



CITRATE-CONTAINING DIALYSATE IS WELL TOLERATED DURING SLOW EXTENDED DAILY DIALYSIS IN THE ICU

James R Madison DO, MS¹; Margarita P Ilumin MSN, RN²; Andrew I Chin MD¹

¹Division of Nephrology, University of California Davis Medical Center, and

²Renal Services Program, University of California Davis Medical Center, Sacramento, CA, U.S.A.



BACKGROUND

- Slow Extended Daily Dialysis (SLEDD) is a well tolerated method of Continuous Renal Replacement in ICU patients
- There is concern about the amount of anticoagulation used to maintain the dialysis circuit during extended treatments
- Citrate based dialysate (Citrasate®) has been used to perform heparin-free, outpatient intermittent hemodialysis
- Citrasate® was used to perform SLEDD in our ICU patients with clinical contraindications to the use of anticoagulation
- *In this report, we review our experience with the safety and efficacy of Citrasate® compared to those receiving Saline Flushes alone during anticoagulant-free SLEDD in the ICU*

METHODS

- UCDCM patients, receiving inpatient dialysis during 2005
- Patients were admitted to 1 of 7 Intensive Care Units
- For inclusion patients must be ≥ 18 years, and on SLEDD with clinical contraindications to the use of any form of anticoagulation
- All patients received 200 cc saline flushes at least every hour
- Citrasate® treated patients were compared to other SLEDD treated patients receiving Saline flushes alone every 30 to 60 minutes
- Clotting was defined as: Early discontinuation of dialysis, greater than 30 minutes prior to prescribed time, because of circuit clotting in either the lines, chambers or dialyzer.
- Data was abstracted by chart review and groups were compared using Chi-Square, T-test and ANOVA

Slow Extended Daily Dialysis (6 - 8 hour) Prescription

Prescription: Qb=200 ml/min, Qd=400 ml/min, with either the typical acid profile: Na⁺140, K⁺4, Ca⁺⁺2.5, or Citrasate®30

Monitoring: Record any dialysis related adverse event, continuous cardiac monitoring, mean arterial pressure, and location of any chamber, circuit or dialyzer clotting were documented

Observations: Pre- and Post- ionized Ca⁺⁺, goal and attained ultrafiltration, the need/use of vasopressors, and treatment completion or duration for every dose was recorded

RESULTS

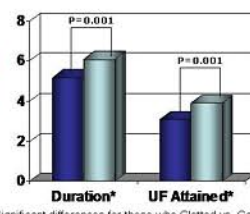
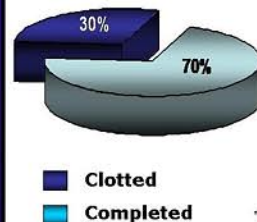
Baseline Characteristics

	Citrasate® (n=15 pts) 64 treatments	Saline Flush (All) (n=92 pts) 349 treatments	Saline (30 min) (n=46 pts) 238 treatments	Saline (1hr) (n=46 pts) 111 treatments	P value
Age (yrs)*	50±13	58 ± 15	57±16	60±15	0.001
Women (%)	17	41	31	46	0.001
Pressors (%)	27*	16*	18	23	0.04*
Catheters (%)	98	95	94	96	0.47NS
Ordered treatment time (hr)*	5.9±1.22	5.8±1.34	5.8±1.18	5.9±1.63	0.44 NS
Average Starting BP (mmHg)	126/62	130/60	130/64	128/60	0.35 NS

*Values expressed as means (±SD)

Clotting Episodes

Saline Flushes Treatment



*Significant differences for those who Clotted vs. Completed. No differences in Age, MAP, or Use of Pressors.

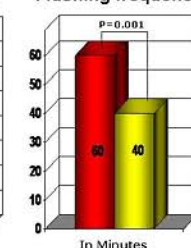
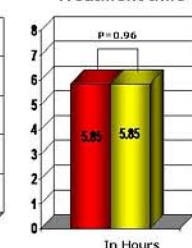
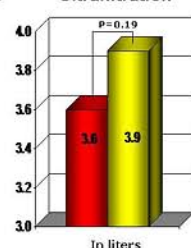
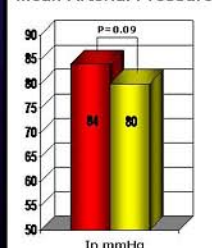
Citrasate® Treatments



Saline Flush Only

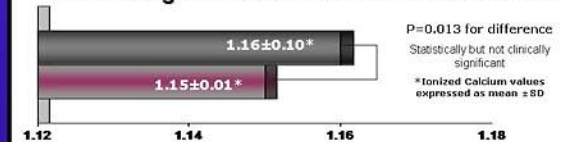
Treatment Observations

Citrasate®



RESULTS - CONTINUED

Monitoring of Ionized Calcium on Citrasate®



DISCUSSION

- Citrate-based dialysate appears safe, since we observed no adverse events during 6 hour SLEDD treatments
- Citrasate® was more effective than Saline flushes alone, at completing anticoagulant-free SLEDD treatments in the ICU
- We observed significantly less clotting events in those on Citrasate® + hourly saline flushes (16%), compared to those receiving Saline Flushes every 30 or 60 minutes alone (30%)
- Despite the statistical significance, serum ionized calcium levels remained clinically stable during all SLEDD treatments
- Use of Citrasate® required significantly less frequent flushing of dialysis circuits and thereby reduced nursing time
- Based on our experiences, a randomized, prospective trial, to further study the benefits citrate-based dialysate is warranted

LIMITATIONS

- Retrospective observational, single center Review
- Small cohort, non-randomized
- Experiences influenced by highly skilled Renal Services support
- Limited to available, documented data

ACKNOWLEDGEMENTS

- The authors affirm there is no conflict of interest, we have no commercial relationship with any company selling citrate-based dialysate.
- The authors wish to express their gratitude to the UCDCM Renal Services Department for their professionalism and dedication