Continuous venovenous hemodiafiltration increased survival more than did continuous hemofiltration in acute renal failure

Saudan P, Niederberger M, De Seigneux S, et al. **Adding a dialysis dose to continuous hemofiltration increases survival in patients with acute renal failure.** Kidney Int. 2006;70:1312-7.

Clinical impact ratings: Critical Care ★★★★★★☆ Nephrology ★★★★★★☆

QUESTION

In critically ill patients with acute renal failure, is survival increased more by increasing the dialysis dose using continuous venovenous hemodiafiltration (CVVHDF) than by using continuous venovenous hemofiltration (CVVH) alone?

METHODS

Design: Randomized controlled trial.
Allocation: Concealed.*
Blinding: Unblinded.*
Follow-up period: 90 days.
Setting: Intensive care units (ICUs) in Geneva, Switzerland.
Patients: 206 patients (mean age 63 y, 61% men) with acute renal failure (urine output < 200 mL/12 h despite treatment or blood urea nitrogen > 30 mmol/L with urine output < 1500 mL/12 h). Exclusion criteria were prerenal or postrenal failure, suspicion of glomerular disease, end-stage renal failure, or use of angiotensin-converting enzyme inhibitors.
Intervention: CVVHDF (ultrafiltration flow rate 25 mL/kg per h replacement fluid plus dialysate flow rate 1 to 1.5 L/h for body weight < or > 70 kg, respectively) (n = 104) or CVVH (ultrafiltration flow rate 25 mL/kg per h replacement fluid) (n = 102). All patients received heparin (or periodic flushing with saline when heparin was contraindicated).
Outcomes: Survival at 28 and 90 days, renal recovery, and duration of ICU stay.
Patient follow-up: 100% (intention-to-treat analysis).

MAIN RESULTS

Survival at both 28 and 90 days was higher with CVVHDF than with CVVH (Table). In patients who survived to 90 days, the rate of renal recovery did not differ between groups (Table). The median duration of ICU stay was 8 days (range 4 to 16 d) in the CVVHDF group and 6 days (range 2 to 10 d) in the CVVH group (P = 0.06).

CONCLUSION

In critically ill patients with acute renal failure, continuous venovenous hemodiafiltration increased survival more than did continuous venovenous hemofiltration alone.

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*See Glossary.

Continuous venovenous hemodiafiltration (CVVHDF) vs continuous venovenous hemofiltration (CVVH) in critically ill patients with acute renal failure†

Outcomes	Follow-up	CVVHDF	CVVH	RBI (95% CI)	NNT (CI)
Survival	28 d	59%	39%	37% (3 to 75)	7 (4 to 84)
90 d	59%	34%	48% (12 to 90)	7 (4 to 26)	
Renal recovery in survivors	90 d	78%	71%	10% (–41 to 38)	Not significant

†Abbreviations defined in Glossary; RBI, NNT, and CI calculated from adjusted hazard ratios in article.

COMMENTARY

The trial by Saudan and colleagues showed a benefit in survival at 28 and 90 days when hemodialysis (CVVHDF) was added to standard-dose CVVH (25 mL/kg per h). 2 other contemporary randomized trials evaluated dose of dialysis in similar patient populations (1, 2). Both these studies compared low-dose (about 20 mL/kg per h) and high-dose (about 45 mL/kg per h) CVVH in critically ill patients. Although the study by Ronco and colleagues (1) indicated a benefit in patient survival at 15 days after cessation of CVVH with volumes > 35 mL/kg per h, the study by Bouman and colleagues (2) did not detect a difference in 28-day mortality.

Elements of these studies can be criticized, including generalizability, sample size and power, timing of outcome assessment, characteristics of the patient population studied, and method of providing increased dose. In addition to the question of dose (and whether dose increases should be accomplished by increasing CVVH or using CVVHDF) is the question of whether outcomes differ between continuous and intermittent renal replacement therapy (RRT) in critically ill patients. A recent randomized trial comparing CVVHDF (about 29 mL/kg per h ultrafiltration plus dialysate) with intermittent RRT (every 48 h) found no difference in survival at 28, 60, and 90 days (3).

The Acute Renal Failure Trial Network and the Randomized Evaluation of Normal vs Augmented Level of RRT are ongoing randomized trials assessing the effect of low- compared with high-dose RRT on patient outcomes. These well-designed, large multicenter trials are likely to provide more definitive conclusions to guide delivery of RRT, with results anticipated by 2008. Given the current uncertainty of benefit and the additional resources required to provide higher doses of dialysis, awaiting these results before modifying practice may be prudent.

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