

# A change from Heparin to Citrate as Anticoagulation for CRRT in SWB Critical Care

Authors: Fahad Zahid, Roshni Baid, Deepak Sharma

## Introduction

- Acute Kidney Injury (AKI) is a common condition that worsens mortality and morbidity in critically ill patients. It also comes with a heavy cost to the treating units.
- The Kidney Disease: Improving Global Outcomes (KDIGO) guidelines recommend that uniformity in how we manage these patients by standard protocols will reduce variations, improve outcomes, and thereby reduce costs.<sup>1</sup>
- There are benefits to promoting the use of citrate as regional anticoagulation against heparin.<sup>2</sup>
- Our unit changed from heparin to citrate for regional anticoagulation in 2021-2022. This allowed us to conduct a study to find out the benefits and cost-effectiveness of this change.

## Purpose

Primary questions we were trying to answer were comparison of Heparin and Citrate Groups in terms of:

- Number of circuits used?
- Duration of each circuit use?
- Frequency of Blood lost with the circuit (unable to wash back the filter)
- Number of Blood transfusion per patient between 2 groups?

## Methods and Analysis

- We collected retrospective data from the hospital's online system for four months on heparin and citrate use.
- The data included the number of circuits used, circuit life, and requirements for packed red blood cells (pRBC) transfusions.
- We wanted to see if using citrate would reduce costs by using fewer circuits or by requiring fewer transfusions.

## Demographic Data

	Pre-citrate	Citrate
<b>Time period</b>	Dec 21 to Mar 22	Jun 22 to Sept 22
<b>Number of patients</b>	39.00	53.00
<b>Average age</b>	57.64	55.02
<b>Maximum age</b>	80.00	84.00
<b>Minimum age</b>	19.00	20.00
<b>Renal Hours</b>	3941.00	10516.80
<b>Renal Day</b>	164.21	438.20
<b>Total filter cost per annum (£)</b>	16100.00	25187.76
<b>Filter lost (%)</b>	67.08	50.00

