

MACHINE PERFUSION VERSUS COLD STORAGE PRESERVATION IN NON-HEART-BEATING KIDNEY DONATION AND TRANSPLANTATION: FIRST RESULTS OF A MULTICENTRE TRIAL IN EUROTRANSPLANT.

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Rationale: Delayed Graft Function (DGF) after Kidney Transplantation causes additional morbidity and cost, and may negatively affect graft function and survival. Kidney grafts procured in Non-Heart-Beating Donors (NHBD) are exposed to both warm and cold ischemia and thus particularly vulnerable to DGF. Compared to standard Cold Storage (CS), hypothermic Machine Perfusion (MP) has been reported to provide superior preservation. This fact could be of great importance particularly for NHBD kidneys, but evidence to support this view is limited in quality and numbers.

Aim: To compare the efficacy of MP vs CS for the preservation of NHBD kidneys.

Methods: In an international prospectively randomized controlled trial we enrolled kidney pairs of 82 consecutive NHBD. All NHBDs were Maastricht category 3 (awaiting cardiac arrest/planned therapy withdrawal). One kidney was randomly assigned to MP and the contralateral kidney to conventional CS. Kidneys were allocated using the standard allocation algorithm. At time of offer, the type of preservation (MP vs CS) and perfusion parameters were not revealed. All 164 recipients were followed-up and 3 month data were analyzed.

Results: Donor age (y) was 43 (17-67). Baseline demographics were comparable between MP vs CS arms: recipient age (y) 49 (24-73) vs 52 (24-77), $p=0.81$; pre Tx dialysis duration (days) 1542 (366-6402) vs 1448 (132-3904), $p=0.48$; first/re Tx 34/48 vs 34/48, $p=0.56$; % current PRA (0-5/6-84/85+) 71/11/0 vs 71/10/1, $p=0.73$; % of 0 HLA A,B and DR mismatches was 2.4 vs 3.7, $p=0.5$. Cold Ischemia Time (CIT) (h) was 15 (4.3-28.9) for MP vs 15.9 (8.6-46.6) for CS ($p=0.7$). Incidence of DGF was 53.7% in MP vs 69.5% in CS recipients, $p=0.027$. Duration of DGF (days) was 9 (1-48) in MP vs 13 (2-43) in CS kidneys, $p=0.04$. DGF < 7days occurred in 12/32 (27%) in the MP vs 6/51 (10.5%) in the CS arm, $p=0.028$. Creatinine clearance (ml/min) at d7, d14, 1mth, and 3mth in MP vs CS was 13 vs 9, $p=0.009$; 23 vs 13, $p=0.001$; 46 vs 38, $p=0.078$; and 57 vs 49, $p=0.19$, resp. PNF rate was identical after MP and CS (2.4%). Acute rejection rate was 7.3% in MP vs 12.2% in CS kidneys; $p=0.22$. Graft loss (<3mth) was identical after MP and CS (3.6%). Patient survival was 98.7% in MP vs 100% in CS recipients. Logistic regression analysis showed that MP ($p=0.035$; Odds ratio 0.476) and CIT ($p=0.009$; Odds ratio 1.118) independently had an impact on DGF.

Conclusion: This study demonstrates for the first time in a large controlled trial that MP of NHBD kidneys reduces the incidence, the duration and the severity of DGF and ameliorates graft function after kidney transplantation.