Early mobilization in surgical ICU: Not a chimera anymore?

Schaller SJ, Anstey M, Blobner M, Edrich T, Grabitz SD, Gradwohl-Matis I, Heim M, Houle T, Kurth T, Latronico N, Lee J, Meyer MJ, Peponis T, Talmor D, Velmahos GC, Waak K, Walz JM, Zafonte R, Eikermann M; International Early SOMS-guided Mobilization Research Initiative. (Klinik für Anaesthesiologie, Klinikum rechts der Isar der Technischen Universität München, Munich, Germany; Department of Intensive Care, Sir Charles Gairdner Hospital, Nedlands, Western Australia, Australia; Department of Anesthesiology and Critical Care, Klinikum Landkreis Erding, Erding, Germany; Universitätsklinik für Anästhesiologie, perioperative Medizin und allgemeine Intensivmedizin, Universitätsklinikum Salzburg, Paracelsus Medical University, Salzburg, Austria; Department of Anesthesia, Critical Care and Pain Medicine and Department of Trauma, Emergency Surgery, and Surgical Critical Care, Massachusetts General Hospital and Harvard Medical School, Boston, Massachusetts, USA; Institute of Public Health, Charité, Universitätsmedizin Berlin, Berlin, Germany; Department of Anesthesia, Critical Care and Emergency, Spedali Civili University Hospital, University of Brescia, Brescia, Italy; Department of Emergency Medicine and Department of Physical Therapy, Massachusetts General Hospital, Boston, Massachusetts, USA; Department of Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Massachusetts, USA; Department of Anesthesiology and Perioperative Medicine, University of Massachusetts Medical Center, Worcester, Massachusetts, USA; Department of Physical Medicine and Rehabilitation, Spaulding Rehabilitation Hospital, Massachusetts General Hospital, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts, USA; and Universität Duisburg-Essen, Klinik für Anaesthesiologie und Intensivmedizin, Essen, Germany.) Early, goal-directed mobilisation in the surgical intensive care unit: A randomised controlled trial. *Lancet* 2016;**388:**1377–88.

SUMMARY

Although the importance of early mobilization in critically ill patients in accelerating the recovery process is known, the mobilization protocols especially for patients in surgical intensive care units (ICUs) are often tardy due to perceived barriers among caregivers and a scarcity of evidence.[1,2] In this international, multicentre, assessor-blinded randomized trial, Schaller *et al*. analysed the efficacy of an early, goal-directed mobilization protocol in surgical ICU patients convalescing from major surgery or trauma.

All patients >18 years of age admitted in the surgical ICU, on ventilator support for <48 hours and were likely to require ventilator support for at least 24 hours, who fulfilled the baseline criteria for functional independence at baseline, were included in the study and were randomized equally into a standard treatment group and an early goal-directed mobilization group. Clinical care was similar in both the groups except for the mobilization protocols. The patients in the control group were mobilized according to the individual centre's standard protocols. In the intervention group, the patients received goal-directed mobilization using the algorithm of the Surgical Optimal Mobilization Score (SOMS) devised by the authors in their previous study. The goal-directed mobilization was classified using the SOMS from level 0 (no activity) to level 4 (ambulation). The mobilization goal of the patient for each day was defined during the morning rounds using the SOMS safety criteria, following which a facilitator coordinated with the care team to achieve the goal for the day by identifying and addressing the barriers. The score attained on each day was recorded during the evening rounds. The primary outcome was the mean SOMS during the ICU stay. The length of ICU stay and the functional mobility at the time of hospital discharge in terms of mini-modified functional independence measure (mmFIM) score were the key secondary outcomes. Both intention-to-treat (ITT) and per protocol (PP) analyses were done for the primary and key secondary outcomes.

Of the 200 patients studied over 4 years, 96 were in the control group and 104 in the intervention group. Both groups were comparable in terms of baseline characteristics. The patients in the intervention group had a significantly higher mean SOMS compared with that of the control group (2.2 *v*.1.5; p<0.0001). With the use of goal-directed mobilization protocol, the patients had a significantly shorter ICU stay (difference of 3 days, p=0.0054) and higher levels of functional independence at hospital discharge in terms of the mmFIM score (8 *v*. 5; p=0.0002). Patients in the intervention group achieved higher levels of SOMS earlier than those in the control group during the surgical ICU stay. Over half (52%) the patients in the intervention group had attained the SOMS of 4 at the time of discharge from the surgical ICU as compared to 25% in the control group. Patients in the intervention group did better in terms of other tertiary outcomes such as the mmFIM score at ICU discharge (p=0.009) and length of hospitalization (difference of 6.5 days; p=0.11; CI 1.5 to 11). However, the in-hospital mortality rate was higher in the intervention group, but not statistically significant (OR 2.1, CI 0.9–5.2, p=0.09). Although the adverse events reported were higher in the intervention group (2.8% *v*. 0.8%), there were no reports of any serious adverse events. There was, however, a loss to follow-up of about 50% in each arm at 3 months. The authors concluded that a rigorous implementation of an early, goal-directed mobilization protocol led to improved mobility levels during the surgical ICU stay, reduced the length of surgical ICU stay and improved the patients' functional independence at discharge from the hospital.

