

Management of Continuous Renal Replacement Therapy in the Intensive Care Unit: a review post-introduction of citrate anticoagulation therapy.



Introduction

Continuous Renal Replacement Therapy (CRRT), is a specialised Intensive Care Unit (ICU) treatment for critically ill patients. In August of 2019, the ICU introduced a new method of regional anticoagulation. The new anticoagulation method was introduced with intent to improve the care delivery to patients receiving CRRT. It was necessary to conduct this review in order to measure the new anticoagulation method's performance and compare it with the units previous anticoagulation.

Aims

- To evaluate the CRRT citrate practice within the ICU at the Northern Hospital for a 12 month period since installation, from August 2019-2020.
- To compare the data analysed with data of the previous 12 month period, 2018-2019.
- To evaluate the data to ensure best practice and evidence based-care was being delivered.

Methods

Study Design

- A single centre retrospective data analysis, utilising the data obtained from the five Prismaflex filtration machines owned by Northern Health's ICU.

Study Population

- 185 filters were audited between August 2019 and July 2020, and compared to the same audit conducted on 217 filters between July 2018 and June 2019.

Statistical Analysis

- Completed by Baxter's TrueVue Analytics software. Data separated into themes by the TrueVue Analytics software. **Northern Health**
- Data then compared between 2018-2019 and 2019-2020.

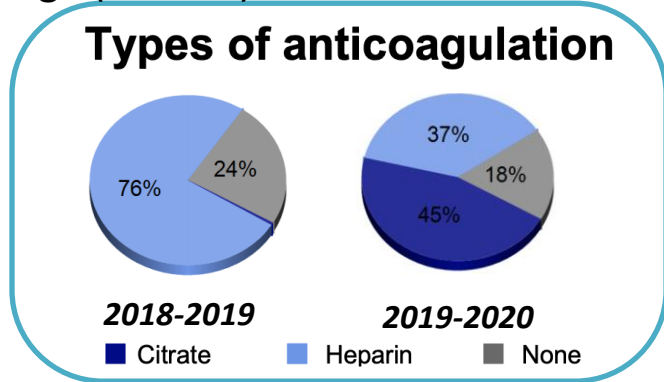
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Results

	2018-2019	2019-2020
Mortality	55.84%	43.83%
Number of Filters	217	185
Number of Patients	77	73

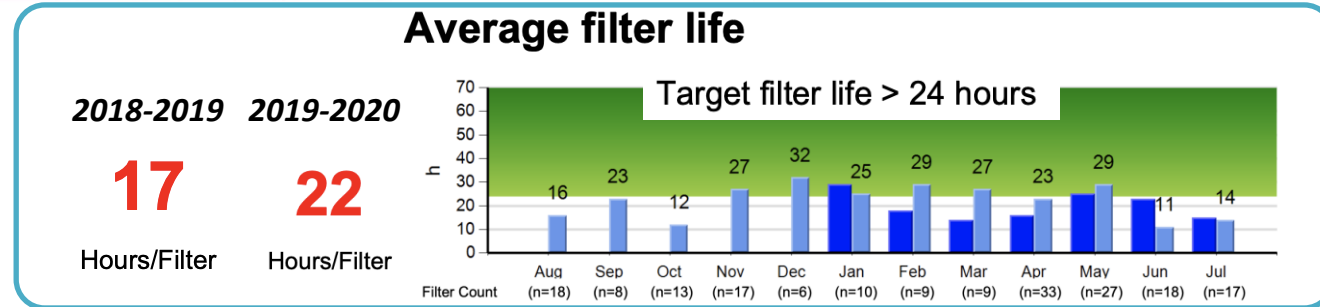
Table 1. Mortality rate, number of patients treated and filters used.

Patient mortality from the 2019-2020 period was 43.83% at discharge (Table 1).

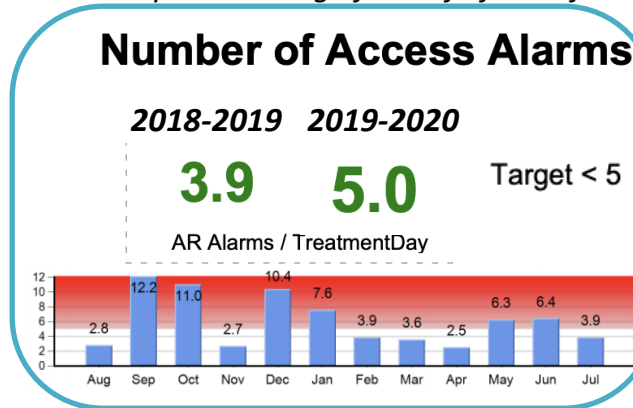


Graph 1a (2018-2019) and 1b (2019-2020). Types of anticoagulation used to treat the filters.