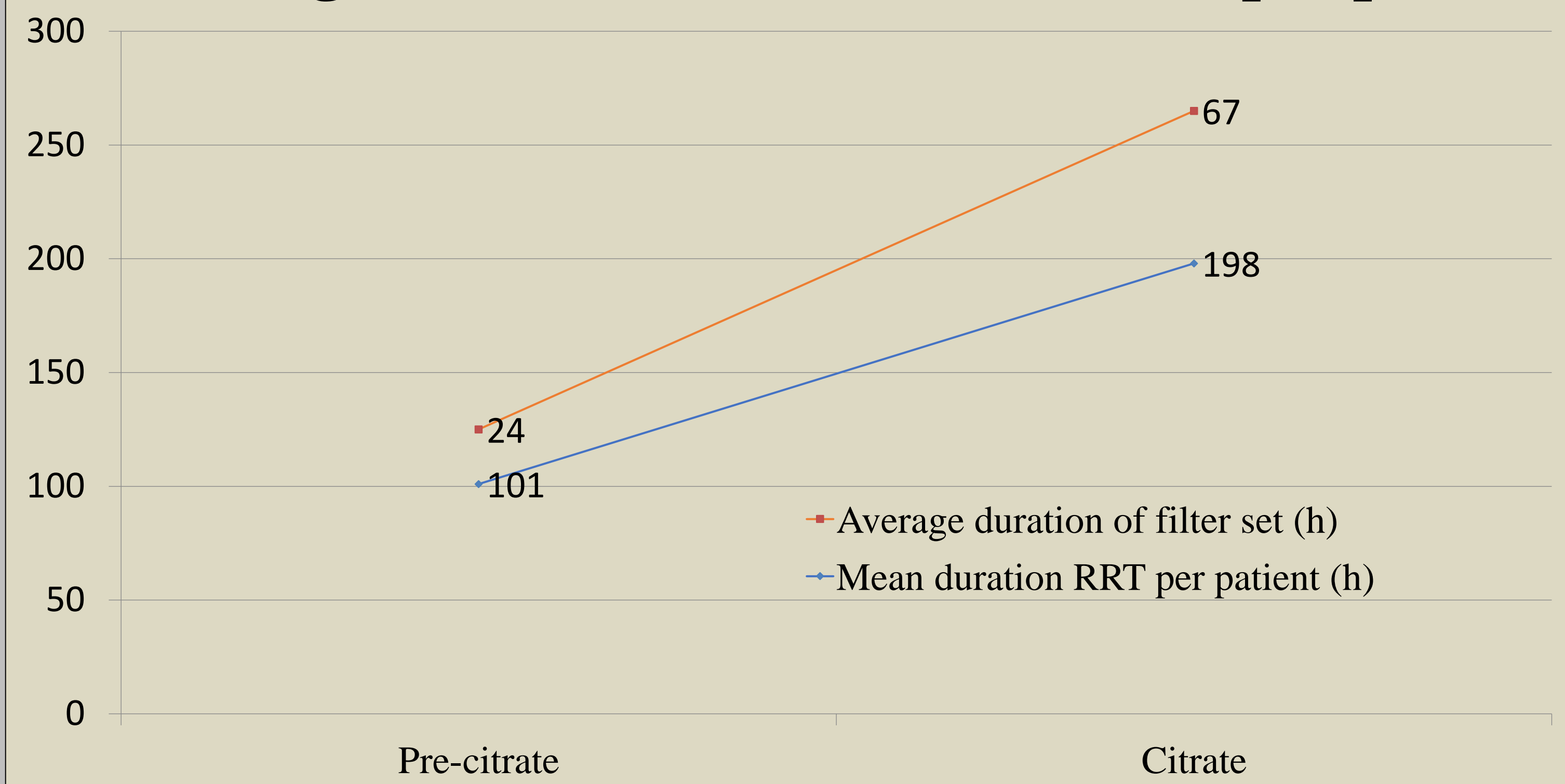
## Results

- In the heparin group, 39 patients required CRRT for a total of 3,941 hours. In the citrate group, 53 patients required CRRT for a total of 10,516 hours.
- The mean duration of CRRT per patient was 101 hours in the heparin group and 198 hours in the citrate group. This difference was statistically significant, with a p-value of 0.03.
- The citrate group's mean filter life was also noticeably longer, at 67 hours as opposed to 24 hours in the heparin group.
- The number of pRBC transfusions required was also lower in the citrate group, at 0.38 units per day compared to 0.5 units per day in the heparin group.

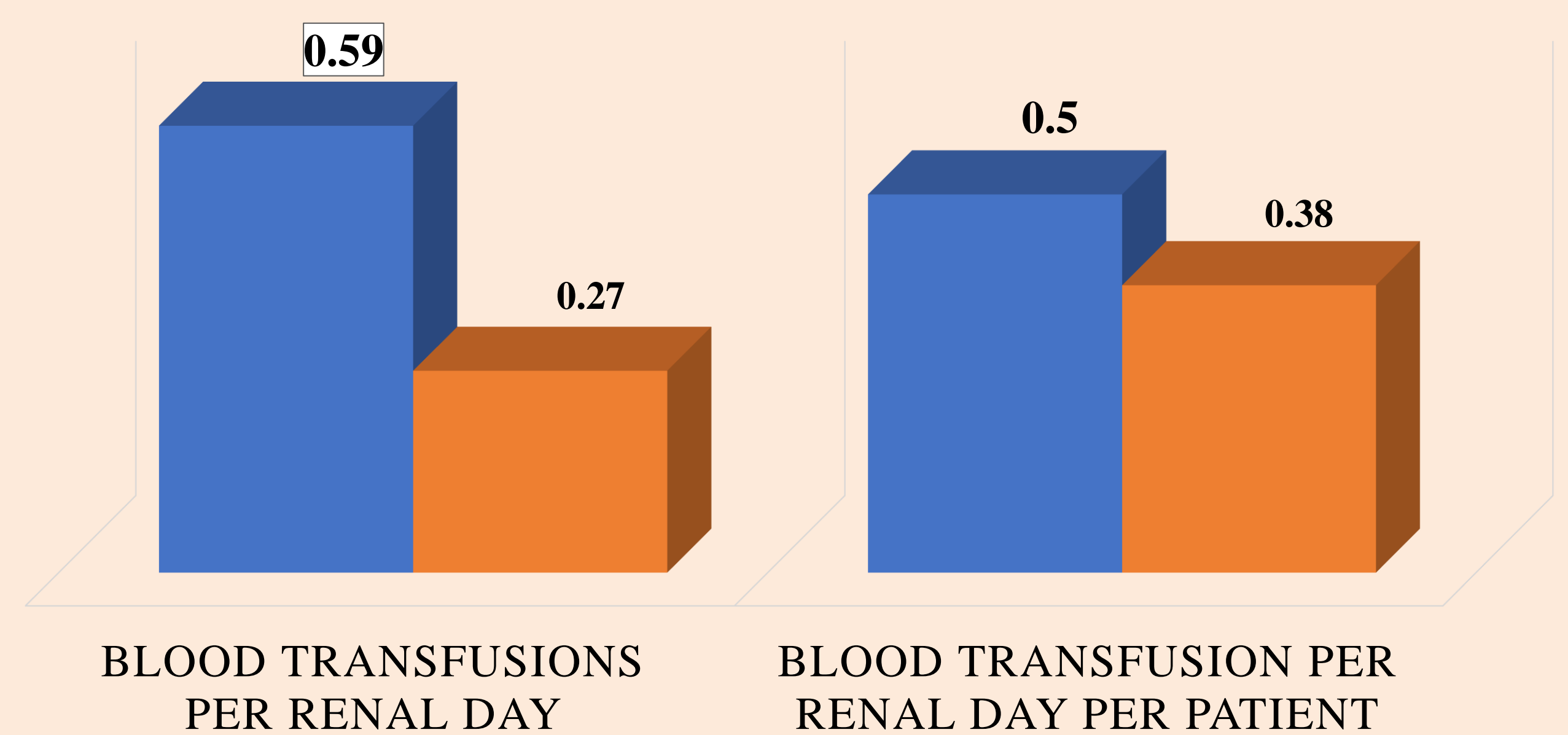
## References:

