Regional citrate anticoagulation implementation and comparison against heparin (or other) systemic anticoagulation; the nurses perspective

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AIM

We introduced regional citrate anticoagulation (RCA) for continuous renal replacement therapy (CRRT) into a twelve bedded critical care unit, in a district general hospital (DGH) in Scotland.

Anticoagulation of the patient's blood is essential for CRRT to maintain the extra-corporeal circuit patency for haemodialfiltration [1,2]. A number of studies have shown advantages of regional citrate anticoagulation (RCA) when compared with heparin systemic anticoagulation for CRRT in terms of prolonged circuit life, safety through reductions in haemorrhagic complications and reduced transfusion requirements [1,2,3,5,6,7].

For these reasons RCA is recommended by Kidney Disease Improving Global Outcomes as first line anticoagulation treatment for CRRT for patients without contraindications (KDIGO) [4,5]. We trained our consultant intensivists, advanced nurse practitioners and charge nurses to be super users who would provide bedside teaching and support with additional technical support provided by Gambro Renal Products.

Then we moved to using RCA for CRRT. Eighteen months post implementation this study aims to identify the perceptions of the critical care nursing staff (CCN) on their education and training, the RCA implementation strategy and comparing RCA against Heparin the previous default systemic anticoagulation therapy. This study can help guide other critical care units when implementing RCA for CRRT.

METHODS

A Likert-scale questionnaire was generated and distributed in named envelopes to each registered critical care nurse within the DGH minus six, who along with the RCA lead Consultant intensivist were used to assess content and face validity (n=42). Consent was assumed by responses posted into a locked box. Response rate 79% (n= 33 of 42 critical care nurses). Data were analysed at four weeks using excel to generate descriptive statistics.

OUTCOMES/RESULTS

![Graph showing How many years critical care nursing experience do you have?](Image)

- **How many years critical care nursing experience do you have?**

  - 1 year
  - 2 years
  - 3 years
  - 4 years
  - 5 years

![Graph showing Did you receive any RCA training and who was it from?](Image)

- **Did you receive any RCA training and who was it from?**

  - Charge Nurse
  - Consultant
  - Advanced Nurse Practitioner

Education and Training

<table>
<thead>
<tr>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
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<td>43% (11)</td>
<td>27% (7)</td>
<td>29% (13)</td>
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Preparation, education and training for the implementation of RCA for CRRT were appropriate.

The number of staff trained to key (expert) users prior to the implementation of RCA for CRRT was appropriate.

I have an adequate level of knowledge of RCA.

Unsatisfactory

| I prefer using RCA for CRRT than heparin (or other) SA | 91% (30) |
| I want to use heparin (or other) SA as my default anticoagulation for CRRT | 9% (3) |

Setup

The set up for RCA CRRT is more difficult when compared to heparin (or other) SA RRT.

The Prismaflex on-screen instructions are simple and easy to follow when setting up RCA CRRT.

Workload

| Patients who have fewer interruptions to their CRRT with RCA | 88% (29) |
| RCA reduces my workload when caring for patients receiving CRRT | 64% (21) |

Blood Monitoring and Maintenance

| Blood sampling for heparin (or, other) SA is less work than for RCA CRRT | 49% (16) |
| I find it easier to interpret blood results and make immediate changes to patients' RCA than with heparin (or, other) SA | 88% (29) |

Protocol and Paperwork

The RCA protocol for CRRT was difficult to follow.

The prescription and information sheet allows easy identification of appropriate RCA therapy and maintenance.

Technical Challenges

| I have to troubleshoot complications to maintain RCA CRRT more than with heparin (or, other) SA | 3% (1) |
| Interruptions to CRRT are usually related to the central vascular catheter | 76% (25) |

Safety

| RCA for CRRT is safer for my patients than heparin (or other) SA | 79% (26) |

CN, charge nurse, RCA, regional citrate anticoagulation, ANPCC, advanced nurse practitioner in critical care, CRRT, continuous renal replacement therapy, SA, systemic anticoagulation.

Twenty-one (63%) CCN felt their knowledge of RCA was adequate on implementation. Eleven (34%) felt education and training were adequate with ten (31%) identifying that the implementation strategy used was effective. When comparing to previous heparin systemic anticoagulation for CRRT, 30 (91%) preferred RCA with 28 (85%) wanting to remain with RCA as default therapy. Twenty-nine (88%) found fewer interruptions in CRRT with 21 (64%) identifying a reduced workload. Twenty-nine (88%) found interpreting blood results and adjusting treatment easier than heparin. Twenty-four (73%) felt that overall there were less complications and 26 (79%) felt RCA was a safer therapy to deliver CRRT.

CONCLUSION

CCN's would have preferred more education and training prior to implementation. Cascading the RCA super-user training throughout the team would improve their accessibility for bedside support on shift. The majority of CCN's felt they had adequate knowledge of RCA at implementation. Eighteen months post implementation and the CCN's prefer RCA. They find RCA easier to use, easy to set up and maintain, less work with fewer interruptions to patient treatment and with less complications than with heparin (or other) systemic anticoagulation. Additionally, the CCN's felt RCA was a safer therapy to facilitate the delivery of CRRT when compared to heparin (or other) systemic anticoagulation.

REFERENCES


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