CONTINUOUS RENAL REPLACEMENT THERAPY (CRRT) AND SUSTAINED LOW EFFICIENCY DIALYSIS (SLED) ORDER SET

[] General
  [] Nurse to check vital signs, I/O every 15 minutes for one hour then hourly
  [] Team to notify nurse and ICU team about planned procedures outside of ICU
  [] Nephrology and ICU team to review medication dosages with pharmacist
  [] Weigh patient pre-CRRT and daily
  [] Labs: CBC, Phosphorus, Magnesium daily, Chem 7 and pT/pTT bid

[] Method
  [] SCUF
  [] CVVH
  [] CVVHD
  [] CVVHDF
  [] SLED

[] Dialysate

[] Fluid goal: Net negative _____ mL/hr (consider all IVF given including blood products and medications)
Anticoagulation (choose one of the following):

- No anticoagulation

- Heparin (100 units/mL) to run into anticoagulant line (use if platelet count >100,000, PT and aPTT normal, and if no evidence of active bleeding or history of HIT)
  - 3,000 units
  - No heparin bolus

- Heparin maintenance:
  - 500 units/hour
  - ______ units/hour

- Therapeutic aPTT range: _____________

  **Nomogram for adjusting heparin to be written by ICU team.**

- Labs for heparin anticoagulation:
  - STAT baseline aPTT and platelets (recommended if not done within last 24 hours)
  - STAT aPTT 6 hours after heparin initiation or rate change, then Q6 hours until aPTT in therapeutic range (see above) on two consecutive readings, then check aPTT once daily.
  - Platelet count every other day.

- Argatroban (1 mg/mL) to run into anticoagulant line (Note: for severe hepatic impairment, consider other agents)

  - Initiate argatroban:
    - 0.5 mcg/kg/min continuous infusion into anticoagulant line in moderate hepatic impairment
    - 2 mcg/kg/min continuous infusion into anticoagulant line for all other patients
    - Other

  **Subsequent argatroban dosing per ICU team. Order must be written for each dosage change; dosing changes to be written in mcg/kg/min.

- Therapeutic aPTT range: _____________

- Labs for argatroban anticoagulation:
  - STAT baseline labs (if not already obtained within the past 24 hours)
    - Hematocrit
    - Platelet count
    - PT, aPTT
    - Hepatic function panel

  - STAT aPTT 4 hours after argatroban initiation or rate change, then Q4 hours until aPTT in therapeutic range (see above) on two consecutive readings, then check aPTT daily.

  - Platelet count daily.
Regional Citrate (sodium citrate and citric acid as solution ACD-A, available from Distribution) to run into anticoagulant line at ______ ml/hour (usually 2% of total blood flow rate per hour, e.g., 180 ml/hour of blood flow rate of 150 ml/minute) to maintain POST-FILTER IONIZED CALCIUM at 0.3-0.4 mM. (Note: decrease rate with hepatic failure and decrease cap on infusion rate)

Adjust CITRATE flow rate according to the sliding scale below based on POST-FILTER IONIZED CALCIUM:

<table>
<thead>
<tr>
<th>Post-Filter Ionized Calcium (mM)</th>
<th>Citrate Infusion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.2</td>
<td>Decrease by 20 ml/hour, redraw ionized calcium, and page renal M.D.</td>
</tr>
<tr>
<td>0.2-0.29</td>
<td>Decrease by 10 ml/hour</td>
</tr>
<tr>
<td>0.3-0.4</td>
<td>NO CHANGE</td>
</tr>
<tr>
<td>0.41-0.5</td>
<td>Increase by 10 ml/hour</td>
</tr>
<tr>
<td>0.51-0.6</td>
<td>Increase by 20 ml/hour, redraw ionized calcium, and page renal M.D.</td>
</tr>
</tbody>
</table>

DO NOT decrease the citrate flow rate below 120 ml/hour.
DO NOT increase the citrate flow rate above 300 ml/hour.

