

Net ultrafiltration rate and mortality



Fluid complication occurs in nearly two-thirds of critically ill patients with acute kidney injury. Guidelines recommend the use of net ultrafiltration (NUF) when fluid overload is resistant to treatment with diuretics. However, it is still unclear whether the net ultrafiltration rate is associated with survival among critically ill patients with acute kidney injury and whether it could affect patient outcomes. So far, it is known that a slower NUF rate is associated with prolonged exposure to tissue oedema and organ dysfunction, while a faster NUF is associated with haemodynamic stress. Both these complications can have a negative impact on survival.

The Randomized Evaluation of Normal vs. Augmented Level (RENAL) of Renal Replacement Therapy clinical trial was conducted to examine the association of NUF with survival among critically ill patients with acute kidney injury who were treated with continuous venovenous haemodiafiltration (CVVHDF). Efficacy of two different intensities of solute control using CVVHDF was compared in the study participants. NUF was defined as the volume of fluid removed per hour adjusted for patient body weight. The primary outcome of the study was risk-adjusted 90-day survival.

1434 patients were included in the study and were divided into three groups: high (NUF rate greater than 1.75 mL/kg/h); middle (NUF rate from 1.01 to 1.75 mL/kg/h); and low (NUF rate less than 1.01 mL/kg/h). Findings showed no fatalities from day 0 to day 6. Death occurred in 14.7% of the patients in the high-tertile group compared to 8.6% in the low tertile group from day 7 to 12. 15.3% of patients in the high-tertile group died from day 13 to day 26 compared to 7.9% in the low-tertile group and 19.2% patients died in the high-tertile group versus 9.9% in the low-tertile group from day 27 to day 90. Overall, it was observed that every 0.5-mL/kg/h increase in NUF rate was associated with increased mortality. Hypophosphataemia was also more frequent in the high-tertile group compared with the middle and low-tertile groups. Cardiac arrhythmias that required treatment occurred among all the three groups at 36.8% in the high-tertile group, 36.5% in the middle-tertile group and 30.8% in the low-tertile group.

Overall, these findings demonstrate that NUF rates greater than 1.75 mL/kg/h compared with NUF rates less than 1.01 mL/kg/h were associated with lower survival. However, while a lower NUF rate improved outcomes, it was more likely to prolong treatment duration.

Source: [JAMA](#)

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