Costo-efectividad de intervenciones para insuficiencia renal cronica terminal [Cost-effectiveness of interventions for end-stage renal disease]

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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.

Health technology
The health technologies examined in the study were three interventions for the management of end-stage renal disease (ESRD) patients: continuous peritoneal ambulatory dialysis (CPAD), haemodialysis (HD), and renal transplantation (RT).

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
The study populations included all patients undergoing any of the three treatments for ESRD at the considered institution. Patients included in the study were those aged between 20 and 45 years (young adults), those being transplanted or under treatment for dialysis for at least 1 year and at most 6 years, and those whose ESRD was the primary reason for undergoing the treatment.

Setting
The setting was a hospital. The economic study was carried out at the Instituto Mexicano del Seguro Social, where the three interventions were performed.

Dates to which data relate
The effectiveness data were gathered from 1967 to 1995 and a single study published in 1995 was also used. The price year was 1995. The dates during which the quantities of resources used were gathered were not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study, but a published study was also used as a source for data on survival associated with CPAD.

Link between effectiveness and cost data
The costing was not undertaken on the same patient sample as that used in the effectiveness analysis and was carried out retrospectively.

Study sample
A sample of 40 patients, undergoing one of the three procedures, was considered. Power calculations were not
performed and there was no evidence that the initial study sample was appropriate for the study question. The number of patients in each group was not clearly stated.

**Study design**
This was a retrospective case-control study, carried out in a single centre. Follow-up information and details of the methods used to assess the outcomes were not reported.

**Analysis of effectiveness**
The primary health outcome used in the analysis was the estimated score on the Rosser Index, used to evaluate the utility values associated with the health states after the interventions. Patients were given a questionnaire, adjusted for the Mexican setting, and were asked to attribute scores to two dimensions: "inability" and "tension" for 29 final health states. These utility scores were then used to calculate the quality-adjusted life years (QALYs) in a time horizon of 5 years and with a discount rate of 5%. To compute the QALYs, a secondary outcome was also calculated: the survival associated with CPAD (from a published study) and renal transplant (from a sample of patients transplanted at the institution from 1985 to 1995). Data on survival with haemodialysis (HD) were not available from the literature. No statistical analysis was conducted to show the comparability of groups with respect to baseline characteristics.

**Effectiveness results**
The Rosser Index (utility) scores were 0.8794 for CPAD, 0.8640 for HD, and 0.9783 for renal transplant (RT).

The analysis of survival indicated that the probability of surviving associated with CPAD was 86.2% after 1 year, 66.9% after 3 years, and 37.5% after 6 years.

The probability of surviving after RT was 89.9% after 1 year, 79.6% after 3 years, and 75.8% after 6 years.

To show the improved probability of survival in the hospital, the authors presented the RT survival rates of a group of 182 patients treated from 1967 to 1985: the probability of survival with RT was 71.23% after 1 year, 57.75% after 3 years, 51.28% after 6 years, and 38.35 after 10 years.

The QALY estimates obtained by combining utility scores and survival rates were 4.44 with RT and 3.99 with CPAD. QALYs were not computable for HD because of the lack of data on survival.

**Clinical conclusions**
RT was the most effective treatment in terms of both primary and secondary outcomes. It was associated with a higher utility score, a longer survival rate and, as a consequence, a greater number of QALYs compared to CPAD and HD (although there was no evidence on survival with HD).

**Measure of benefits used in the economic analysis**
The benefit measure was represented by the utility scores associated with the treatments, as obtained from the effectiveness analysis. QALYs were not chosen because they were not available for haemodialysis. The method of assessment of the utilities was reported earlier.

**Direct costs**
The total annual cost of each treatment was calculated. Unit costs and quantities were not reported separately.

