Results from the COPE Multinational Randomised Controlled Trial Comparing Efficacy of Normothermic Machine Perfusion with Static Cold Storage in Human Liver Transplantation

Background:

The poor outcomes associated with DCD liver transplantation have prevented the increased use of these organs. Normothermic machine perfusion (NMP) may mitigate the harmful effects of the DCD donation process and so increase liver utilisation. We present results from the first RCT of NMP vs static cold storage (SCS).

Methods:

This multinational RCT was initiated by the Consortium for Organ Preservation in Europe (COPE) and involved seven European transplant centres. Adult DBD and type III DCD livers were randomly assigned (1:1) to continuous NMP or SCS. The primary end point was the difference in peak-AST, requiring 220 transplants (90% power). Secondary endpoints were: organ utilisation, preservation time, early allograft dysfunction (EAD), six month graft and patient survival and ischaemic cholangiopathy on MRCP.

Results:

272 livers (135 SCS, 137 NMP) were enrolled, including 194 DBD and 78 DCD organs. 50 were discarded (34 SCS, 16 NMP; p=0.004) mainly due to steatosis. These consisted of 27 DBD (10 NMP, 17 SCS) and 23 DCD livers (6 NMP, 17 SCS).

NMP livers experienced longer median preservation times (SCS 7hr 09min vs 11hr 20min NMP).

Early graft function was significantly better in the NMP group with respect to peak AST (NMP 485 IU/L vs SCS 974 IU/L; p<0.0001) and EAD (NMP 12.6% vs 29.9%; p=0.002).

The magnitude of AST reduction was greater for DCD than DBD livers (p=0.02).

DCD NMP livers had a 93% lower likelihood of developing EAD compared to DCD SCS.

There were five NMP graft failures (including three deaths) in the first 30 days and two in the SCS group.

Conclusions:

Continuous NMP of the donor liver is associated with better early graft function than SCS, an effect that is more pronounced in DCD organs. This is despite fewer NMP discards and longer preservation times. MRCP results are awaited.