

## ICU Volume 9 - Issue 4 - Winter 2009/2010 - Series

### Early Mobilisation of Critically Ill Patients:

In our previous article, we discussed the rationale for early mobilisation and described general screening guidelines and safety issues when considering this therapy (Korupolu et al. 2009). In this second of three articles, we focus on the feasibility and benefits of early mobility, describing how ICUs use available personnel and equipment to facilitate early rehabilitation.

#### Is Early Mobilisation Feasible in ICU Patients?

Feasibility of early mobilisation is dependent on a supportive culture and interdisciplinary collaboration in the ICU. It may be possible to incorporate early mobility into routine clinical care without increasing staffing (Bailey et al. 2007), while using routine physical therapy and ICU equipment. However, successful delivery of early mobility requires team effort, which frequently includes a physical therapist, nurse, respiratory therapist and technician or assistant to safely manage the patient and ICU equipment (Hopkins and Spuhler, 2009).

Benchmarks of successful early mobilisation include receipt of rehabilitation therapy in the ICU initiated immediately after physiological stability and objective measures of the patient's physical activity. For example, 73% (106/145) of all patients assigned to a dedicated mobility team (using a mobility protocol), received physical therapy in the ICU compared to only 6% (8/135) of patients receiving "usual" care ( $p < 0.001$ ) (Morris et al. 2008). In another study of 104 acute respiratory failure patients requiring mechanical ventilation for  $>4$  days, the odds of ambulation in the ICU increased 2.5 times (95% confidence interval (CI) 1.9-3.4) following transfer from a traditional ICU to a respiratory ICU with an emphasis on early mobilisation (Thomsen et al. 2008).

During mobilisation activities, patients may receive mechanical ventilation, vasopressors and other ICU therapies. For example, in a cohort of 103 patients receiving early mobility, 41% (593/1,449) of activity events occurred in patients with endotracheal tubes, with ambulation occurring in 42% of these events (Bailey et al. 2007). Moreover, 9% of the 103 patients received catecholamine infusions during their ICU activities.

The feasibility of early ambulation is illustrated (Figure 1) by a 75-year old patient admitted for pneumonia and septic shock who is ambulating during her stay in the Johns Hopkins Medical ICU (Needham, 2008). This patient is mechanically ventilated using assist control mode via an oral endotracheal tube and has a left radial arterial line, peripheral intravenous access, a right internal jugular central line, and a urinary catheter. During three physical activity sessions occurring on day 14 of her MICU stay, she walked a total distance of 150 feet, and sat up in a chair for 90 minutes posttherapy. Key success factors for this patient's early ambulation include coordination and communication among the ambulation team (physical therapy, respiratory therapy and ICU technician) and the patient's ICU nurse and physicians. The team used standard physiotherapy equipment (e.g. two-wheeled walker) available in any hospital in addition to a portable mechanical ventilator and a mobility device for the ICU equipment (Needham, 2009).

#### What are the Benefits of Early Mobilisation?

Studies conducted in patients with chronic disease (e.g. chronic obstructive pulmonary disease) and long-term mechanical ventilation demonstrate the benefits of rehabilitation therapy. In these patients, rehabilitation therapy is associated with improved strength, physical function, weaning from mechanical ventilation and ICU length of stay, with some evidence of a dose-response effect (i.e. more therapy results in greater benefit) (Nava, 1998).

Reports from single-centre uncontrolled studies of early mobilisation suggest potential improvements in both patient health and hospital resource utilisation. Patient benefits over a six-year review of an early mobilisation programme in a respiratory ICU included a 24% absolute reduction in tracheotomy rate (29% to 5%) and a 9% reduction in mechanical ventilation weaning failure (12% to 3%) (Hopkins et al. 2007). Furthermore, ICU length-of-stay decreased by three days (13 to 10 days) during this period. Successes from this hospital's early mobilisation programme, which provides twice-daily treatment, seven-days per week, are encouraging. For example, in 103 patients ventilated for  $>4$  days, 69% ambulated  $>100$  feet by ICU discharge (Bailey et al. 2007). In a subsequent cohort of 104 ventilated patients, 88% ambulated a median distance of 200 feet (interquartile range 0-800) by ICU discharge with this ICU's early mobilisation programme (Thomsen et al. 2008).

A second hospital centre noted improvements in physical activity and resource utilisation in patients with acute respiratory failure admitted to a medical ICU (Morris et al. 2008). A controlled trial of 330 patients compared patients assigned to an early mobility team and protocol within 48 hours of ICU admission versus usual care. Patients in the early mobility group got out of bed 8.3 days earlier than those in usual care (5.0 vs. 11.3 days,  $p < 0.001$ ), had a 1.4 day decrease in risk-adjusted ICU length of stay (5.5 vs. 6.9 days,  $p = 0.025$ ), and a 2.3 day decrease in risk-adjusted hospital length of stay (11.2 vs. 14.5 days,  $p = 0.006$ ).

More recently, the first randomised controlled trial of early mobilisation was published (Schweickert et al. 2009). This study occurred in medical ICUs at two hospitals and included 104 mechanically ventilated patients. Researchers randomised patients to early mobility during daily interruption of sedation versus daily sedation interruption with "usual care" for rehabilitation therapy. Early mobilisation resulted in more patients returning to independent physical functioning at hospital discharge (59% vs. 35%,  $p = 0.02$ ), a shorter duration of ICU-associated delirium (2 vs. 4 days,  $p = 0.02$ ), and a shorter duration of mechanical ventilation (3.4 vs. 6.1 days,  $p = 0.02$ ).

#### Conclusion

Recent data support the feasibility and short-term benefits of early mobilisation in mechanically ventilated ICU patients. Successful implementation of an early mobility programme requires a supportive culture and interdisciplinary teamwork. Future studies of early mobility in the ICU aim to evaluate the longer-term benefits to patients and provide formal economic analyses of the benefit to the healthcare system.

Published on : Wed, 15 Feb 2012

© For personal and private use only. Reproduction must be permitted by the copyright holder. Email to [copyright@mindbyte.eu](mailto:copyright@mindbyte.eu).

