APHERESIS AND TRANSPLANTATION

Round Table: Organ Perfusion

Normothermic Ex Vivo Perfusion: the Liver

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In the absence of secure data, the choice of the most effective ex vivo perfusion mode becomes difficult. Normothermic perfusion appears to be the most suitable for the liver, although it also requires more supporting evidence. In general, its application has the aim of increasing the number of transplants and improving graft / patient survival, as well as reducing post-operative complications thanks also to the organ reconditioning and to the improvement of organs' quality. In this context, Pisa Experience concerns both, DBD and DCD organs. Considering DBD organs, a prospective randomized study compared the normothermic ex vivo perfusion mode, performed 3 hours after in situ perfusion, and the cold static storage of livers taken from elderly donors. There are no significant differences between the two modalities in terms of graft recovery, graft / patient survival, complications. However, the study highlighted some aspects characterising normothermic ex vivo perfusion, allowing to better understand this perfusion method, especially in terms of transplantability criteria, regenerative capacity of the perfused graft subjected (minor mitochondrial edema, reduction of internal steatosis, mechanism of autophagy). In the DCDs, normothermic perfusion is performed following in situ perfusion or after the organ is transported in ice at the transplant centre. In 15 perfused DCD organs, the majority was uncontrolled and there were 6 positive perfusions. The results, both in DBD and DCD organ perfusions, lead to the necessity to better understand the potentials of organ ex vivo perfusion techniques, transforming organ ex vivo perfusion in organ reconditioning treatment, in order to improve organ quality. Some intervention approaches to be used during ex vivo perfusion are already described in the literature, such as, anti-inflammatory strategies, reduction of the cold static storage duration, the use of nanoparticles as a nutrient or drug carrier, all with the aim to transform ex situ perfusion in graft treatment platforms.