Early Mobilization in the Intensive Care Unit to Improve Long-Term Recovery

Michelle Paton, MPhty(Cardio), MPhty, BExSci[a,b],
Rebecca Lane, PhD, GCHPE[c],
Carol L. Hodgson, PhD, BAppSc(PT), MPhil, PGDip(Cardio)[d,*]

KEYWORDS

• Mobilization • Rehabilitation • Recovery • Intensive care • ICU • Dosage

KEY POINTS

- Early mobilization has been established as safe and feasible to deliver in the intensive care unit (ICU) (based on Phase I and II trials only), but the effect on mortality and long-term functional recovery is unclear.
- Heterogeneity of patients admitted to the ICU, and differences in baseline function, may affect the response to early mobilization.
- Early mobilization may provide better outcomes for patients if started within 72 hours of admission to intensive care.
- Evidence has shown that implementing early mobilization strategies is more effective when using a protocol led by mobility champions and teams.
- Using current evidence for early mobilization prescription is problematic especially as optimal type, frequency, intensity, and duration for this heterogeneous patient group remains unclear.

INTRODUCTION

There are very few interventions in the intensive care unit (ICU) that demonstrate improved outcomes in survivors of critical illness. Over the past decade, one intervention that has been tested in small studies and is rapidly gaining momentum is early mobilization (EM). The rationale behind the use of EM in ICU is plausible. Critical illness

can lead to the development of muscle weakness and wasting, resulting in increases in mortality and morbidity.[1,2] Despite hospital mortality decreasing over the past decade, ICU survivors have been shown to suffer from postintensive care syndrome namely physical, psychological, and cognitive impairments leading to functional decline.[3,4] This has been shown to have long-term effects on patients' quality of life (QoL) and their recovery from the critical illness.[5]

Observational studies and small randomized controlled trials (RCTs) have shown that EM (commencing within 72 hours of ICU admission) is an important and feasible strategy to prevent ICU-acquired weakness, with improvements in functional outcomes at hospital discharge, more ventilator free days, and decreases in delirium duration.[6–9] Despite this, recent systematic reviews have demonstrated minimal effect on functional recovery or QoL.[10,11] One reason for this may be difficulty prescribing appropriate mobilization programs in the ICU population due to the heterogeneity of the cohort.[12] It is still unsure if there are distinct patient groups that would benefit from more intensive mobilization programs, or if there are some conditions where EM should be minimized during this critical phase.[13] It is known that a patient's baseline function has an effect on long-term outcomes, but the best way to assess and address this in a targeted program of EM in the ICU is still being investigated.[14,15]

Currently, EM has incorporated a large variety of interventions, including passive movements, electrical muscle stimulation, cycle ergometers, tilt tables, and functional mobilization, with minimal investigation into the effect of exercise dosage. This makes exercise prescription for this high-risk patient group problematic, with difficulty synthesizing results from studies that provide different types of exercises.

Despite several phase II trials demonstrating improved function at hospital discharge with EM, particularly with the delivery of functional exercises such as sitting, standing, and walking, there have been several barriers identified that may prevent this intervention in ICU.[16] Patient barriers such as sedation levels and physiologic stability have been reported as the largest obstacle to applying EM; however, structural barriers (staff expertise and numbers), process barriers (lack of coordinated patient review to identify those suitable for EM), and cultural barriers (staff perceptions) also play a large role.[17] The development of structured mobilization protocols and nomination of mobility champions or teams has been shown to facilitate the implementation of EM, but the long-term outcomes of this intervention is still yet to be completely evaluated.[18]

SUMMARY
Should We Provide Early Mobilization in Intensive Care Unit?

As mortality from critical illness has declined, an increase in morbidity and long-term sequelae for survivors has become more prevalent. Critical illness polyneuropathy (CIP), characterized as primary axonal degeneration without demyelination, was initially defined in the 1980s.[19] For decades it was described as the main reason behind the inability of patients to wean from mechanical ventilation.[19] It is now known that a combination of muscle and nerve pathophysiological processes caused by the unique fusion of bed rest, catabolism, and drug reactions seen during critical illness leads to an accelerated neurocognitive and functional decline after ICU.[20–22] "ICU-acquired weakness" is the term now used to describe this "diffuse, systematic, generalized muscle weakness that develops after the onset of critical illness"[4] and incorporates CIP, critical illness myopathy, and critical illness neuromyopathy.[23]