Epidemiology of patients receiving Continuous Renal Replacement Therapy in the Intensive Care Unit: a comparison between 2018-2019 and 2019-2020

RESEARCH WEEK
5-9 OCTOBER 2020
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Introduction

Continuous Renal Replacement Therapy (CRRT), is often used to manage critically ill patients in the Intensive Care Unit (ICU) environment that are affected by a form of critical illness. Patients who require CRRT generally have a higher mortality rate when compared with the general ICU population. The treatment of these patients have been monitored over the last three years, however the patient epidemiology has not been investigated. With the introduction of a new method of anticoagulation, the epidemiology was investigated in order to assess the effectiveness of the intervention.

Aims

- To investigate the epidemiology of the patients who receive CRRT within the ICU at the Northern Hospital.
- To understand the patient demographics of those admitted to the ICU and receiving CRRT
- To determine if further investigation into the uses of CRRT are required

Methods

Study Design

- A single centre retrospective data analysis of patients admitted to the Northern Hospital's ICU admitted from July 2018-June 2019 and August 2019-July 2020. Data was sourced from the ANZICS APACHE database,

Study Population

- 150 patients who were admitted between August 2019 and July 2020, and between July 2018 and June 2019 who received treatment with CRRT.

Statistical Analysis

- Simple descriptive statistics of mean were used to draw comparisons between data groups.

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Results

2019-2020 saw a decrease in ICU admissions, an increase in overall mortality rate of 1.09% and a decrease in the CRRT death rate of 12.01% as shown in Table 1.

The number of patients treated with CRRT altered by 4, 0.8% of a difference between the two time periods (Table 1).

Across both time periods, males received CRRT significantly more than women at 59.74% in 2018-2019, and 64.28% in 2019-2020 (Table 2).

The treatment age range differed slightly from 29-88 years in 2018-2019 to 22-88 years in 2019-2020 (Table 3). Mean age of patients saw a slight decrease from 63.81 years to 60.3 years in 2019-2020 (Table 3).

	2018-2019	2019-2020
Total admitted ICU patients	1567	1278
Patients CRRT	77 (4.91%)	73 (5.71%)
ICU deaths	141 (9.0%)	129 (10.09%)
CRRT deaths	43 (55.84%)	32 (43.83%)

Table 1. ICU patient numbers, patients who received CRRT, overall patient death numbers for ICU and patient death numbers for those who received CRRT.

ICU length of stay (LOS) range more than doubled to reach a maximum LOS of 76.8 days (Table 4). ICU LOS mean increased by 1.62 days in 2019-2020 (Table 4). LOS within the hospital service increase to 137 days from 102, but despite this, the mean only increased from 15.5 in 2018-2019 to 19.01 days in 2019-2020 (Table 4).

	2018-2019	2019-2020
Male	46 (59.74%)	45 (64.28%)
Female	31 (40.26%)	25 (35.71%)

Table 2. Male/Female CRRT treatment numbers

Age (years)	2018-2019	2019-2020
Range	29-88	22-88
Mean	63.81	60.3

Table 3. Age range and mean of patients who received CRRT treatment

Length of Stay (days)	2018-2019	2019-2020
ICU Range	0.1 - 32.74	0.24-76.8
ICU Mean	6.05	7.67
Hospital Range	1-102	1-137
Hospital Mean	15.5	19.01

Table 4. ICU length of stay compared to hospital length of stay

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Results Continued.

In 2018-2019, 38.96% of patients (n=30), had sepses as their discharge summary diagnosis, in 2019-2020 this decreased to 26.03% (n=19) (Table 5).

2019-2020 saw an increase in the number of cardiac arrest patients treated with CRRT, from 8 to 13 (Table 5). Within the timeframe 2019-2020, 2 patients with COVID-19 required treatment with CRRT (Table 5).

More patients, an increase of 4, who were diagnosed with a respiratory condition, required treatment with CRRT in 2019-2020.

	2018-2019	2019-2020
Sepsis	30	19
Cardiac Arrest	8	13
Multi-organ Failure	8	9
Liver Failure	5	4
Bowel	7	4
Neurological Condition	1	2
Renal Failure	8	9
Pancreatitis	2	4
Respiratory	3	7
COVID-19	N/A	2
Other	3	1

Table 5. Outline of patients discharge diagnosis within hospital discharge summary.

Please note- Bowel includes: Ischaemic collitis, ischaemic gut, post-operative management, perforated duodenum, AAA, perforated stomach, gastroenteritis.
Renal Failure includes : Acute/Chronic
Neurological includes : FIRES, PRESS

Conclusion

CRRT is a valuable resource that ICUs can provide to critically ill patients. Interesting trends were noted within the data, relating in particular to the differences in mortality rate between the investigated time periods. This comparison shows that patients who receive CRRT are at a continuously higher risk of mortality than patients admitted to the ICU who do not receive this therapy. CRRT and the introduction of the new anticoagulation method can not be the only reason for the decrease in mortality, therefore, it may be worthwhile investigating this further and continuing to monitor.

It may be worthwhile investigating the ratio of male to female admissions to ICU. This may assist in determining if males are admitted at a higher rate in line with those who receive CRRT, and worthwhile investigating if other organisations have found the same.

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