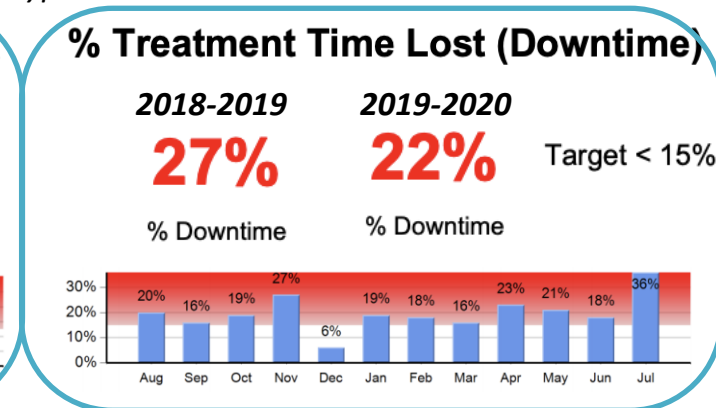
45% of filters used utilised citrate as the chosen method for anticoagulation in the 2019-2020 period (Graph 1a, 1b). The average filter life, for all methods of filtration (Citrate, Heparin and None), increased from 17 hours to 22 hours (Graph 2).



Graph 2. Average filter life for all filter types.



Graph 3. Number of access alarms 2019-2020. Compared.



Graph 4. Percentage of treatment time lost 2019-2020. Compared.

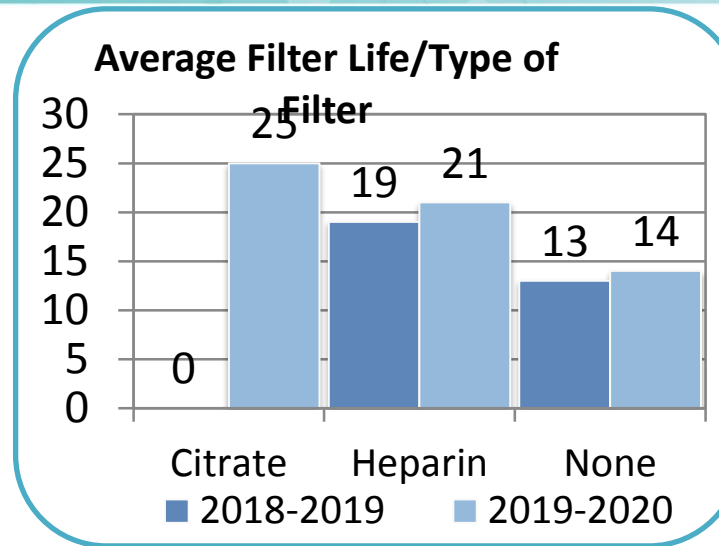
The number of access alarms increased to 5 per treatment day (Graph 3). Treatment time lost has reduced by 5% to 22%. Still greater than target (Graph 4).

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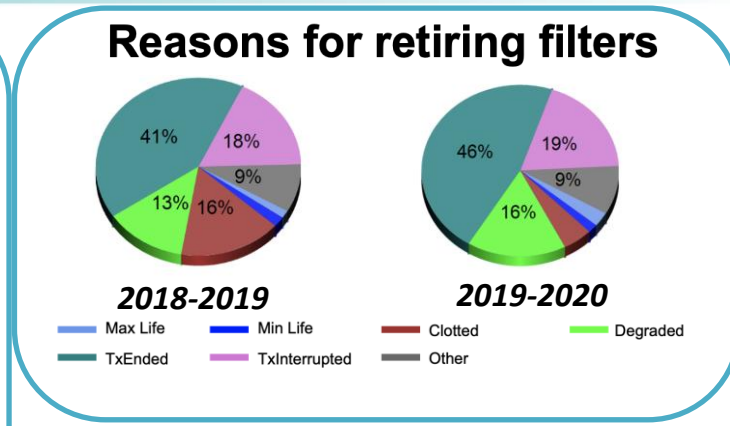
Results

The average filter life for citrate was 25 hours, heparin increased by two hours to 21 in the 2019-2020 year, and none increased by one hour to 14 in the same period (Graph 5).

The number of filters that were ceased due to clotting decreased by 11% from 16% to 5% in the 2019-2020 period (Graph 6). An increase in electively ceasing filters was seen from 41% to 46% (Graph 6). The number of filters that were retired due to degradation (indicative of septic load) increased from 13 to 16% (Graph 6).



Graph 5. Average filter life (hours) per type of anticoagulation compared between time periods.



Graph 6a (2018-2019) and 6b (2019-2020). Reasons for cessation of filtration in ICU patients.

Conclusion

An increase in the average filter life hours and a reduction in filters retiring due to clotting indicates that the use of citrate anticoagulation has potentially improved the quality of haemofiltration delivered to the ICU patients. This will require continued monitoring, and some protocol alteration to increase the scope of use for citrate anticoagulation. Whilst the average filter life hours have increased, they are still below the targeted time of 25 hours. This may be a result of early elective cessation or increase septic load of the patients. This may require further investigation, in particular, improving the ability to collect this data.