

BUNCHMAN PEDIATRIC CRRT PROTOCOL

Citrate Protocol For Use With CRRT Therapy (PRISMA)

1. Prime in CVVHDF Mode using ordered dialysate and replacement solutions.
Dialysate – HCO₃ based without Ca
2. Place a 3 way stop cock to both the “arterial” and venous ports of the dialysis access. Attach the Citrate ACD(A) Solution 1000cc to a regular IV pump and then attach it to the “arterial” stop cock.
When ready to start the citrate rate in ccs/hr will be 1.5 x the blood flow rate of the PRISMA machine at ccs/min. (eg Start Citrate at 150 mls/hr if the BFR is 100 mls/min)
3. Set up the Ca⁺⁺ infusion (8gms Calcium Chloride in 1L NS) as ordered via central line other than the dialysis access. This will run at 40% of the citrate flow rate. (eg citrate rate = 150 mls/hr then CaCl rate = 60 mls/hr)
4. Set the flow rates in PRISMA as ordered.
5. Patient Fluid Removal Rate is calculated by:
Net Ultrafiltration rate + Citrate rate + Calcium infusion rate = Pt. Fluid Removal Rate.
6. Connect the Prisma circuit to the dialysis catheter as per procedure and press start.
7. 2 hour after initiation of therapy and every 6 hours thereafter, send the following blood work

 Post-filter ionized Ca⁺⁺ (drawn from the return line, blue sample port)
 Systemic ionized Ca⁺⁺ (drawn from patient (true) arterial line or peripheral draw)
 Chemistries (eg Lytes, Bun, Cr, Ca, Phos, Albumen)
8. Titrate the Citrate infusion according to the citrate sliding scale below :

Prisma ionized Ca ⁺⁺ (mmol/L)	<u>Citrate Infusion Adjustment</u>	
	> 20 kg	< 20 kg
< 0.35	? rate by 10 ml/hr	? rate by 5 ml/hr
0.35 – 0.5 (Optimum Range)	No adjustment	
0.5 – 0.6	? rate by 10 ml/hr	? rate by 5 ml/hr
> 0.6	? rate by 20 ml/hr	? rate by 10 ml/hr
NOTIFY MD IF CITRATE INFUSION RATE > 200 ml/hr		

Titrate the Calcium infusion according to the calcium sliding scale below :

Patient ionized Ca ⁺⁺ (mmol/L)	<u>Calcium Infusion Adjustment</u>	
	> 20 kg	< 20 kg
> 1.3	? rate by 10 ml/hr	? rate by 5 ml/hr
1.1-1.3 (Optimum Range)	No adjustment	
0.9-1.1	? rate by 10 ml/hr	? rate by 5 ml/hr
< 0.9	? rate by 20 ml/hr	? rate by 10 ml/hr
NOTIFY MD IF Calcium INFUSION RATE > 200 ml/hr		

9. Call Peds Nephrologist if the Serum Bicarb is > 35 meq/l In that case the Peds Nephrologist will add in NS as a replacement soln by 200-400 cc/hr and decrease the dialysate rate by the same amount. This will give an acid load from the NS and diminish the HCO₃ from the bath at the same time
10. Notify MD for the following :

- a. Systemic Ionized $\text{Ca}^{++} < 0.75$ mmol/L. (Consider holding citrate for 1 hours and resuming infusion at 30% of the citrate flow rate and bolus with 10 mg/kg of CaCl and increase Ca infusion by 10%)
 - b. $\text{Na}^+ > 150$ mmol/L. Consider changing replacement solution to 0.45% NaCl.
11. If the filter clots, stop the Citrate and Ca^{++} infusions and discontinue the filter.
 12. **In children less than 10 kg who require a blood transfusion when going on, avoid the use of citrate for the first 15 minutes for it may exacerbate the Bradykinin release syndrome seen in some children.**

Order Sheets Below

The Children's Hospital of Alabama

Division of Pediatric Nephrology and Transplantation

Pediatric Hemofiltration Order Sheet

Birthdate:

Name:

MR No.

Sex: M F

Visit No.

Date: _____

Time: _____

Hemofiltration Day # _____

Type of Treatment: CVVH with Replacement Fluid
(circle one) CVVH-D with Dialysate
CVVHDF with both Replacement Fluid and Dialysate

Pharmacy Orders

1. Normocarb KCl _____ Meq/L (0-2Meq/L)
KPO₄ _____ Meq/L (0-2Meq/L)

2. CaCl₂ 8000mg in 1000ml of 0.9NaCl (infuse in central line **other** than Hemofiltration access)

3. ACD-A (This needs to be administered on the "Arterial" access of the hemofiltration access.)

Hemofiltration Orders

Recommendations

Blood Flow Rate (BFR) _____ mls/min 4-5ml/kg/min

Dialysate Rate _____ mls/hr 2000ml/1.73m²/hr

Patient Fluid Removal Rate _____ mls/hr Patient net loss 1-2ml/kg/hr

ACD-A Rate _____ mls/hr Start 1.5 x BFR

CaCl₂ Rate _____ mls/hr Start at 0.4 x ACD-A Rate

Replacement Fluid Rate _____ mls/hr

Titrate CaCl₂ infusion to maintain patient iCa⁺⁺ of 1.1-1.3 (See chart on other side)

Titrate Citrate infusion to maintain Prisma iCa⁺⁺ 0.25-0.35 (See chart on other side)

Nursing Order

1. Record hourly data on CRRT flow sheet

2. Weight QD between 0400-0600

3. Patient and Prisma system ionized calcium two hours after beginning, then at 6AM, Noon, 6PM, Midnight. (call Nephrologist on call for the first 24 hrs with results)
4. Renal panel q AM.
5. Notify Nephrologist if serum bicarb is > 30 meq/l

No changes in hemofiltration orders including patient fluid removal to be made without discussion with Nephrologist on call.
 Physician Signature _____ Dr # _____

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Division of Paediatric Nephrology and Transplantation

CRRT Citrate Protocol

Paediatric Hemofiltration Order Sheet

Flow Sheet