Early referral and its impact on emergent first dialyses, health care costs, and outcome

Schmidt R J, Domico J R, Sorkin M I, Hobbs G

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
Early referral (ER) to nephrologists of patients with chronic renal failure.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Male and female, black and white patients with ESRD referred for dialysis.

Setting
Tertiary care centre. The economic study was carried out in West Virginia and Southern Pennsylvania, USA.

Dates to which data relate
Effectiveness and resource use data were collected between 1 January 1990 and 30 April 1997 with follow-up extending through 30 November 1997. The price year was 1996.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing, which was carried out prospectively alongside the effectiveness study, was undertaken on the same patient sample as that used in the effectiveness study.

Study sample
A total of 344 patient charts were reviewed. For 106 patients events immediately preceding the first dialysis were unavailable. Therefore, 238 patients (46% male, 92% white, age: 61 +/- 15 years) with ESRD were included in the analysis. Of these, 180 patients were referred more than one month before requiring dialysis (46% male, 92% white, age: 59 +/- 15 years) and 58 patients presented within 30 days of requiring dialysis (43% male, 91% white, age: 65 +/- 15 years). Patients were excluded if the cause of renal failure involved acute renal failure, trauma-induced renal loss, renal allograft failure, rapidly progressive glomerulonephritis, or malignancy. Power calculations to determine the sample size were not reported.
**Study design**
This was a retrospective cohort study carried out at three dialysis units in West Virginia and one in Southern Pennsylvania. Patients were followed-up for 4 months. No patients were lost to follow-up.

**Analysis of effectiveness**
The analysis of effectiveness was based on the intention to treat principle. The primary health outcomes included incidence of emergent first dialysis, choice of dialysis modality (hemodialysis, HD or peritoneal dialysis, PD) and survival. Chi-squared tests were used to compare groups in terms of demographic characteristics, but results were not reported.

**Effectiveness results**
Significantly more ER than LR patients had diabetic renal failure (49% versus 33%, p<0.03). Emergent HD was needed in 22% of ER patients compared with 90% of LR patients, (p<0.0001). Of the 70 patients for whom records were available, 36% of ER patients and 50% of LR patients were emergently dialysed because of symptomatic uremia or hyperkalemia and 64% of ER patients and 50% of LR patients were emgerntly dialysed because of pulmonary edema. HD was initially chosen by 67% patients whereas PD was the initial modality of choice in 33%. Whereas most patients had not changed modality at 4 months, significantly more patients had changed from HD to PD (15%) than from PD to HD (8%) (p<0.0001). More LR patients (28%) than ER patients (16%) had switched from HD to PD by 4 months (p<0.08). Of the total 238 patients, 5% were dead at 4 months (4% of ER patients and 7% of LR patients). Survival analysis failed to show a difference between ER and LR groups. Distance from dialysis centre did not influence whether a patient was ER or LR, or the incidence of emergent HD.

**Clinical conclusions**
The need for emergent HD was significantly less among ER as compared with LR. Initial modality chosen among patients was predominantly HD. Whereas most patients had not changed modality at 4 months, significantly more had changed from HD to PD than from PD to HD.

**Modelling**
No modelling was undertaken.

**Measure of benefits used in the economic analysis**
No summary benefit measure was used in the analysis and as such the authors conducted a cost and consequences analysis.

**Direct costs**
Costs were not discounted given that patients were followed up for only four months. Quantities and costs were not reported separately. Direct costs included costs of emergency department visit, hospitalisation and physician costs, costs for placement of a central line and for the line itself, and chest radiograph costs. The quantities/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. The price year was 1996.

**Statistical analysis of costs**
Not reported.

**Indirect Costs**
Not included.
Currency
US dollars ($).

Sensitivity analysis
Not reported.

Estimated benefits used in the economic analysis
See "Effectiveness results" above.

Cost results
The costs for an emergent HD treatment ranged from $1,303 to $1,388 (no post-HD hospital stay) to $3,198 (with 3-day hospitalization). All emergently dialysed patients were hospitalised for at least 1 to 3 days at a total cost of $1,992 per day per patient or a total ranging from $204,116 to $332,540 for 104 1-day or 3-day stays, respectively.

Synthesis of costs and benefits
Effectiveness and cost results were not combined into a cost-effectiveness ratio.

Authors' conclusions
Despite the lack of difference in long-term survival, the financial costs of emergent HD alone merit greater promotion of ER and the psychosocial preparation and modality choice it allows.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear. ER is the ideal clinical scenario for preparing patients for the physical, emotional and financial ramifications of ESRD. However, ER is not always available in each setting. You, as a user of this database, should consider whether this is a widely used health technology in your own setting.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis and as such the authors conducted a cost and consequences analysis. The authors did not examine how early and late referral influenced intervention and management of attendant medical problems such as renal anemia, hypertension and access planning. Quality of survival time was not taken into account.

Validity of estimate of costs
Charges rather than cost data were used and these do not represent real opportunity costs. Aggregate cost results for the ER and LR group were not presented. Adequate details of source and method of analysis of quantity/cost data were not given. However, important cost items do not appear to have been omitted. No sensitivity analysis was conducted to examine the robustness of the cost results.

Other issues
Appropriate comparisons were made with other studies in terms of clinical and economic outcomes. The generalisability of the results to other settings or countries is questionable given the higher rate of use of PD in the dialysis units studied. The use of PD reflects the emphasis of the physicians involved in presenting the various modalities. It should also be noted that there is a market variation in the prevalence of ESRD across counties.

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