Cost-effectiveness analysis of renal replacement therapy in Austria

Haller M, Gutjahr G, Kramar R, Harnoncourt F, Oberbauer R

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 objective was to assess the cost-effectiveness of three renal replacement therapy options for patients with end-stage renal disease. The authors concluded that policies that increased allocation to live donor transplantation and peritoneal dialysis were cost-effective compared with higher allocation to haemodialysis; efforts should be made to increase the availability of these alternatives. The conclusions of the main paper were appropriate, but the conclusion presented in the authors' abstract was outside the scope of this paper.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of three renal replacement therapy options for patients with end-stage renal disease (ESRD).

Interventions
The three options varied in the proportion of patients allocated to haemodialysis, peritoneal dialysis, and renal transplant.

The first option was the usual practice in Austria, in which 90.6% of new patients were treated with haemodialysis, 7.2% with peritoneal dialysis, 0.1% with a transplant from a live donor, and 2.1% with a transplant from a deceased donor. In the second option, 20% of new patients were treated with peritoneal dialysis. In the third option, 20% of new patients were treated with peritoneal dialysis, and 10% were treated with transplant from a live donor. In the last two options, the percentage of patients treated with haemodialysis was reduced.

Location/setting
Austria/in-patient secondary care.

Methods
Analytical approach:
A Markov model was used to assess the costs and outcomes of the three options. The time horizon was 10 years and the authors reported that the perspective was that of the public health system in Austria.

Effectiveness data:
All the effectiveness data were from the Austrian Dialysis and Transplant Registry. This registry contained information on all dialysis and transplant patients from January 2005 to December 2008. The main estimates were the survival and transition probabilities, between health states, for each therapy option. The methods used to combine these data to produce the model parameters were reported.

Monetary benefit and utility valuations:
The utility estimates were from published studies. Those for dialysis were from a study of Dutch patients, which used the European Quality of life (EQ-5D) questionnaire, the standard gamble technique, and the time trade-off method. Those for kidney transplantation were from the same study, but were obtained from three previous studies, rather than by interview.

Measure of benefit:
Life-years gained and quality-adjusted life-years (QALYs) gained were the summary measures of benefit. Future benefits were discounted at an annual rate of 3%.

Cost data:
The direct costs included dialysis, renal transplant, transport to the renal unit, medication, and admission to hospital for conditions other than ESRD. Most of the costs were from the finance department of the Elisabethinen Hospital, Linz. The medication and transport costs were from the Upper Austrian Health Insurance. Future costs were discounted at an annual rate of 3%. All costs were reported in Euros (EUR).

Analysis of uncertainty:
One-way sensitivity analyses were undertaken by varying all the model parameters over ranges of plausible values. The results were presented in a Tornado diagram.

Results
For the whole Austrian population, usual care generated 259,731 life-years. With 20% of patients allocated to peritoneal dialysis, the life-years gained were 260,435. With 20% peritoneal dialysis and 10% living donor transplant, the life-years gained were 261,511.

The QALYs were 203,407 with usual care, 204,245 with 20% peritoneal dialysis, and 205,648 with 20% peritoneal dialysis and 10% living donor transplant.

The costs were EUR 8,083 million with usual care, EUR 8,057 million with 20% peritoneal dialysis, and EUR 8,046 million with 20% peritoneal dialysis and 10% living donor transplant.

The allocation of 20% of new patients to peritoneal dialysis and 10% to living donor transplant was dominant, as it was more effective and less costly, compared with usual care and compared with allocating 20% of new patients to peritoneal dialysis.

Authors’ conclusions
The authors concluded that, based on their findings that policies which include a higher rate of allocation to live donor transplantation and peritoneal dialysis were cost-effective compared with lower rates of these modalities and higher rates of haemodialysis, efforts should be made to increase the availability of these alternatives.

CRD commentary
Interventions:
The interventions were reported adequately.

Effectiveness/benefits:
The clinical and effectiveness data were from the Austrian Dialysis and Transplant Registry. This was not a randomised controlled trial and differences in the effects of the three options could have been partly explained by differences in patient characteristics. For example, patients on haemodialysis were, on average, more than 10 years older than those on either peritoneal dialysis or kidney transplantation, and they were more likely to suffer from diabetes and vascular diseases. It was not clear whether the statistical analysis took account of these differences and the impact that they could have on the results.

Costs:
The perspective was explicitly reported as that of the public health care system. It appears that all the major cost categories and costs relevant to this perspective were analysed. The sources for the costs, the time horizon, discount rate and currency were reported. The price year was not reported, which will hamper future inflationary exercises.

Analysis and results:
The costs and outcomes were combined in a Markov model; details of its structure and a diagram were provided. Extensive one-way sensitivity analyses were undertaken and clearly reported. This type of analysis goes some way towards evaluating uncertainty, but a probabilistic sensitivity analysis could have evaluated the overall model uncertainty. The conclusions in the authors’ abstract that live donor transplantation was cost-effective were not
consistent with the conclusions in the main paper and the scope of the analysis. The cost-effectiveness of each individual intervention separately was not assessed. The conclusion of the main paper that allocation of 20% of new patients to peritoneal dialysis and 10% to renal transplant from a living donor was cost-effective was more appropriate. As a limitation to their study, the authors reported that they used relatively old quality of life data from a Dutch study.

Concluding remarks:
The conclusions of the main paper were appropriate, but the conclusion presented in the authors' abstract was outside the scope of this paper.

Funding
Supported by the Austrian Academy of Science, and the European Union.

Bibliographic details

PubMedID
21310740

DOI
10.1093/ndt/gfq780

Original Paper URL
http://ndt.oxfordjournals.org/content/26/9/2988.abstract

Indexing Status
Subject indexing assigned by NLM

MeSH
Austria; Cost-Benefit Analysis; Female; Glomerular Filtration Rate; Humans; Kidney Failure, Chronic /economics /mortality /therapy; Living Donors; Male; Markov Chains; Middle Aged; Prognosis; Quality-Adjusted Life Years; Renal Replacement Therapy /economics /mortality; Sensitivity and Specificity; Survival Rate

AccessionNumber
22011001772

Date bibliographic record published
08/02/2012

Date abstract record published
16/04/2012