

DIALYSIS

Dialysis-specific factors increase risk of cardiac arrest

Sudden cardiac arrest (SCA) is the most common cause of death among patients with end-stage renal disease (ESRD) on dialysis. New data now indicate that some of this risk is attributable to modifiable factors associated with the dialysis procedure. “This is the first study to link extremes of predialysis serum potassium [levels] specifically to risk of SCA,” report Pun and colleagues from Duke University, NC, USA.

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The researchers studied 43,200 patients on hemodialysis over a 3-year period, and identified 502 cases of SCA. Clinical and dialysis data for these patients were compared to those of 1,632 controls matched for age and duration of dialysis.

Predialysis hypokalemia was strongly associated with SCA. Exposure to low-potassium dialysate (<2 mmol/l) also strongly predicted an increased risk of SCA, even after adjustment for cardiac risk

factors and predialysis serum electrolyte levels. In this case-control study, no benefit of using low-potassium dialysate was observed even in patients with predialysis hyperkalemia (>5 mmol/l). “These findings underscore the potential detrimental effects of aggressive potassium removal in patients who have normal or near-normal predialysis serum potassium levels,” note Pun *et al.* They suggest that serum potassium levels should be closely monitored in such patients to avoid inadvertent hypokalemia associated with needless use of low-potassium dialysate. However, further studies are needed to determine whether the increased risk of SCA arises principally from aggressive potassium removal or from rapid changes in serum concentrations of this electrolyte produced by large serum-dialysate concentration gradients.

Pun’s team also identified several other factors that were independent predictors of increased SCA risk, including exposure to a low-calcium dialysate (<1.25 mmol/l) and low predialysis serum creatinine levels.

The researchers also highlight that high ultrafiltration volume is an important

modifiable risk factor, and recommend that patients should be counseled about the risks posed by excessive weight gain between dialysis sessions. Pun *et al.* also suggest that nocturnal hemodialysis or frequent daily dialysis could be considered for high-risk patients.

Although patients with ESRD have a high prevalence of traditional cardiovascular risk factors, the researchers found that congestive heart failure, coronary heart disease, and a history of cardiac arrhythmia were not associated with an increased risk of SCA. “Traditional SCA prevention strategies aimed at conventional cardiovascular risk factor reduction may not prove beneficial among ESRD patients,” they warn.

“Attention to hemodialysis factors, such as the management of dyskalemia and volume homeostasis, might significantly improve the risk profile of patients with ESRD,” the researchers conclude.

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Original article Pun, P.H. *et al.* Modifiable risk factors associated with sudden cardiac arrest within hemodialysis clinics. *Kidney Int.* doi:10.1038/ki.2010.315