

# Acute renal failure in the intensive care unit: does it really increase mortality?

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'Mortality is proportional to the number of failing organs' has been the mantra of the intensivists for many years. Medical students soon learn that oliguria not reversed by the administration of fluid is a bad sign. The incidence of acute renal failure (ARF) in the intensive care unit (ICU) can be as high as 40% and in fulfilment of the mantra, many studies have shown that the presence of ARF increases mortality on the ICU.

The combination of respiratory and renal failure has a synergistic effect on mortality and increasing the frequency of intermittent renal replacement from alternate days to daily may improve outcome (reviewed by Thadhani et al, 1996). However, assessing a patient's 'degree of sickness' and teasing apart severity of illness from the contribution to mortality played by ARF is still controversial.

There is plenty of evidence to suggest that ARF is an innocent consequence of underlying disease processes that also cause death. Groeneveld and colleagues (1991) described the outcome of ARF in a medical ICU as being largely dependent on factors predisposing to ARF rather than ARF itself. Storset and colleagues (1995) found that patients surviving ICU in ARF for more than 7 days had the same ICU survival as those with normal renal function and, furthermore, those dying within 7 days in renal failure had a higher septic severity score. ARF is easily countered by continuous renal replacement therapy (compared with intermittent therapy used in some parts of Europe and the US) and **Dr Tony Whitehouse** is Research Registrar, Centre for Anaesthesia, University College London Hospitals, London W1N 8AA

should the patient survive ICU, most eventually recover their renal function. A survey of Scottish ICUs reported their long-term dialysis rate following admission was only 1.6%. With the exception of patients from whom renal support has been withdrawn, death from ARF is now very rare.

No published studies have shown that correcting ARF improves survival. This is in part a result of the lack of specific, disease-modifying treatments. Renal 'salvage' with frusemide, while having some theoretical benefits, has never been shown to improve renal function or survival (Shilliday et al, 1997).

Animal studies have shown that tubular cell oxygen consumption may be reduced through inhibition of Na<sup>+</sup>/K<sup>+</sup>-ATPase pumps with frusemide and that preserving intracellular adenosine triphosphate (ATP) may prevent cell damage. However, this observation has never been translated into clinical data.

'Renal dose dopamine' has been used in an attempt to improve renal artery flow with the presumption that all renal failure has the same underlying mechanisms. It was introduced and is used on little evidence base and its safety and efficacy is finally being questioned (Galley, 2000). In septic patients, dopamine may well increase renal blood flow but fails to increase work in either healthy or failed kidneys. Its use does not improve survival or renal function.

Other than offering the patient the best ICU care by judicious use of fluids and inotropic support, a specific treatment for ARF remains elusive (O'Leary and Bihari, 2001) and now that biocompatible membranes are used, the mode of renal replacement makes no survival difference.

This calls into question whether ARF, when treated by renal replacement therapy, contributes significantly to morbidity or mortality on the ICU. Even if we are doing our intensive care correctly, ARF may occur anyway. We should, however, take heart from knowing that good intensive care management curtails further deterioration in other organ systems even if the kidney cannot be salvaged at the time. In any event, the majority of cases with profound oliguria and renal failure improve to near pre-morbid states once the insult has subsided. Some have even suggested that renal failure is actually the deliberate shutdown of renal function as a way of preserving the organ for the long-term.

Whatever the reason for ARF, perhaps the mantra should change from 'Acute renal failure increases mortality on the ICU' to 'If the patient develops acute renal failure, are we doing all the right things?' **HM**

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