Impact of a high-dependency care area on the nutritional management of patients with acute uremia

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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 use of renal high-dependency care (RHDC) facilities for the nutritional management of patients with acute uraemia.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with acute uraemia.

Setting
The setting was a hospital. The economic study was carried out at Hope Hospital, Salford, UK.

Dates to which data relate
The effectiveness data were collected for two different periods. First, between 20 May 1995 and 20 May 1996, and second, from 20 May 1998 to 20 May 1999. The date to which the costs related was 1995. The price year was not given.

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

Link between effectiveness and cost data
The costing was undertaken on the same sample population as that used in the effectiveness study. The costs were estimated on the basis of a local costing model developed by the authors and applied to the patients involved in the study.

Study sample
No power calculations were performed to determine the sample size. All the patients admitted to the Department of Renal Medicine at the hospital with acute uraemic emergencies were included in the study. An emergency constituted either acute renal failure (ARF) or acute-on-chronic renal failure, urea greater than 30 mmol/L and/or creatinine greater than 500 micromol/L. None of the patients were already on dialysis. Those patients who were never referred to the specialist team, for example, surgical acute renal failure requiring immediate intensive care unit (ICU) transfer, were...
excluded from the study. During the study periods, 120 patients with nutritional support given by the renal dietician and 97 patients with nutritional support given by the RHDC unit were admitted to the Department of Renal Medicine at the hospital. The authors reported the baseline characteristics, which could provide evidence that the study sample was representative of the study population. Those patients with incomplete or missing relevant data were not included in the analysis. These included 12 patients receiving nutritional support from the renal dietician and 11 from the cohort of patients treated by the RHDC unit.

Study design
This was a before-and-after study carried out at a single centre. Each one of the two cohorts of patients under study was followed up during 12 months, one before and one after the introduction of the RHDC unit.

Analysis of effectiveness
The basis for the analysis (intention to treat or treatment completers only) is less relevant for a non-experimental design. However, the fact that a total of 108 patients before, and 86 patients after the introduction of the RHDC unit were considered for the analysis of effectiveness, suggests a treatment completers only basis. The primary health outcomes assessed for both cohorts of patients were:

- the number and percentage of patients receiving nutritional support;
- the mode of nutrition support received, in terms of the percentage of patients receiving either oral nutrition support, nasogastric support, or total parenteral nutrition;
- the mortality rate;
- the number and percentage of patients receiving dialysis, and the mean number of sessions per patient;
- the number of episodes of sepsis;
- the number of ICU admissions;
- the total number of ICU days used; and
- the average in-hospital length of stay.

The groups were shown to be comparable in terms of their age, gender, initial co-morbidity and illness severity. The authors also reported that the pattern of uraemic diagnoses was similar in both groups.

Effectiveness results
For the cohort of patients studied before the introduction of the RHDC unit:

- the number of patients receiving nutritional support was 22 (24%);
- of those patients receiving nutritional support, 36% received oral nutrition support, 32% received nasogastric support, and 32% received parenteral nutrition;
- the number of patients receiving dialysis was 65 (60.2%), and the mean number of sessions per patient was 2;
- 48 patients (45.4%) experienced episodes of sepsis;
- 19 patients (17.6%) were admitted to the ICU;
- the total number of ICU days used was 195; and
- the average in-hospital length of stay was 14 days.
For the cohort of patients treated by the RHDC unit:

33 patients (38.4%) received nutritional support;

of those patients receiving nutritional support, 69.7% received oral nutrition support, 24.2% received nasogastric support, and 6.1% received parenteral nutrition;

54 patients (63.5%) received dialysis, and the mean number of sessions per patient was 6.5;

29 patients (33.7%) experienced episodes of sepsis;

7 patients (8.1%) were admitted to the ICU;

the total number of ICU days used was 86; and

the average in-hospital length of stay was 18 days.

The difference in in-hospital length of stay between this group and the cohort studied before the introduction of the RHDC unit was due to the existence of outliers within this group, which had very prolonged lengths of stay.

The mortality rate was 35% in both groups.

The number of patients receiving nutritional support was higher for those treated by the RHDC unit, (p<0.0321). There were significant differences in terms of the mode of nutrition between the two cohorts, (p<0.0133), with oral nutritional support being the most common among those treated by the RHDC.

The mean number of sessions per patient receiving dialysis was significantly higher for those in the cohort treated by the RHDC unit, (p<0.0001).