COMMENT

Although many studies have reported the feasibility and safety of early mobilization in ICU, these studies were limited by their design, had limitations in the algorithm used and heterogeneity in the mobilization protocols.[1] Schaller *et al*. emphasize in this study the role of early mobilization in improving patient outcomes.

Previous studies on mobilization in critically ill patients observed that a majority of the time by the physical therapist/ caregiver was devoted to coordinating the process rather than actual administration of an intervention.[3,4] This study used a standardized algorithm, which was valid, simple and comprehensive to all levels of training in clinical care, for increasing physical activity. The role of a devoted facilitator is commendable in effectively implementing the intervention protocol and in overcoming the perceived barriers. Favourable outcomes of using effective inter-professional closed loop communication emphasize that it is often the lack of coordination among caregivers than inadequate staffing which interferes with the implementation of such protocols. This model can be used not only in ICU settings, but also in other hospitalized patients.

Although the patients recovering from various major surgeries or trauma were randomized equally into the two groups, the results should be generalized with caution owing to the heterogeneity of the study groups. An assessor-blinded multicentric trial design is laudable; however, a further stratification of

institutions could have overcome the variation in mobilization protocols in the control group. Moreover, the results of two previous randomized trials on patients of respiratory failure and stroke contradict the results of this study.[5,6] This contradiction could be attributed to the lack of a coordinated approach in the previous studies as well as to a mixed cohort of patients. Wider exclusion criteria further reduce the generalizability of results to all surgical ICU patients. Though the results of in-hospital outcomes are reassuring, a loss to follow-up of about 50% of patients in each arm is appalling; hence the long-term outcomes should be judged with caution. However, this has not affected the results, as majority of the key outcomes were in-hospital.

This study is a cornerstone for further research in identifying optimal early mobilization techniques for clinical use in critically ill patients. Large trials with long-term follow-up are needed to assess the durability of benefits of early mobilization protocols.[1] These goal-directed early mobilization protocols can be used along with enhanced recovery after surgery (ERAS) pathways in emergency settings.[7,8] Early mobilization helps in breaking the vicious cycle of complications related to prolonged immobilization especially in critically ill patients.

REFERENCES

1 Hodgson CL, Berney S, Harrold M, Saxena M, Bellomo R. Clinical review: Early patient mobilization in the ICU. *Crit Care* 2013;**17:**207.
2 Garzon-Serrano J, Ryan C, Waak K, Hirschberg R, Tully S, Bittner EA, *et al.* Early mobilization in critically ill patients: Patients' mobilization level depends on health care provider's profession. *PM R* 2011;**3:**307–13.
3 Schweickert WD, Pohlman MC, Pohlman AS, Nigos C, Pawlik AJ, Esbrook CL, *et al.* Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial. *Lancet* 2009;**373:**1874–82.
4 Morris PE, Berry MJ, Files DC, Thompson JC, Hauser J, Flores L, *et al.* Standardized rehabilitation and hospital length of stay among patients with acute respiratory failure: A randomized clinical trial. *JAMA* 2016;**315:**2694–702.
5 Moss M, Nordon-Craft A, Malone D, Van Pelt D, Frankel SK, Warner ML, *et al.* A randomized trial of an intensive physical therapy program for patients with acute respiratory failure. *Am J Respir Crit Care Med* 2016;**193:**1101–10.
6 AVERT Trial Collaboration group, Bernhardt J, Langhorne P, Lindley RI, Thrift AG, Ellery F, Collier J, *et al.* Efficacy and safety of very early mobilisation within 24 h of stroke onset (AVERT): A randomised controlled trial. *Lancet* 2015;**386:**46–55.
7 Gonenc M, Dural AC, Celik F, Akarsu C, Kocatas A, Kalayci MA, *et al.* Enhanced postoperative recovery pathways in emergency surgery: A randomized controlled clinical trial. *Am J Surg* 2014;**207:**807–14.
8 Roulin D, Blanc C, Muradbegovic M, Hahnloser D, Demartines N, Hübner M. Enhanced recovery pathway for urgent colectomy. *World J Surg* 2014; **38:**2153–9.

VIKRAM KATE
MOHSINA SUBAIR
Department of Surgery
Jawaharlal Institute of Postgraduate Medical Education and Research
Puducherry
drvikramkate@gmail.com