- Work group membership. Kidney International Supplements. 2012;2(1):2. doi:10.1038/kisup.2012.2
- Oudemans-van Straaten HM, Kellum JA, Bellomo R. Clinical review: Anticoagulation for continuous renal replacement therapy - heparin or citrate? Critical Care 2011; 15: 202

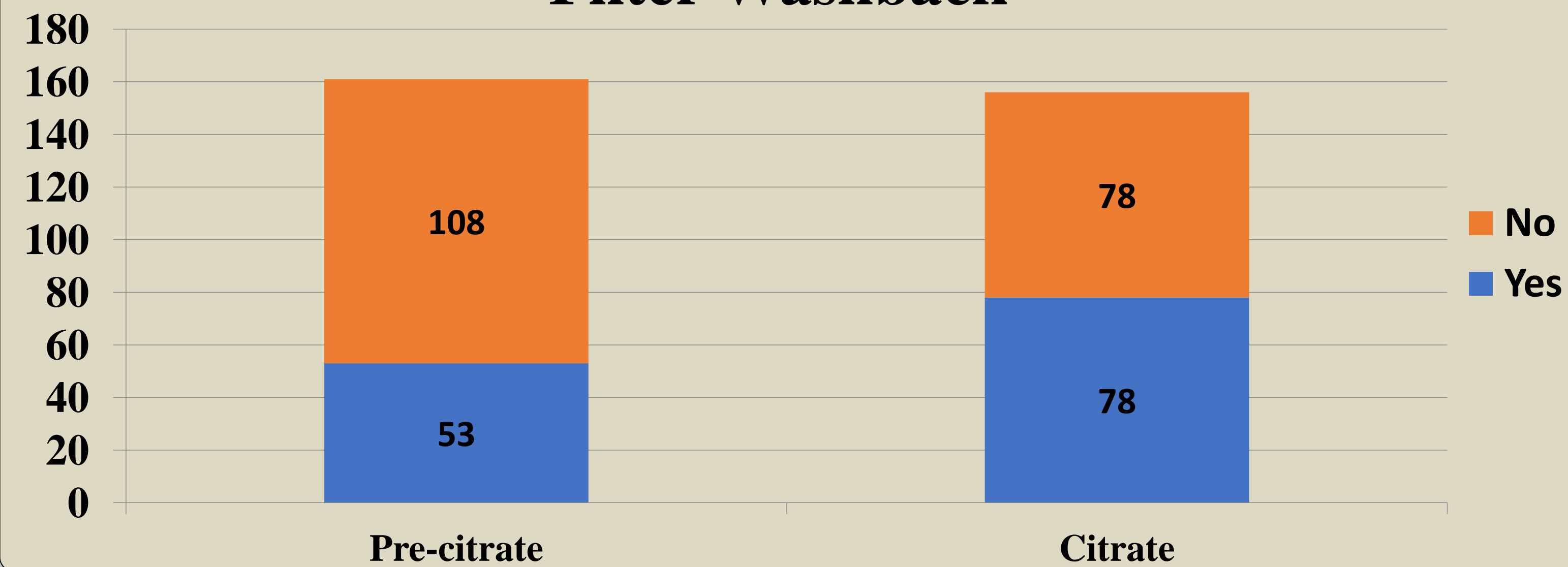
## Average and Mean Duration of CRRT per patient