Calcium chloride 8 g in 1 L sodium chloride 0.9% (1080 ml) to run into the CENTRAL line at an initial rate of 40 ml/hour for 4 hours, then adjust calcium chloride rate according to the sliding scale below, based on peripheral ionized calcium:

**Standard calcium protocol.**

<table>
<thead>
<tr>
<th>Peripheral Ionized Calcium (mM)</th>
<th>Calcium Chloride Infusion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.85</td>
<td>Redraw ionized calcium, give 1 g calcium gluconate IV over 10 min, increase rate by 20 ml/hour, and page renal M.D.</td>
</tr>
<tr>
<td>0.85-0.94</td>
<td>Give 1 g calcium gluconate IV over 10 min, increase rate by 15 ml/hour</td>
</tr>
<tr>
<td>0.95-1.04</td>
<td>Increase rate by 10 ml/hour</td>
</tr>
<tr>
<td>1.05-1.09</td>
<td>Increase rate by 5 ml/hour</td>
</tr>
<tr>
<td>1.1-1.2</td>
<td>NO CHANGE</td>
</tr>
<tr>
<td>1.21-1.3</td>
<td>Decrease rate by 5 ml/hour</td>
</tr>
<tr>
<td>1.31-1.45</td>
<td>Decrease rate by 10 ml/hour</td>
</tr>
<tr>
<td>&gt;1.45</td>
<td>Decrease rate by 15 ml/hour and notify renal MD</td>
</tr>
</tbody>
</table>

**High calcium protocol (for cardiac surgical and severely hypotensive patients)**

<table>
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<tr>
<th>Peripheral Ionized Calcium (mM)</th>
<th>Calcium Chloride Infusion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.85</td>
<td>Redraw ionized calcium, give 1 g calcium gluconate IV over 10 min, increase rate by 20 ml/hour, and page renal M.D.</td>
</tr>
<tr>
<td>0.85-0.99</td>
<td>Give 1 g calcium gluconate IV over 10 min, increase rate by 15 ml/hour</td>
</tr>
<tr>
<td>1.0-1.09</td>
<td>Increase rate by 10 ml/hour</td>
</tr>
<tr>
<td>1.1-1.19</td>
<td>Increase rate by 5 ml/hour</td>
</tr>
<tr>
<td>1.2-1.3</td>
<td>NO CHANGE</td>
</tr>
<tr>
<td>1.31-1.35</td>
<td>Decrease rate by 5 ml/hour</td>
</tr>
<tr>
<td>1.36-1.45</td>
<td>Decrease rate by 10 ml/hour</td>
</tr>
<tr>
<td>&gt;1.45</td>
<td>Decrease rate by 15 ml/hour and notify renal MD</td>
</tr>
</tbody>
</table>

Labs for regional citrate anticoagulation:

- POST-FILTER ionized calcium at initiation of CRRT, every 4 hours times 24-hours, then every 8 hours times 24 hours then every 12 hours.
- Peripheral ionized calcium at initiation of CRRT, every 4 hours for 24 hours, then every 8 hours for 24 hours then every 12 hours.
Flow rates

Dialysate (up to 8L/hr)

- [ ] 1,000 mL/hr
- [ ] 1,500 mL/hr
- [ ] 2,000 mL/hr
- [ ] _________ mL/hr

Replacement fluid (up to 5L/hr)

- [ ] PRE-FILTER
- [ ] POST-FILTER
- [ ] 0.9% saline
- [ ] Other: ____________________________

To run at ___________ mL/hour

Blood flow rate (120 to 180 mL/min)

- [ ] 150 mL/minute
- [ ] _________ mL/minute

Catheter care

- [ ] Inspect site and change dressing as per central line care policy
- [ ] If CRRT stopped, flush each lumen of the dialysis catheter with 10mL 0.9% sodium chloride, then instill into each lumen:
  - [ ] Heparin 1000 units/mL at volume of lumen (e.g. 1.2 mL if 1.2 mL lumen)
  - [ ] Heparin 5000 units/mL at volume of lumen
  - [ ] Other

Renal Fellow/Attending Signature ___________________________ Date ___________ Time ______

ICU Physician Signature _________________________________ Date ___________ Time ______