

Long Term Cost-Effectiveness of Hypothermic Machine Perfusion Versus Static Cold Storage in Kidney Transplantation

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Static cold storage (CS) is the most widely used organ preservation method for deceased donor kidney grafts. We performed an economic evaluation of the use of hypothermic machine perfusion (MP) versus CS alongside a multi-center RCT and present the preliminary results of the long term cost-effectiveness (CE) analysis up to 20 years post transplant.

336 consecutive kidney pairs were included, one of which was assigned to MP and one to CS. The economic evaluation combined the short term results based on the empirical data from the study with a Markov model with a 20-year time horizon. Patient survival (life-years, LYs) and quality adjusted life-years (QALYs) were the clinical outcomes. Direct medical costs of hospital stay, dialysis treatment and complications were included. Data regarding long-term survival (5% annual mortality for functional graft, 15% annual mortality after graft failure) and quality of life (0.66 utility for graft failure), and long term costs were derived from the literature. Costs and LYs were discounted at 5% and 2%, respectively.

Short term results showed that MP reduced the risk of delayed graft function and graft failure in the first year post transplant. The base-case long term analysis based on the crude odds ratio (OR) in the clinical study resulted in an incremental CE ratio of minus 51,200 Euro (-\$64,500) per LY gained in favor of MP. The corresponding incremental cost-utility (CU) ratio was minus 111,800 Euro (-\$ 140,800) per QALY gained. An alternative scenario with the multivariate adjusted OR increased incremental LYs, QALYs, and cost-savings by 33%. Further scenarios, including the impact of re-transplantation and multivariate sensitivity analyses will be added. We conclude that MP has a favorable short-term effect on post transplant outcome compared to CS. Preliminary CE results suggest that MP is also superior to CS in the long term. MP results in more LYs and lower costs than CS. The favorable CE- and CU ratios, suggest that LYs and QALYs can be gained while reducing costs at the same time, when kidneys are preserved by MP instead of CS.