

DIALYSIS

Rapid fluid removal and cardiovascular mortality

New research shows that rapid fluid removal during hemodialysis substantially increases the risk of death due to cardiovascular causes. “This was the first time that an association between ultrafiltration rate (UFR) and cardiovascular death had been demonstrated. The magnitude of the association was far greater than even we had anticipated,” notes senior author Steven Brunelli from Brigham and Women’s Hospital and Harvard Medical School, USA.

Patients on dialysis have high rates of mortality—chiefly because of a high number of deaths associated with cardiovascular disease. “Approximately half of patients starting dialysis will die within 2.5 years, which is a poorer prognosis than is seen in conditions that are considered fatal such as colon cancer, breast cancer and heart failure,” adds Brunelli. Motivated by the suggestion that dialytic practice has an effect on survival, the investigators wanted to clarify the association of UFR—a putative cardiovascular risk factor that could be easily modified—with morbidity and mortality, in particular, cardiovascular morbidity and mortality.

The researchers retrospectively examined data from the Hemodialysis Study, which included 1,846 patients on thrice-weekly chronic hemodialysis. Patients were grouped according to their UFR: <10 (ml/h)/kg, 10–13 (ml/h)/kg and >13 (ml/h)/kg. Overall, 343 of 871 deaths in the study cohort were from cardiovascular causes. Patients with the highest UFR had a 59% increase in their risk of death from all cause and a 71% increase in their risk of death from cardiovascular causes compared with patients with the lowest UFR.

Although a UFR of 10–13 (ml/h)/kg was not associated with all-cause or cardiovascular mortality overall, such an association was observed among patients with congestive heart failure. Moreover, cubic spline analysis suggested that the threshold UFR level was 10 (ml/h)/kg; UFRs over this threshold resulted in a sharp increase in the risk of all-cause and cardiovascular mortality irrespective of whether patients had congestive heart failure.

Brunelli hopes their findings will “spur future research in the area and draw clinical attention to consideration of UFR in the titration of dialysis”. Future work



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will distinguish which UFR determinants (the amount of fluid retained or the duration of fluid removal) should be modified to minimize UFR and risk of death from cardiovascular causes, as well as measure patients’ attitudes towards these targeted UFR manipulations to improve patient outcomes.

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