Management of acute kidney injury in the intensive care unit: a cost-effectiveness analysis of daily vs alternate-day hemodialysis

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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
This study compared the cost-effectiveness of managing acute kidney injury using daily haemodialysis with alternate-day haemodialysis. The authors concluded that daily haemodialysis was more cost-effective than alternate-day haemodialysis. The study methods were adequate and the authors' conclusions were plausible.

Type of economic evaluation
Cost-utility analysis

Study objective
This study compared the cost-effectiveness of managing acute kidney injury (AKI) using daily haemodialysis, with alternate-day haemodialysis for patients with severe AKI.

Interventions
Haemodialysis at a frequency of six times per week was compared with three times per week for male patients aged 60 years with severe AKI in the intensive care unit (ICU).

Location/setting
USA/hospital ICU

Methods
Analytical approach:
A Markov model was developed in order to incorporate the costs and benefits of the interventions. A lifetime horizon and a one-year cycle length were considered in the analysis. The authors stated that a societal perspective was taken.

Effectiveness data:
The clinical estimates used in the model were based on a selection of known relevant studies and the authors' assumptions. A published randomised controlled trial was the main study used to derive the mortality data. This key source was supplemented with data from other studies, but the details of these were not fully reported.

Monetary benefit and utility valuations:
The health state utilities were obtained from published studies and a time trade-off technique was used.

Measure of benefit:
The benefit measure was quality-adjusted life-years (QALYs). The QALYs appear to have been discounted at an annual rate of 3%.

Cost data:
The economic analysis included the direct costs of hospitalisation (including ICU stay) and haemodialysis. The cost data came from the accounts of a medical centre and from the published literature. All costs were adjusted to 2006 US dollars ($) using the medical care component of the Consumer Price Index and were discounted at an annual rate of 3%.

Analysis of uncertainty:
The robustness of the model outcomes was assessed by conducting one- and two-way sensitivity analyses of the model input parameters for cost, efficacy and utility variables. The ranges of values used in the sensitivity analysis were
Results
The QALYs for daily haemodialysis were 8.03 and for alternate-day haemodialysis they were 5.89.

The total costs of daily haemodialysis were $93,191.80 and those of alternate-day haemodialysis were $82,267.62.

The incremental cost-effectiveness of daily haemodialysis over alternate-day haemodialysis was $5,084 per QALY gained.

The sensitivity analysis showed that the incremental cost-effectiveness ratio was sensitive to the maintenance haemodialysis rate and the difference in 14-day post-discharge mortality rate between the interventions.

Authors' conclusions
The authors concluded that daily haemodialysis was cost-effective when compared to alternate-day haemodialysis.

CRD commentary
Interventions:
The authors provided a clear justification for their selection of the interventions under examination. The interventions compared appeared to be relevant for the disease under examination and in the study setting.

Effectiveness/benefits:
The clinical estimates were derived from multiple sources, and the main evidence was based on data from a study which appears to have been a randomised controlled trial. However, the authors provided little information about the studies used to derive the clinical evidence. There was no indication that a systematic review was conducted, so it is not clear if the best available evidence was used. The use of QALYs is a strong feature of the analysis, and will permit comparisons to be made between this study and others carried out in different settings. The authors did not provide many details about the methods used to derive the QALY estimates.

Costs:
Although the authors stated that a societal perspective was adopted in the study, the costs considered in the analysis appear to have been only those associated with the health care system. The sources of cost data were reported, but only the data at macro level were provided. Other details, such as the price year and the discount rate, were reported, which will facilitate the replication of the analysis in other settings and time periods. The cost estimates were relevant to the setting.

Analysis and results:
The costs and benefits were synthesised appropriately and the results were presented clearly. An extensive deterministic sensitivity analysis was conducted. In addition, the authors discussed the main limitations to their study.

Concluding remarks:
The study methods were adequate and the authors’ conclusions were plausible.

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Bibliographic details

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Other publications of related interest


Indexing Status

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