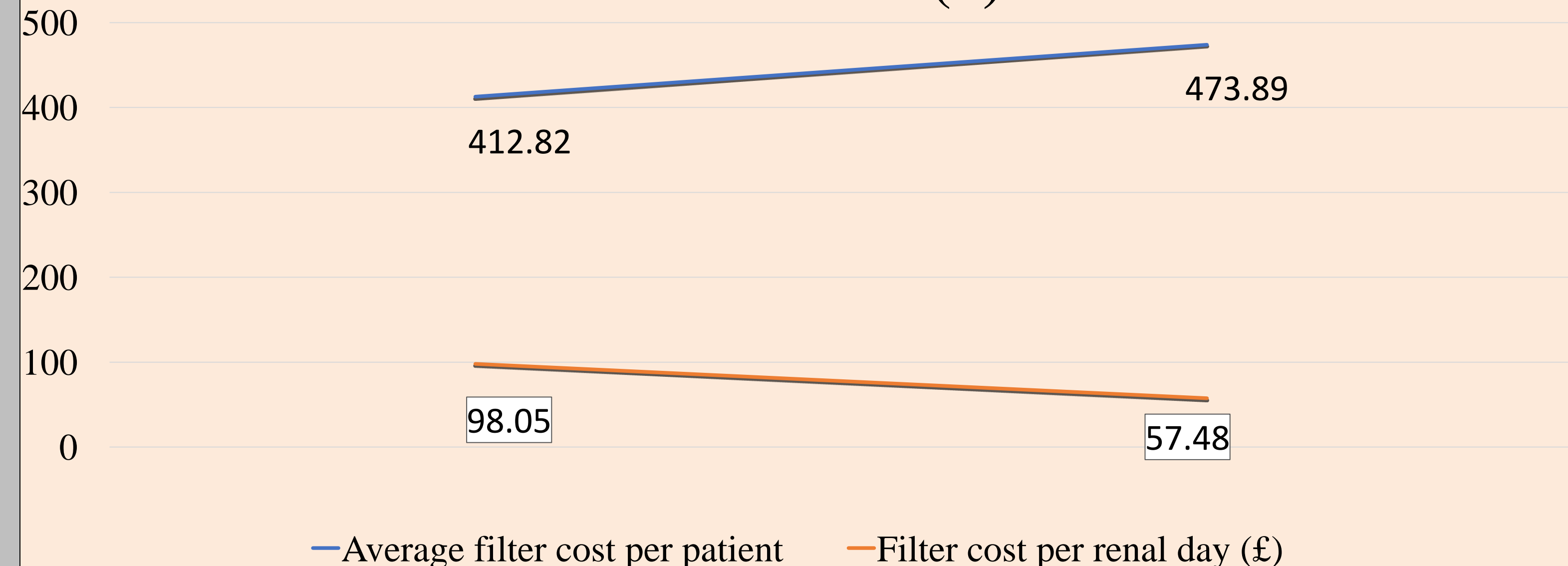
## Blood Transfusion



## Filter Washback



## Filter Costs (£)



## Conclusion

- Citrate anticoagulation increases filter life when compared with systemic heparinization, with a cost saving of approximately £35,000 per year, in addition to previously reported patient benefits.
- There is a non-significant trend towards a reduction in blood transfusion requirements, representing an annual cost saving of £6,400.
- The time on dialysis was significantly higher on citrate filter, the cause of which was not the objective of this project but will be looked at upcoming projects.

**Acknowledgements:** Afelemo Orilade, Ahmad Daebis, Sophie Randal