

# Functional Outcomes of COVID19 Patients Receiving Extra-corporeal Membrane Oxygenation- A Single Centre Study

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## Background

As of March 2020, COVID19 pneumonia was declared a global pandemic by the World Health Organisation (WHO)(1). COVID19 pneumonia typically presents with systematic and/or respiratory manifestations, with a large percentage requiring advanced respiratory support (2). In severe cases COVID19 pneumonia can induce acute respiratory distress syndrome leading to refractory hypoxaemia and the use of extra-corporeal life support (ECLS) may be appropriate as a rescue therapy (3). The functional outcomes of patients receiving extra-corporeal membrane oxygenation (ECMO) for COVID are unknown and this observational study will present data from the first and second wave of the pandemic.

## Objectives

To describe the demographics, functional outcomes and discharge needs of patients receiving ECMO for COVID19.

## Methods and Materials

Adults admitted to ICU for ECMO with a confirmed diagnosis of COVID19 were included. Functional outcomes were measured using the Chelsea Physical Assessment Scale (CPAx) (Figure 1) (4) and ICU mobility score (5). Measurements were taken once patients were deemed appropriate for rehabilitation up to discharge from the hospital.

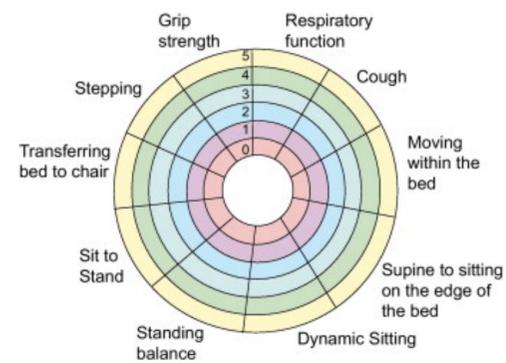
**Table 1.** Demographics

	Discharged from ICU (n= 21)	Died in ICU (n= 13)
Age, years	46.22 (±9.90)	50.2 (± 11.5)
Gender % Male	15 (68)	8 (66)
Ethnicity		
- White	5 (22.7)	1 (8.3)
- Asian	9 (40.9)	5 (41.6)
- Black	5 (22.7)	3 (25)
- Mixed/Other	3 (13.6)	3 (25)
Clinical Frailty Score	1.6	2.2
APACHE II Score	15.21 (±5.99)	18 (±5.72)
Co-morbidities		
- Obesity BMI >30	14 (63.6)	6 (50)
- Hypertension	5 (22.7)	3 (25)
- Diabetes Mellitus	7 (31.8)	3 (25)
- Respiratory Conditions	3 (13.6)	1 (8.3)

**Table 2.** ECMO and ICU Therapies + Outcomes of Survivors

ICU Therapy + Outcomes	Discharged from ICU (n= 21)
ECMO	
- VV	18 (85.7)
- VA	2 (9.5)
- VAV	1 (4.7)
Duration of ECMO	25.1 (±19.6)
Duration of Mechanical Ventilation	45.67 (±36.96)
Renal Replacement Therapy	5 (23.8)
Tracheostomy	14 (66.6)
Steroids	12 (57.1)
Neuromuscular Blockade	21 (100)
Prevalence of ICUAW*	21 (100)
Mobilised in ICU	21 (100)
Time to mobilise (days) post decannulation	10.86 (±6.61)
CPAx on Step down from ICU	30.10 (±8.94)
ICU Mobility Score on Step down from ICU	6.14 (±2.33)

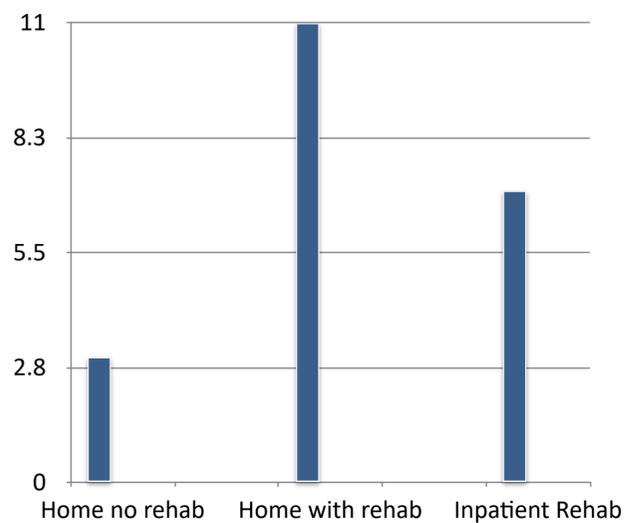
\***ICUAW-** Intensive care unit acquired weakness documented as an MRC sum score <48



**Fig 1.** Chelsea Physical Assessment Scale

## Results

A total number of n34 patients were included in the review, n21 survived to hospital discharge and were included in the analysis, 68% of patients were male with an average age of 46 (±9.9). The predominant method of ECMO was veno-venous (85.7%). Mean duration of ECMO was 25.1 days (±19.6). The average time to mobilise post decannulation from ECMO was 10.86 days (±6.61), with an average CPax score of 30.10 (±8.94) and ICU mobility score of 6.14 (±2.33) on ICU discharge. Functional milestones included on average achieving independent sitting balance at ~4 weeks and mobilising +/- an aid at ~6 weeks. There were no significant differences between patients who were mobilised within 7 days of decannulation of ECMO (P= 0.9). Patients who did not require a tracheostomy had reduced ICU length of stay (P= 0.006). There was nil significant difference between patients who received steroids and ICU length of stay (P = 0.143) CPax (P= 0.357) or ICU mobility scores (P= 0.414) on discharge from ICU. On discharge from hospital 86% of patients required ongoing support which included discharge home with community therapy, in-hospital transfer and referral to a rehabilitation centre.



**Chart 1.** Needs on Discharge

## Conclusions

This data is the first of its kind to present the demographics, ICU therapy and functional outcomes of patients receiving ECMO during the COVID19 pandemic. Patients receiving ECMO for COVID19 present with high acuity of illness with prolonged mechanical ventilation and ongoing rehabilitation needs at discharge from hospital. Despite a surge in ECMO bed occupancy and redeployment of staff, the therapy team were able to provide high level rehabilitation to patients and a follow up clinic was established to support ongoing needs post hospital care.

Further work comparing COVID ECMO data to non COVID ECMO data would provide insight into the similarities and differences in functional outcomes and needs on discharge. This data could provide information for future surge planning, including pathway development and to ensure staffing levels and skill mix are able to meet the requirements to ensure rehabilitation remains a priority.

## References

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