A quality improvement project to improve the life of continuous renal replacement circuits

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Background

Continuous renal replacement therapy is a treatment option widely used within the intensive care unit to treat acute kidney injury in the critically ill patient. The therapy relies on continuous blood flow through a circuit to support the clearance of solutes and water. Failures of the circuit are common due to blood clotting which results in insufficient detoxification of the patient, high blood losses and increases workload and costs. Preventing clotting in the circuit is the primary concern of the staff and this can be achieved by using an anticoagulant. Current practice uses heparin but studies have shown that citrate is a more effective anticoagulant (1,2,3).

Aim

The aim was to improve filtration circuit life to the 72 hours stated by the manufacturer.

Methods

Using the model for Improvement, baseline data was collected from 12 consecutive filters anticoagulated with heparin and circuits were found to last a median of 24 hours. A project charter was created to organise and define all critical project information and quantitative measures were identified to show that the change had resulted in an improvement. Using PDSA cycles to test change ideas, an iterative process was used to undertake the changes slowly, measuring whether an improvement was gained with each cycle.

Change ideas included:

• Introduction of a protocol to guide practice.
• The provision of education sessions to allow the nurses to become proficient in the use of citrate.
• Changing the anticoagulant used during renal replacement therapy to citrate.
• Introducing a trouble shooting guide.

Measures

The measures included outcome, process and balancing measures

• Outcome measures:
  Improve circuit survival times and reduce premature circuit clotting.
• Process measure:
  How much time nurses are spending setting up circuits.
• Balancing measure:
  No new or worsening metabolic disturbances.

Results

Baseline Data

Quantitative measures identified show that the change resulted in improvement.

The time nurses spent setting up circuits did not differ greatly between heparin and citrate but overall the change generated a time saving due to the extension of circuit life which resulted in less circuit changes.

Outcome

Citrate used as an anticoagulant during renal replacement therapy improved circuit lifespan from 24 hours to 71 hours. Less circuit downtime resulted in uninterrupted therapy which produced a reduction in workload and time. No adverse effects were identified during this project so citrate was safe for use as an anticoagulant.

References