

The Organ Care System as a new promising tool for donor heart *ex vivo* preservation

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Heart transplantation remains the gold standard treatment for end-stage heart failure. To face actual donor shortage, heart warm perfusion with the Organ Care System (OCS) was introduced alternatively to usual cold ischemic storage [1]. Here, OCS-preserved hearts were matched against those subjected to cold ischemia in terms of (i) perioperative clinical parameters, (ii) histopathological, immunohistochemical, and ultrastructural features of pre- and post-implant left ventricle biopsies, and (iii) cardiomyocyte metabolism by NMR spectroscopy of blood samples. Concerning clinical outcomes and myocardium structural preservation, preliminary data seem to be encouraging. Namely, NMR spectra revealed OCS perfusion to reduce cardiomyocyte oxidative stress by lowering the lactate/glucose ratio. Ultrastructurally, cardiomyocytes from OCS-preserved hearts showed minor hypertrophy signs and few altered mitochondria. OCS preservation also seemed to mitigate reperfusion effects, decreasing the number of degenerating cardiomyocytes. Interestingly, disappearance of sarcomere banding in one heart undergone pre-explant arrest was found to be restored after OCS perfusion. In conclusion, these preliminary data suggest that the OCS can improve heart storage. Functional recovery of borderline hearts with actual broadening of the donor pool seems to represent additional advantages of OCS technology.

References

[1] Messer et al. (2015) Normothermic donor heart perfusion: current clinical experience and the future. *Transpl Int* 28: 634-642.

Keywords

Organ Care System, heart transplant, cardiomyocyte metabolism, histopathology, ultrastructure