Cost-effectiveness of immunosuppressive regimens in renal transplant recipients in Germany: a model approach

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The aim was to estimate the cost-effectiveness of four triple immunosuppression regimens that were available for renal transplant patients. The authors concluded that sirolimus-based immunosuppression was the most cost-effective, after a renal transplant in Germany, from the Statutory Health Insurance perspective. Provided that all the relevant comparators were included and no further clinical evidence was available following the Cochrane review, the conclusions are reasonable.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim was to estimate the cost-effectiveness of four triple immunosuppression regimens that were available at the time of the study, for renal transplant patients.

Interventions
The four triple immunosuppression regimens consisted of the mammalian target of rapamycin inhibitors, sirolimus (rapamycin) or everolimus, or the calcineurin inhibitors, cyclosporine or tacrolimus, with mycophenolate mofetil and the corticosteroid prednisolone.

Location/setting
Germany/secondary care.

Methods
Analytical approach:
A state-transition Markov model was used to estimate the cost-effectiveness of the triple immunosuppression regimens, by combining data from a range of sources. The authors stated that they took the perspective of the German Statutory Health Insurance (SHI) and the time horizon was 10 years.

Effectiveness data:
The effectiveness data came predominantly from a meta-analysis conducted by the Cochrane Renal Group (two-year probabilities), as well as estimates from an expert panel (10-year extension), and published literature. The main clinical parameters were the probabilities of acute rejection and infection.

Monetary benefit and utility valuations:
Not applicable.

Measure of benefit:
The main measures of benefit were the cost per life-year gained and the cost per year with a functioning graft gained. Future effects were discounted at a rate of 5% per year.

Cost data:
The costs included the direct costs of health care services for immunosuppression and related events, such as immunosuppression drugs, hospital services, and adverse events. The cost data were from German tariffs and the
German drug price list. The price year was 2007, all costs were provided in Euros (EUR), and future costs were discounted at a rate of 5% per year.

Analysis of uncertainty:
A probabilistic sensitivity analysis was performed to test whether the results were robust to variations in the parameter estimates, to reflect the uncertainty in them.

Results
The mean cost per patient over two years was EUR 26,732 for sirolimus, EUR 29,352 for cyclosporine, EUR 33,415 for everolimus, and EUR 49,978 for tacrolimus treatment regimens. Over 10 years, the mean cost was EUR 100,758 for sirolimus, EUR 108,300 for cyclosporine, EUR 120,316 for everolimus, and EUR 183,802 for tacrolimus.

The life-years gained per patient over two years were 1.910 for sirolimus, 1.915 for cyclosporine, 1.893 for everolimus, and 1.908 for tacrolimus. Over 10 years, they were 6.792 for sirolimus, 6.752 for cyclosporine, 6.606 for everolimus, and 6.839 for tacrolimus.

Over a period of two years, everolimus and tacrolimus were dominated by sirolimus, as they were more costly and less effective. The incremental cost per life-year gained for cyclosporine versus sirolimus was EUR 524,000.

Over 10 years, cyclosporine and everolimus were dominated by sirolimus, and the incremental cost per life-year gained for tacrolimus versus sirolimus was EUR 1,766,894.

Authors' conclusions
The authors concluded that sirolimus-based immunosuppression was the most cost-effective, after a renal transplant in Germany, from the SHI perspective.

CRD commentary
Interventions:
The interventions were comprehensively introduced and well described. The study compared four triple immunosuppression regimens, which appear to have been usual care options, but there seem to have been other options available and it was not clear why these were not included. This study did not assess whether this sirolimus regimen was the most cost-effective compared with other regimens that included sirolimus.

Effectiveness/benefits:
The effectiveness data were predominantly from a meta-analysis, based on a Cochrane review of published literature. This was a potentially good source of data, but there was no discussion of the value of updating the review. Some of the effectiveness data were from an expert panel and the process used was described.

Costs:
The authors stated the perspective and appear to have included all those costs relevant to this perspective and to the consequences of the treatments. The sources of cost data were relevant to the study setting, and the price year and discounting were reported and appropriate. The authors provided a table of all the costs and sources of data, which will make it easy to replicate the results for other settings.

Analysis and results:
The analytic approach was well reported and the model was described in detail, with a diagram. The results were reported clearly and in full, and appropriate sensitivity analyses were performed. The authors discussed the limitations of their study.

Concluding remarks:
Provided that all the relevant comparators were included, and no further clinical evidence was available following the Cochrane review, then the conclusions seem reasonable.
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