

POST FILTER IONIZED CALCIUM LEVELS WITH DILUTE REGIONAL CITRATE ANTICOAGULATION: DO WE NEED TO FOLLOW THEM?

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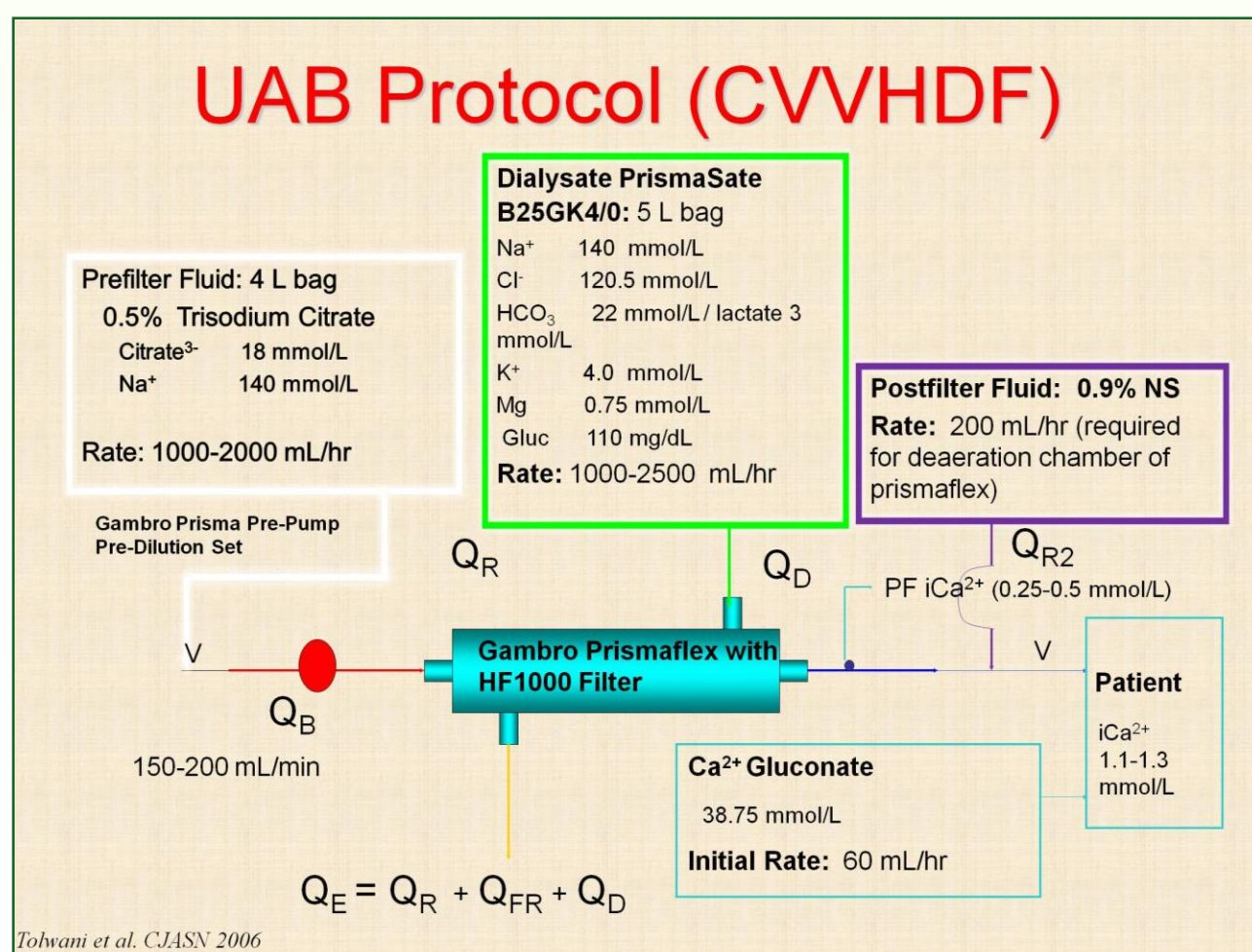


INTRODUCTION

Although regional citrate anticoagulation (RCA) with continuous venovenous hemodiafiltration (CVVHDF) has been shown to be safe and effective, it requires intensive monitoring of ionized calcium (iCa) levels every 6 hours from the patient as well as the circuit. At the University of Alabama at Birmingham (UAB), CVVHDF is performed with a 0.5% dilute citrate solution that serves as both an anticoagulant and replacement fluid (RF). Post filter iCa levels are checked every 6 hours and citrate adjusted to maintain a post filter iCa level of < 0.5 mmol/L. The purpose of this study was to determine if measuring post filter iCa levels every 6 hours are necessary with the typical citrate RF and blood flow rate ranges used at UAB.

METHODS

This is a prospective analysis of post filter iCa levels in 10 critically ill patients using pre-dilution CVVHDF. Post filter iCa levels were checked at varying combinations of citrate RF ranges of 1500 to 2500 ml/hr, dialysate ranges of 1500 to 2500 ml/hr, and blood flow rate ranges of 150 to 200 ml/min. Patient demographics, electrolytes, as well as dialysate parameters were reviewed.



RESULTS

Post filter iCa levels remained <0.5 mmol/L for all 10 patients with the various combinations of blood citrate RF, dialysate, and blood flow rates. See Tables 1 and 2.

Table 1:

Blood Flow (ml/min)	Citrate and Dialysate Rates (ml/hr) with Corresponding Post Filter iCa (mmol/L)								
	1500/1500	1500/2000	1500/2500	2000/2500	2000/2000	2000/1500	2500/1500	2500/2000	2500/2500
200	0.41	0.41	0.39	0.33	0.30	0.31	<0.25	<0.25	0.27
200	0.48	0.36	0.36	0.29	0.27	0.25	<0.25	<0.25	<0.25
200	0.37	0.38	0.36	0.29	0.28	0.29	<0.25	<0.25	0.42
200	0.54	0.40	0.44	0.31	0.31	0.31	<0.25	0.31	<0.25
200	0.43	0.45	0.40	0.32	0.32	0.30	<0.25	<0.25	<0.25
Mean	0.446	0.40	0.39	0.308	0.296	0.292	<0.25	<0.25	<0.25

Table 2:

Blood Flow (ml/min)	Citrate and Dialysate Rates (ml/hr) with Corresponding Post Filter iCa (mmol/L)								
	1500/1500	1500/2000	1500/2500	2000/2500	2000/2000	2000/1500	2500/1500	2500/2000	2500/2500
150	0.31	0.29	0.35	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
150	0.29	0.28	0.26	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
150	0.32	0.33	0.30	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
150	0.32	0.34	0.35	<0.25	0.32	<0.25	<0.25	<0.25	<0.25
150	0.27	0.25	0.27	0.31	<0.25	0.36	<0.25	<0.25	<0.25
Mean	0.302	0.298	0.306	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

CONCLUSIONS

There appears to be limited clinical benefit to follow post filter iCa every 6 hours when using the UAB 0.5% dilute RCA protocol for CVVHDF. Unless a patient has clotting problems on CVVHDF, we recommend post filter iCa can perhaps be changed from every 6 hours to once a day reducing not only complexity of citrate use with CRRT but also decreasing labor and cost.