Clinical conclusions

Compared with supervision by the renal dietician, the RHDC unit seemed to present better effectiveness results because it treated a higher percentage of patients receiving nutritional support, and the ICU bed usage was much lower. The RHDC unit used less invasive methods of nutritional supplementation, of which oral supplementation was the most common. The percentage of patients experiencing episodes of sepsis was smaller under the management of the RHDC unit, although the difference was not statistically significant.

Modelling

The authors reported that the costing was undertaken using a model they had already developed.

Measure of benefits used in the economic analysis

No summary of health benefit was used in the economic analysis. A cost-consequences analysis was therefore performed.

Direct costs

Some of the resource quantities were reported separately from the costs. The direct costs considered in the analysis were those of the health service. These included the ICU costs (1,050, or $1,680 per patient day), the ward costs (283, or $453 per patient day), the ward dialysis costs (100, or $160 per session), and the ward nutritional costs. The ward nutritional costs were 70, or $112 per day for parenteral nutrition; and 1 to 3, or $1.60 to $4.80 for nasogastric feeding and oral supplements. The authors stated that the costs were estimated using a local costing model they had developed earlier. Discounting was not carried out, but it was irrelevant since the costs were incurred over less than 2 years. The study reported the average costs. The price year was not given.
Statistical analysis of costs
No statistical analysis of the costs was reported.

Indirect Costs
No indirect costs were reported.

Currency
UK pounds sterling (£) and US dollars ($). The conversion to US dollars was made using an exchange rate of $1 = 0.625 at the time at which the costs were estimated (1995).

Sensitivity analysis
No sensitivity analysis was reported.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The cost per patient was 5,546 ($8,874) before the introduction of the RHDC unit, and 6,325 ($10,120) after.

The overall cost of treating patients with acute uraemia was 599,000 ($958,000) before the introduction of the RHDC unit, and 544,000 ($870,000) after.

Although the overall cost was slightly lower after the introduction of the RHDC unit, it has to be considered that the number of patients treated was also less (see 'Study Sample' section).

Synthesis of costs and benefits
Not applicable due to the cost-consequences approach adopted.

Authors' conclusions
With the introduction of the renal high-dependency care (RHDC) unit, a larger number of patients benefited by receiving nutritional therapy, and the methods used were generally less invasive. The authors stated that the individual impact of the introduction of the RHDC unit on patient outcomes was difficult to assess. However, there were improvements in terms of less episodes of sepsis (although they were not statistically significant), and the collaboration between nurses and dieticians in the RHDC unit allowed reductions in the use of intensive care unit (ICU) facilities, thus reducing the demands on an already overstretched resource.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparator chosen. Nutritional support given by the renal dietician was the current practice before the introduction of the RHDC unit.

Validity of estimate of measure of effectiveness
The analysis used a before-and-after study. This seems to have been appropriate for the study question, although there was no randomisation and the possibility of other confounding exists. However, the patient groups were shown to be comparable at baseline. Statistical analyses to take account of potential biases and confounding factors could have improved the analysis. As the authors reported, one limitation of their study was the small sample size, which might have limited the statistical significance of some of the findings.
**Validity of estimate of measure of benefit**
The author did not derive a measure of health benefit. The analysis was therefore categorised as a cost-consequences study.

**Validity of estimate of costs**
All the categories of cost relevant to the perspective adopted appear to have been included in the analysis. Some resource quantities (but not all) were reported separately from the costs. The resource quantities reported were obtained from the single study. Some statistical analyses of the quantities were performed. Discounting was unnecessary since all the costs were incurred over one year. The authors stated that the actual cost per patient episode after the introduction of the RHDC unit might have been overestimated, because the unit had the capacity to treat more patients without increasing costs. Therefore, the full capacity of the unit was unused and the cost-effectiveness was not fully realised.

**Other issues**
The authors made some comparisons of their findings with those from other studies. However, the issue of generalisability was not discussed. The results were reported in full except for some costing. The authors’ conclusions were in keeping with the scope of the study.

**Implications of the study**
The authors acknowledge that the reduction in ICU beds obtained with the introduction of the RHDC unit is important because of the scarcity of this resource in the UK, allowing these ICU beds to be available for other patients. The high mortality rate among patients with acute uraemia led the authors to state that efforts should be focused on the prevention of renal failure.

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**Other publications of related interest**


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