ALTERNATIVES TO HEPARIN ANTIMICOAGULATION DURING SLOW EXTENDED DAILY DIALYSIS IN THE ICU

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BACKGROUND

• Slow Extended Daily Dialysis (SLEDD) is a well tolerated method of Renal Replacement Therapy in ICU patients
• Concern exists about the amount of heparin that is used to maintain the dialysis circuit in most critically ill patients. This is particularly true when a patient has antibodies to heparin.
• Alternative methods utilized to perform dialysis in these situations include, frequent saline flushes, citrate based dialysate (Citasate®), and regional citrate anticoagulation

METHODS

• Patients receiving SLEDD in the Intensive Care Units, 2005-2006.
  • For inclusion, patients were ≥ 18 years, on no systemic anticoagulation, and on SLEDD without heparin use.
  • Alternatives to heparin included:
    1. Saline flushes with 200 cc at least every hour
    2. Citrasate®: (2.5mEq/L) citrate-based dialysate
    3. Regional citrate: ACD-A (0.113 mol/L) & Calcium gluconate (40mg/ml)
    • Cloting defined as early discontinuation of dialysis, greater than 30 minutes prior to prescribed time because of circuit clotting in lines, chambers, or dialyzer.
    • Data was abstracted by chart review and groups were compared using Chi-Square, T-test and ANOVA

RESULTS - CONTINUED

Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Saline Flush</th>
<th>Citrasate®</th>
<th>ACD-A</th>
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</thead>
<tbody>
<tr>
<td>(n=97 pts)</td>
<td>(n=19 pts)</td>
<td>(n=16 pts)</td>
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<tr>
<td>Age (yrs)*</td>
<td>58 (± 16)</td>
<td>50 (± 14)</td>
<td>57 (± 14)</td>
</tr>
<tr>
<td>Mean arterial pressure (mmHg)</td>
<td>85</td>
<td>71</td>
<td>79</td>
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<tr>
<td>Net ultrafiltration (L/day)</td>
<td>2.1</td>
<td>2.1</td>
<td>2.2</td>
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Monitoring of Ionized Calcium

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<thead>
<tr>
<th></th>
<th>Pre- iCa²⁺</th>
<th>Post- iCa²⁺</th>
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<tbody>
<tr>
<td>Saline Flush</td>
<td>1.15±0.01*</td>
<td>1.19±0.11*</td>
</tr>
<tr>
<td>ACD-A</td>
<td>1.18±0.10*</td>
<td>1.15±0.01*</td>
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DISCUSSION

• SLEDD was a safe, effective and well-tolerated method of renal replacement therapy in all ICU patients in this study
• Saline flushes, the most commonly employed alternative to heparin, was least effective at preventing circuit clotting
• Citrasate® was more effective in maintaining the circuit than saline flushes, and appears to safe for use in SLEDD
• We observed no clinically significant hypocalcemia events using either Citrasate® or regional citrate
• Regional citrate, using our protocol, was the superior method to keep the dialysis circuit from clotting.
• Our regional citrate protocol was safe and required limited adjustments in about half of all treatments
• It appears that regional citrate and Citrasate® can safely be used for SLEDD treatments in critically ill patients

LIMITATIONS

• Retrospective, observational, single center Review
• Small cohorts, non-randomized