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Titel des Beitrags:
A new system for regional citrate anticoagulation in continuous venovenous hemodialysis (CVVHD).

Abstract:
BACKGROUND: CVVHD is an established renal replacement therapy in hemodynamically unstable ICU patients. Various methods for regional citrate anticoagulation have been developed to minimize bleeding complications. Metabolic alkalosis, the risk of severe hypocalcemia and need for continuous calcium substitution as well as treatment-associated hypernatremia have limited the success of systems employed so far. We have developed a new technique for regional citrate anticoagulation in CVVHD to overcome these deficiencies and have performed a validation study. METHODS: One hundred and thirty-three filters with an overall treatment duration of 3,324 hours were used in 19 critically ill patients with bleeding complications. We used a calcium-containing dialysate (1.81 mmol/l Ca) to avoid mandatory systemic calcium supplementation. Sodium bicarbonate was added to the dialysate in variable concentrations (13 - 34 mmol/l) to control acid-base status and prevent hypernatremia. The resulting dialysate sodium concentrations were between 121 and 140 mmol/l. Blood flow was set at 75 ml/min. Infusion of a solution containing trisodium citrate and citric acid with an overall citrate concentration of 113 mmol/l was started at 250 ml/h. Primary endpoints were pre- and post-filter ionized calcium (Ca(i)) concentrations, base excess and serum sodium. Filter life was assessed as a secondary
end-point. RESULTS: Control of electrolyte balance and azotemia was excellent (prefilter serum Ca(i) 1.06 +/- 0.012 mmol/l (+/- SEM), post-filter Ca(i) 0.23 +/- 0.01 mmol/l, base excess -0.39 +/- 0.4 mmol/l, serum sodium 137 +/- 4 mmol/l, mean serum creatinine 1.8 +/- 0.07 mg/dl). Normal base excess was achieved with a mean dialysate bicarbonate concentration of 26 mmol/l at a mean citrate infusion rate of 266 +/- 4 ml/h. After 48 hours, 25% of filters were still patent, mean filter life was 26 +/- 1.6 hours. No patient developed serious CVVHD-related adverse events. CONCLUSION: The new regional citrate anticoagulation system for CVVHD is safe, feasible and can avoid major complications of previously described methods, especially hypocalcemia, alkalosis and hypernatremia.

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