Heparin free citrate dialysis in end stage liver disease (esld) patients is well tolerated.

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Background: Heparin cannot be used for hemodialysis (HD) in patients at high risk of bleeding, but heparin free dialysis is often associated with clotting, leading to early termination. Citrate- containing dialysate (CD) (Citrasate®, Advanced Renal Technologies, Bellevue, WA, USA) has been successfully used for dialysis without heparin in many acutely ill patients. CD differs from standard dialysate only in containing 2.4 mEq/l citrate and 0.4 mEq/l acetate in the final dialysate. Since citrate is mainly metabolized in liver, the use of citrate is generally considered inadvisable in the presence of liver failure. At our institution, acutely ill ESLD patients with renal failure require dialysis either in the intensive care unit or in the operating room during liver transplantation surgery. CD has routinely been used in these acutely ill patients in both settings.

Objectives: To study the safety and efficacy of CD in acutely ill patients with fulminant liver failure

Methods: We retrospectively analyzed the data in our five most recent patients with ESLD who used CD for their heparin-free HD. Three males and 2 females with average age of 57.8 years (range 32-68) used CD for 22 HD sessions (mean 4.4 treatments/patient), blood bilirubin 12.2 +/- 10.8 mg/dl. The length of dialysis ranged 3 to 6 hours (mean 4.12 hrs). Blood and dialysate flow ranged 200-400 (mean 288) and 300-500 (mean 468) ml/min, respectively.

Results: All treatments were well tolerated without any dialysis related complications including one 6hr session conducted during liver transplant surgery in the OR. No treatment was terminated due to clotting or increased bleeding. The pre- and post–dialysis blood values are given below:

Values	Mean (SD)	
IonizedCa		mmol/l
Mg		mEq/l
Na		mEq/l
Bicarb		mEq/l
Anion Gap		mEq/l
BUN		mg/dl

Predialysis	Postdialysis	p Value
1.12 (0.09)	1.12 (0.05)	0.8
1.93 (0.34)	1.83 (0.25)	0.8
133.7 (3.3)	133.7 (2.8)	0.4
23.5 (2.8)	25.4 (1.9)	0.02
13.3 (4)	12.4 (3)	0.04
50.5 (24)	32.4 (18)	0.0000

Ionized Ca and magnesium declined but remained in the normal range. CD was not associated with hypernatremia or increase in anion gap. Thus there was no evidence of accumulation of citrate in these patients, probably because of the low citrate concentration coupled with citrate metabolism in the muscles. Significant increase in bicarbonate and decrease in blood urea nitrogen (BUN) was as expected with HD. In our experience CD is well tolerated in patients with advanced liver failure and bleeding risk and resolves the dilemma of anticoagulation in these patients.