The following costs were included in the economic analysis:

annual materials and staff;

training for the installation of dialysis at the patient's home;
number of dialysis events, laboratory tests, and physician visits for CPAD;

number of haemodialysis events, surgery procedures, laboratory tests, and physician visits for HD;

and with respect to RT hospitalisation, medical consultations, surgery, clinical and laboratory tests for the donor and surgery, medical consultations, histocompatibility studies, post-transplantation studies, and visits for the recipient.

A 10% interest rate was used to calculate the annual cost of renal transplantation because total costs occurred over a 5-year time period.

The hospital treatment protocol was used as the main source of the resource use data for each procedures. This information was then validated by experts' opinions and the available literature. The estimation of costs was based on actual data derived from the hospital financial departments (centros de costos). The dates during which the quantities of resources used were gathered were not reported. The price year was 1995.

**Statistical analysis of costs**
No statistical analysis was reported.

**Indirect Costs**
Indirect costs were not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was carried out.

**Estimated benefits used in the economic analysis**
The estimated benefits, in terms of utility scores as reported in the effectiveness section, were 0.8794 for CPAD, 0.8640 for HD, and 0.9783 for RT.

**Cost results**
The total annual costs were $5,643.07 for CPAD, $9,631.60 for HD, and $3,021.63 for RT.

**Synthesis of costs and benefits**
Costs and benefits were combined by performing an average cost-utility analysis. However, renal transplant dominated HD and CPAD. It was associated with lower annual costs and greater utility. The coefficients of the average cost-utility analyses were 3,088.69 for RT, 6,416.95 for CPAD, and 11,147.68 for HD.

**Authors' conclusions**
The authors concluded that renal transplantation was the most cost-effective strategy for the management of patients suffering from end-stage renal disease. It represented both the preferred procedure according to patients' preferences (utilities) and the cheapest intervention from the perspective of the institution.

**CRD COMMENTARY - Selection of comparators**
The selection of the comparators was clear: HD, CPAD, and RT were the most commonly performed procedures at the
Validity of estimate of measure of effectiveness
The effectiveness analysis was based on a retrospective case-control study. However, some limitations to the internal validity of the study have to be reported. The study sample was quite small and was not large enough to detect substantial differences among the groups. Furthermore, statistical analyses were not carried out to show the comparability of groups with respect to baseline characteristics, such as demographics and the clinical condition of patients. Thus, the results of the analysis could have been influenced by selection bias and confounding variables. Finally, as the authors acknowledged, the results should be considered applicable only to the study population.

Validity of estimate of measure of benefit
The utility estimates based on patients' values were used as the benefit measure. The estimates were derived from the Rosser Index, which is a widely used method to elicit patients' preferences for different health states. QALYs were not used as the final benefit measure because of the lack of survival data for haemodialysis. However, some doubts remain on the validity of the QALYs computed for CPAD and RT, due to the fact that survival data for CPAD and RT were obtained from different sources (a published study and a sample of patients treated at the institution, respectively) and then combined to compute the QALYs. However, it was not clear whether the populations were homogeneous.

Validity of estimate of costs
The estimations of costs were quite specific to the study institution and statistical analyses on quantities were not conducted. In addition, quantities and unit costs were not reported separately. This limits the external validity of the study. The costs of complications were omitted. Therefore, the estimated annual costs should be viewed as minimum treatment costs required with each procedure. The inclusion of complication costs as well as indirect costs (which appear to have been substantial and relevant to the disease) could have affected the authors' conclusions.

Other issues
The authors stated that the results of their analysis confirmed the findings of other previously published studies. The generalisability of the analysis to other setting was quite limited, because sensitivity analyses were not conducted.

Implications of the study
The most important implication of the study was that, from the perspective of the institution, renal transplantation procedures should be adopted for patients suffering from end-stage renal disease in Mexico.

Source of funding
None given.

Bibliographic details

PubMedID
10349148

Indexing Status
Subject indexing assigned by NLM

MeSH
AccessionNumber
21999006902

Date bibliographic record published
30/09/2002

Date abstract record published
30/09/2002