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Physiotherapy on ECMO: Mobility and beyond

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Intensive care unit-acquired weakness is a common sequela of critical illness and is associated with deficits in physical strength, functional performance, and associated health-related quality of life.¹⁻³ Early rehabilitation in the intensive care unit (ICU) is recognised as safe and feasible.^{4,5} Maintaining and restoring musculoskeletal strength and function is recognised as an essential element of therapy in critical care.³

Active rehabilitation of patients with femoral access veno-venous extracorporeal membrane oxygenation (VV ECMO) has been deemed a high-risk procedure and to the authors' knowledge is not a routine practice. There is limited published literature describing the rehabilitation of those requiring VV ECMO in critical care.⁶⁻⁸ The aim of this study was to explore the active rehabilitation of those requiring VV ECMO.

A retrospective review of the medical records of patients admitted to the Intensive Care Unit at Saint Thomas' Hospital requiring VV ECMO was undertaken. Owing to the nature of this observational retrospective study, it was exempt from ethical approval. Data were collected for the period from 1 September 2012 to 31 January 2015. Details of rehabilitation sessions were recorded daily on the electronic patient record by physiotherapists. Data on the frequency and type of active rehabilitation, time on VV ECMO, and patient characteristics, including diagnosis, were collected. Active rehabilitation was defined as any of the following interventions: active range of movement, bed mobility, sitting on the edge of the bed, step transfers, mobilisation, and leg cycle ergometer use.

During the study period, 56 patients (30 male) who required VV ECMO were identified. Of them, 55 were cannulated bi-femorally and 1 required femoral and jugular cannulation. The mean (SD) patient age was 44.2 (14.3) years and the diagnoses requiring VV ECMO were: bacterial pneumonia ($n = 19$), viral

pneumonia ($n = 20$), interstitial lung disease ($n = 5$), aspiration ($n = 2$), asthma ($n = 4$), tuberculosis ($n = 2$), cancer ($n = 1$), and non-pulmonary ARDS ($n = 3$). The mean (SD) duration of VV ECMO was 32 (37.6) days.

Twenty-six patients (46%) participated in active rehabilitation. A total of 808 active rehabilitation sessions were carried out. The active rehabilitation interventions provided were: sitting on the edge of the bed ($n = 683$); step transfer to chair ($n = 112$); and cycle ergometer use ($n = 13$). Rehabilitation sessions generally involved two physiotherapists, one bedside nurse, and one ECMO clinical nurse specialist. Thirty patients (54%) did not participate in active rehabilitation. The reasons recorded for this were either a deterioration in the patient's condition or the indication that the patient did not meet the criteria for active rehabilitation, e.g. Richmond Agitation and Sedation Score < -2 or $> +2$; neurologically inappropriate; or unable to follow commands. No rehabilitation sessions had to be terminated due to adverse events.

This small retrospective cohort study showed that active rehabilitation is feasible in patients receiving VV ECMO, the majority (98%) of whom were cannulated bi-femorally. However, not all patients are suitable for active rehabilitation. Previous local evaluation data have shown that care for those requiring VV ECMO is resource intensive, requiring increased numbers of staff and time compared with those requiring conventional mechanical ventilation. Sufficient resource is essential to ensure a safe, structured, and co-ordinated approach, which enables active rehabilitation for those requiring VV ECMO. Further research is required, investigating the physiological response to exercise in this patient cohort, to inform future practice.

Keywords: active rehabilitation, physiotherapy, ECMO

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REFERENCES

- Gosselink R, Bott J, Johnson M, Dean E, Nava S, Norrenberg M, Schönhofer B, Stiller K, Van de Leur H, Vincent JL. Physiotherapy for adult patients with critical illness: Recommendations of the European Respiratory Society and European Society of Intensive Care Medicine Task Force on physiotherapy for critically ill patients. *Intensive Care Med.* 2008;34(7):1188–1199.
- Kress JP, Hall JB. ICU-acquired weakness and recovery from critical illness. *N Engl J Med.* 2014;370(17):1626–1635.
- Nordon-Craft A, Moss M, Quan D, Schenkman M. Intensive care unit-acquired weakness: Implications for physical therapist management. *Phys Ther.* 2012;92(12):1494–1506.
- Li Z, Peng X, Zhu B, Zhang Y, Xi X. Active mobilization for mechanically ventilated patients: A systematic review. *Arch Phys Med Rehabil.* 2013;94(3):551–561.
- Parker A, Needham D. The importance of early rehabilitation and mobility in the ICU. *Soc Crit Care Med.* 2013; Available from: <http://www.sccm.org/Communications/Critical-Connections/Archives/Pages/Importance-Early-Rehabilitation-Mobility-ICU.aspx> [Accessed on 20 January 2016].
- Abrams D, Javidfar J, Farrand E, Mongero LB, Agerstrand CL, Ryan P, Zimmel D, Galuskin K, Morrone TM, Boerem P, Bacchetta M. Early mobilization of patients receiving extracorporeal membrane oxygenation: A retrospective cohort study. *Critic Car.* 2014;18(1):1.
- Rahimi RA, Skrzat J, Reddy DR, Zanni JM, Fan E, Stephens RS, Needham DM. Physical rehabilitation of patients in the intensive care unit requiring extracorporeal membrane oxygenation: A small case series. *Phys Ther.* 2013;93(2):248–255.
- Polastri M, Loforte A, Dell'Amore A, Nava S. Physiotherapy for patients on awake extracorporeal membrane oxygenation: A systematic review. *Physiother Res Int.* 2016;21(4):203–209.