A third kidney transplant: cost-effective treatment for end-stage renal disease

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
Third kidney transplant in end-stage renal disease.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Male and female end-stage renal disease patients. No further details were given.

Setting
Hospital. The study was carried out in Minnesota, USA.

Dates to which data relate
The effectiveness and resource use data were collected between 1985 and 1994. The price year was not clearly reported.

Source of effectiveness data
The estimates of graft survival rate, patient survival rate, rate of complications leading to graft, readmission rate and hospital stays were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken retrospectively on a subsample of the patient sample used in the effectiveness study.

Study sample
While not reporting power calculations, the study included a total of 1,548 patients. 1,251 (62% male, 46% living donors, mean age not stated) were in the first transplant group, 246 (58% male, 28% living donors, mean age 28 (+/- 2 years)) received a second transplant, and 51 (57% male, 20% living donors, mean age 28 (+/- 2 years)) underwent a third kidney transplantation.

Study design
Case series. The study was carried out in a single centre. The duration of follow up was reported as more than one year in some cases.
Analysis of effectiveness

The analysis used in the study was based on the whole sample. The primary health outcome was the graft survival rate calculated at 1st, 3rd and 5th year by means of Kaplan-Meier methods, with the patient survival rate, rate of complications leading to graft loss, readmission rate and hospital stays also being reported. Employment and quality of life data (subgroup of 28 third transplant patients) were also relevant to the analysis.

Effectiveness results

At 1, 3 and 5 years, the graft survival rates (in percentage terms) for the first transplant group were 89%, 81%, and 73%, respectively. The corresponding figures for the second transplant group were 87%, 76%, and 66%, respectively. The third transplant group had figures of 76%, 56%, and 48%, respectively. The differences between the third and other groups had p values of 0.0002, and 0.02, respectively, relative to the first and second transplant groups. When the recipients with recurrent disease were excluded, no differences in graft survival figures with p values less than 0.05 were found between groups (figures not reported).

At 1, 3 and 5 years, the patient survival rates for the 1st transplant group were 95%, 90% and 85%, respectively. The corresponding figures for the 2nd transplant group were 94%, 89% and 83%, respectively. The third transplant group had figures of 96%, 84% and 77%, respectively. Although higher complication rates were found in the third transplant group (29.2%) relative to those in the first and second transplant group (9.5% and 14.5% respectively), only in one case did the complication lead to graft loss. The initial hospitalizations were 13.7 (+/- .5), 15.6 (+/- .7), and 16 (+/- 2.6) days in the 1st, 2nd and 3rd transplant group, respectively. The mean number of readmissions were 2.4 (+/- 0.1), 2.8 (+/- .3) and 2.5 (+/- .5) in the 1st, 2nd and 3rd transplant group, respectively. The readmissions were 21 (+/- 1.4), 26 (+/- 2.6) and 24 (+/- 7) days in the 1st, 2nd and 3rd transplant group, respectively. Of 28 third transplant recipients, 16 (57%) were currently working or going to school. Of 21 third transplant recipients, 17 (81%) were reported as healthy, and all (100%) considered transplantation not to be a drawback to their health.

Clinical conclusions

The third transplant did not differ from the 1st and the 2nd transplant in terms of length of initial hospitalization, number of hospital readmissions and total number of readmission days. Graft survival was not as good with the exception of the case in which 3rd transplant recipients with recurrent disease were excluded from the analysis.

Measure of benefits used in the economic analysis

No summary benefit measure was used in the analysis and as such the benefits are considered to be the same as the outcome measures.

Direct costs

Hospital charges were included in the analysis. Quantities were reported separately from prices. The quantity/cost boundary adopted was the hospital. Discounting was not applied. The price date was not stated.

Statistical analysis of costs

Mean hospital charges were reported with standard deviations.

Currency

US dollars ($).

Sensitivity analysis

No sensitivity analysis was performed.
Estimated benefits used in the economic analysis
The benefits are assumed to be identical to the effectiveness results reported earlier.

Cost results
The first transplant group (n=542) had mean charges of $63,140 (+/-1,940), whereas the second (n=175) and third (n=41) transplant groups had figures of $63,489 (+/- 2,174) and $67,227 (+/- 6,512), respectively.

Synthesis of costs and benefits
The costs and benefits were not combined as mean charges, frequency and length of hospital stay of the third transplant were equivalent to the 1st and the 2nd transplant groups. An incremental analysis was not performed.

Authors' conclusions
The results suggest that young patients (less than 30 years of age) should not be routinely precluded from a third transplant, which was associated with return to the work force and good quality of life.

CRD COMMENTARY - Selection of comparators
The authors noted that, one option faced by patients who had previously had two failed transplants, was no retransplanting. In other words, maintaining a patient on dialysis which, although expensive (reported by the authors as costing $35,000 annually), could yield comparable, or better, health-related outcomes for some patients. The authors compared costs and outcomes of the intervention (third transplant) with those achieved in patients undergoing a first or second transplantation. However it is clear that these are not truly comparable strategies.

Validity of estimate of measure of benefit
The estimate of measure of benefit is open to doubt due to the lack of adequate control groups and the lack of control for the possible changes in transplant practices over the 9-year study period. The data, however, have not been used selectively.

Validity of estimate of costs
Quantities were reported separately from the prices. The costing was undertaken only on the transplant admission, given that the quantities of resource use associated with readmissions were found to be comparable. Adequate details of the methods of cost estimation for these costs were not provided. The price date was not stated.

Other issues
The conclusions reached by the authors may not be justifiable for the subgroup of (young) patients for whom the intervention was reported to be beneficial. No adequate studies were reported with which to compare the study results. The issue of generalisability was not addressed. The results were not clearly reported for the subgroup of patients most likely to benefit from the intervention.

Source of funding
None stated.

Bibliographic details