Interruption of sedation for early rehabilitation improves outcomes in ventilated, critically ill adults

Synopsis


**Question:** Does early provision of rehabilitation improve the likelihood of functional independence at discharge in ventilated, critically ill patients? **Design:** Randomised, controlled trial with concealed allocation and blinded assessment of some outcomes. **Setting:** Two tertiary medical centres in the USA. **Participants:** Adults in a medical intensive care unit (ICU) who had been on mechanical ventilation for less than 72 hours and were expected to continue for at least another 24 hours, and who had been functionally independent two weeks before admission. Exclusion criteria included: rapid onset neuromuscular disease, cardiopulmonary arrest, irreversible disorders with high mortality, and raised intracranial pressure. Randomisation of 104 participants allotted 49 to receive the early intervention and 55 to a control group. **Interventions:** Both groups received sedation guided by the Richmond Agitation Sedation Scale and underwent daily interruption of sedatives or narcotics or both, unless contraindicated. Weaning from mechanical ventilation and insulin for glycaemic control were also protocol-directed. During the daily interruption of sedation, the intervention group commenced rehabilitation as appropriate to their clinical status: passive movements for those who were unresponsive, and active assisted or active movements in supine for those who were responsive. If well tolerated, these exercises were progressed to sitting balance activities, activities of daily living, transfer training, pre-gait exercises, and walking. Extensive physiological stability criteria guided whether the intervention could be initiated or continued. Overall progression of the intervention was continued until the participant regained functional independence or was discharged from hospital. **Outcome measures:** The primary outcome was return to functional independence at discharge considered more likely in the intervention group (59% vs 35%, p = 0.02). The intervention group also had fewer days of delirium in hospital (median 2 vs 4 days, p = 0.02), and shorter duration of mechanical ventilation (median 3.4 vs 6.1 days, p = 0.02). Adverse events were rare and discontinuation of the intervention (most commonly, due to perceived patient-ventilator asynchrony) occurred in only 4% of all intervention sessions. **Conclusion:** Early rehabilitation during daily interruption of sedation was safe and well tolerated. It reduced the duration of delirium and mechanical ventilation, and improved functional status at hospital discharge.

Commentary

Early rehabilitation of mechanically ventilated patients in the ICU has historical precedent and an emerging body of research supporting its safety, feasibility, and short-term benefits (Needham 2008). This paper represents the highest level of evidence supporting early rehabilitation. Rehabilitation therapy was started within the first 72 hours of mechanical ventilation, was delivered daily during periods of sedation interruption, and (unlike in previous studies) was continued on the ward after discharge from the ICU. Sedation interruption has been demonstrated as a beneficial ICU intervention (Kress et al 2000) and has also been paired with a ventilator weaning protocol to improve patient outcomes (Girard et al 2008).

Consistent with prior literature, this study demonstrates the benefits of early rehabilitation on patients’ physical function. Moreover, there may be additional benefits related to reducing short-term cognitive impairment frequently experienced by mechanically ventilated patients (Fan et al 2008) and to decreasing health care resource utilisation (Morris et al 2008).

Additional early rehabilitation trials performing economic analyses and evaluating longer-term patient outcomes, including quality of life, are currently under way (eg. Denehy et al 2008 and grant #IR01NR011186-01 at http://crisp.nih.gov/). These ongoing trials will help build a larger foundation of evidence regarding early rehabilitation.

Given that neuromuscular sequelae of critical illness are common, and can be severe and long-lasting in some patients (Fan et al 2009), ICUs that do not routinely provide early rehabilitation should begin the necessary processes, including interdisciplinary collaboration and ‘culture change’ (Hopkins et al 2007), to introduce this efficacious therapy.

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References