfusion autotransplant model.
Methods: The left kidney of ± 40 kg Landrace pig was exposed to 30 minutes of warm ischemia by vascular clamping and randomized after ex vivo cold flush. The LifePort Kidney Transporter® modified to *include an external oxygenator* was used in the following study groups: 1) 22 h oxygenated HMP ($HMPO_2$(FiO_2 90%), *n* = 8), 2) 2 h HMPO2 + 20 h HMP(*n* = 6), and 3) 20 h HMP + 2 h $HMPO_2$(*n* = 5). The LifePort kidney Transporter *without external oxygenator* but direct perfusate oxygenation via bubble and perfusate surface (FiO_2=95%) oxygenation was used in a 4th study group, 22 h standard HMP including 30 min at start and 1 h end-ischemic O_2 uploading ($HMPO_2$uploading). SCS and standard HMP (no active oxygen supply) for 22 h served as control groups.
Results: The perfusate pO_2 at the start and the end of HMP is shown in Figure 1 according to the study group. Graft recovery measured by serum creatine levels was superior in the 22 h $HMPO_2$, the 2 h $HMPO_2$+20 h HMP and the HMPO2uploading groups compared with 22 h SCS ($p < 0.0001$), standard 22 h HMP ($p < 0.0001$) and 20 h HMP + 2h$HMPO_2$ ($p = 0.0288$) (Figure 2).
Conclusion: Our data suggest that during cold perfusion continuous oxygenation might not be required. Brief O_2 uploading via bubble and perfusate surface oxygenation was shown to be as effective as continuous oxygenation via an external oxygenator to obtain supraphysiological pO_2 and similar superior early graft function compared with standard HMP or SCS alone. Such simple but effective oxygenation method might easily get adopted in the clinic since it would hardly complicate handling or logistics during organ sharing.