

COST-EFFECTIVENESS OF HYPOTHERMIC MACHINE PERFUSION VERSUS STATIC COLD STORAGE IN KIDNEY TRANSPLANTATION: FIRST RESULTS OF THE PROSPECTIVE EUROPEAN RCT

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Introduction: Static cold storage (CS) is the most widely used organ preservation method for deceased donor kidney grafts. Retrospective analyses have indicated that preservation by hypothermic machine perfusion (MP) may lead to improved outcome after renal transplantation. We performed an economic evaluation of the use of MP versus CS with data from the recently conducted European multicenter prospective RCT. This analysis concerns the short term cost-effectiveness of MP versus CS, balancing cost of preservation versus cost of renal dysfunction and related complications after transplantation. This is the first MP related cost-effectiveness study to be based on prospectively randomized clinical data.

Methods: The clinical study involved inclusion of 336 consecutive kidney pairs from the same donor, one being randomized to MP and the contralateral organ to CS. This short-term analysis' scope comprised the clinical outcome and costs up to one year after transplantation. The primary clinical endpoint was delayed graft function (DGF). An economic evaluation was performed as a cost-effectiveness analysis with the percentage of patients with a functioning graft after one year as the clinical outcome. Costs were calculated from a hospital perspective: direct medical costs associated with hospital stay, dialysis treatment and function related complications were included, and compared per preservation modality. Missing data regarding dialysis treatment following graft failure were imputed conservatively based on established clinical practice.

Results: MP significantly reduced the risk of DGF (OR 0.62; p=0.02) and also reduced the risk of graft failure (HR 0.39; p=0.03). Costs of dialysis (€760 vs. €940), graft failure or DGF (€136 vs. €193) and hospital readmission (€2,157 vs. €2,399) tended to be lower per patient with MP than with CS, but this finding was not statistically significant. Costs of preservation with MP were higher than with CS for each case (€842 vs. €167). Imputation of dialysis costs contributed considerably to average dialysis expenses, which rose to €4,354 for CS and to €2,564 for MP. Average total costs per patient after imputation were €4,896 for MP and €5,309 for CS. Bootstrap analysis (5,000 iterations) showed that the baseline probability of cost-effectiveness for MP was 71%. Further analyses including sensitivity analysis on the impact of variation of the major cost components are currently performed and prepared for presentation.

Conclusion: The clinical data show that MP has beneficial effects on renal grafts compared to CS. The first results from this cost-effectiveness analysis suggest that the additional costs of MP are more than compensated by savings due to reduced costs of graft function related complications, especially of reduced need for continued or renewed dialysis in case of DGF, primary non-function, or graft failure.