

## Commentary

# Haemodialysis and peritoneal dialysis patients admitted to intensive care units

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## Abstract

Hutchison and colleagues report a 10-year experience of dialysis patients admitted to intensive care units (ICUs) in the UK excluding Scotland. Their study is the largest published so far and raises issues of interest to both ICU physicians and nephrologists. Overall, the dialysis patients, although sicker on admission and having pre-existing co-morbidities, do as well as other ICU patients. Their clinical progress after leaving the ICU, however, is less good than for other ICU patients, raising the possibility that the patients might be leaving too early, or perhaps that dialysis patients should be discharged to a high-dependency unit rather than go direct to a renal ward. All in all, the paper by Hutchison and colleagues provides a useful foundation for planning the critical care management of dialysis patients in the UK and elsewhere.

Improvements in the provision of facilities for dialysis and rising patients' expectations are likely to lead to a rise in the number of critically ill dialysis patients presenting to intensive care units (ICUs). The study of Hutchison and colleagues [1] in the previous issue of *Critical Care* reports data from 170 ICUs in England, Wales and Northern Ireland over the period 1995 to 2004. It makes interesting reading and is far larger than any of the earlier studies, as shown in Table 1 [2-5].

About 20% of patients maintained by haemodialysis or peritoneal dialysis die each year [6]. The causes are predominantly cardiovascular (more than 50% of all deaths) [7] and are often associated with cardiac arrhythmias [8] and infection [9]. Cardiovascular and infective conditions are also the major cause of admission to hospital, and dialysis patients often present critically ill because of associated co-morbidities. In practice, a high proportion of the sickest patients present to ICUs, and many die there.

Hutchinson and colleagues examined a cohort of 3,420 dialysis patients out of a total of 276,731 ICU admissions between 1995 and 2004. In 2003, a dialysis programme with

100 patients had an ICU bed requirement of 32 days; that is, about 1 month per year. At this admission rate, one ICU bed will support a population of about 1,200 dialysis patients. It was surprising, however, that there was no increase over the 9 years despite the known increase of about 50% in the number of dialysis patients over the same period.

Dialysis patients in ICUs were twice as likely as other patients to have had cardiopulmonary resuscitation before admission to ICU. This is consistent with the known increased prevalence of cardiac arrhythmias in patients with end-stage renal disease [8]. It is interesting that relatively few dialysis patients were admitted with complications of congestive heart failure, or with acute coronary events. It is possible that these patients were in practice admitted to coronary care units rather than ICUs. Clearly, any future study of critically ill dialysis patients in hospital must include those admitted to coronary care units and high-dependency units (HDUs).

The study by Hutchison and colleagues demonstrates, in dialysis patients, an ICU mortality of 26% and an 'in-hospital' mortality of 45%. These are encouraging figures when one considers that patients in the dialysis group were considerably sicker, with higher APACHE (Acute Physiology and Chronic Health Evaluation) II scores (24.7 versus 17.2) than other ICU admissions. The median length of stay in ICU of the dialysis group, however, was very similar to that of the non-dialysis group (1.9 days versus 1.8 days) This length of stay of 1.9 days is very much at the lower end of the range shown in Table 1. It is interesting, too, that the dialysis group had both a longer overall hospital stay and a higher death rate after leaving ICU. These data suggest that the dialysis patients may be leaving ICU too early, or there may perhaps be a perception in ICUs that renal wards are better equipped than general wards to receive patients from ICU, and may be transferring them too early.

HDU = high-dependency unit; ICU = intensive care unit.

Table 1

**Studies on ICU admissions in patients with end-stage renal disease on maintenance haemodialysis**

Reference	Number of patients	Mortality in ICU (percentage)	Mortality in hospital (percentage)	Length of stay in ICU (days)	Age (years)	Severity score
[3]	93	9	16	2 days	66	64 (APACHE III)
[2]	57	11	14	5 days	58	64 (APACHE III)
[5]	38	22	38	6 days	45	22 (APACHE II)
[4]	92	28	38	6 days	63	44 (SAPS II)
[1]	3,420	26	45	1.9 days	57	25 (APACHE II)

APACHE, Acute Physiology and Chronic Health Evaluation; ICU, intensive care unit; SAPS, Simplified Acute Physiology Score.

The fact that the number of dialysis patients admitted to ICUs did not increase during the 9 years could be due to the reluctance of critical care physicians to accept such patients on account of their high morbidity and mortality, or possibly because some ICUs have insufficient facilities for dialysis and haemofiltration. The study of Hutchison and colleagues showing that dialysis patients have similar ICU mortality and length of stay to those of other ICU patients indicates that there should be no reluctance to take such patients. Furthermore, there is a clear need for more HDU beds to assist in the safe transfer from ICU to general ward. Interestingly, a study from a French collaborative group over a period of 4 years also showed no increase in the number of dialysis patients admitted to ICUs.

In conclusion, this nationwide study over 10 years shows that dialysis patients generally fare well in ICUs but less well after leaving such units. Resources need now to be diverted to the general raising of standards of HDUs, to ensure the safe return of dialysis patients to renal wards – or perhaps large renal units need their own HDU.

### Competing interests

The authors declare that they have no competing interests.

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