Enferm Intensiva. 2017;28(3):137–139

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Sociedad Española de Enfermería Intensiva y Unidades Coronarias

Enfermería Intensiva

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COMMENTS TO RESEARCH ARTICLES

For patients in intensive care, are rehabilitation and active mobilisation effective in terms of mortality and functional capacity?☆

En enfermos ingresados en cuidados intensivos, ¿es efectiva la rehabilitación y la movilización activa en la mortalidad y capacidad funcional?

Tipping CJ, Harrold M, Holland A, Romero L, Nisbet T, Hodgson CL. The effects of active mobilisation and rehabilitation in ICU on mortality and function: A systematic review. Intensive Care Med. 2017; 43: 171–83.

Abstract

Purpose: Early active mobilisation and rehabilitation in the intensive care unit (ICU) is being used to prevent the long-term functional consequences of critical illness. This review aimed to determine the effect of active mobilisation and rehabilitation in the ICU on mortality, function, mobility, muscle strength, quality of life, days alive and out of hospital to 180 days, ICU and hospital lengths of stay, duration of mechanical ventilation and discharge destination, linking outcomes with the World Health Organization International Classification of Function Framework.

Methods: A PRISMA checklist-guided systematic review and meta-analysis of randomised and controlled clinical trials.

Results: Fourteen studies of varying quality including a total of 1753 patients were reviewed. Active mobilisation and rehabilitation had no impact on short- or long-term mortality ($p > 0.05$). Meta-analysis showed that active mobilisation and rehabilitation led to greater muscle strength (body function) at ICU discharge as measured using the Medical Research Council Sum Score (mean difference 8.62 points, 95% confidence interval (CI) 1.39–15.86), greater probability of walking without assistance (activity limitation) at hospital discharge (odds ratio 2.13, 95% CI 1.19–3.83), and more days alive and out of hospital to day 180 (participation restriction) (mean difference 9.69, 95% CI 1.7–17.66). There were no consistent effects on function, quality of life, ICU or hospital length of stay, duration of mechanical ventilation or discharge destination.

Conclusion: Active mobilisation and rehabilitation in the ICU has no impact on short- and long-term mortality, but may improve mobility status, muscle strength and days alive and out of hospital to 180 days.

Remarks

Patients admitted to intensive care units (ICU) often require multiple treatments that involve immobilisation and bed rest. One of the consequences of bed rest in critical patients is deep muscle weakness that starts in the first 24 h and continues and progresses with the said rest. In fact, patients who are about to be discharged from an ICU have significant muscle weakness and reduced functional capacity which some of them never recover from. The process which leads to this deterioration is not understood very well, although it is connected with the combination of muscular atrophy and the inflammatory process.

Some factors affect recovery of functional capacity after a critical disease. On the one hand there are personal factors such as their basal state, which includes the presence of comorbidities, fragility and functional capacity prior to admission to the ICU; on the other hand there are factors associated with the critical disease, such as type of medication, the presence of sepsis or the duration of mechanical ventilation.

The study by Tipping et al. performed a systematic review and meta-analysis with the aim of determining the impact of active mobilisation and rehabilitation in adult patients admitted to ICU, measured in terms of patient mortality at discharge from the ICU, discharge from hospital and at 3

☆ Please cite this article as: Fernández Bustos P, Muriel García A. En enfermos ingresados en cuidados intensivos, ¿es efectiva la rehabilitación y la movilización activa en la mortalidad y capacidad funcional? Enferm Intensiva. 2017;28:137–139.

2529-9840/

and 6 months; functional capacity, degree of mobility, muscular strength, level of quality of life, days of admission to the ICU and hospital, days of mechanical ventilation and destination on discharge, compared with patients admitted to an ICU who receive standard care. The results were classified according to the International Classification of Functioning, Disability and Health, designed by the World Health Organisation (WHO LCF). The main purpose of this classification is to offer a uniform and standardised vocabulary for the analysis of the components of bodily functions and structures, limitations in activities and restrictions in participation.

They carried out a search in the main databases, contacting authors and following-up references, although they only include studies written in English, which may lead to distortion in the results of the review. They did not search the PEDro database (https://www.pedro.org.au/), the clinical trial search database or ones containing systematic reviews and clinical practice guides specifically for physiotherapy.

Methodological quality was evaluated by 2 independent researchers using the Cochrane risk of bias tool. This tool makes it possible to evaluate 7 domains, classifying risk as high, low or unclear. This review evaluated the bias of 15 randomised and controlled clinical trials, although only 14 studies are included in the analysis. It is possible to observe a mix of randomised studies with other that are compared to historical controls.

The patients selected in 14 studies were adults admitted to an ICU for longer than 24 h. 1753 patients from 9 different countries were included, of whom 880 were included in the intervention group and 873 were in the control group. The patients were highly heterogeneous in terms of whether their diagnosis was medical, surgical or due to trauma, as well as in their clinical situation. This may restrict the validity of the results in the group of particular patients who differed in the form and manner of their recovery. Nevertheless, the patients in both groups (intervention and control) had similar basal data, with the exception of 2 studies in which the intervention was performed in significantly older patients who lacked muscle strength and mobility in bed, although the difference was not significant.

Intervention was defined as active mobilisation and rehabilitation undertaken by any member of the ICU team, including any combination of exercises in bed, progressively increasing mobility (from sitting in a chair to standing for a length of time, with or without the aid of mobilisation tables) and walking.

To standardise the analysis of intervention in this systematic review 2 sub-groups were defined, depending on when mobilisation started and its intensity: (1) early active mobilisation and rehabilitation, defined as starting mobilisation $\geq$3 days after admission, compared with late mobilisation after 3 days of admission; and (2) a high dose of active daily rehabilitation lasting for longer than 30 min, compared with those patients who received less than 30 min per day. The control group received therapy according to normal clinical practice. Analysis was therefore restricted to the time, amount and intensity of therapy received, although both groups (intervention and control) varied in the different studies. The total impact of early mobilisation and rehabilitation on patients admitted to ICU is still unknown.

One of the weaknesses of this study is the small amount and heterogeneity of the information that is available on the duration, intensity, frequency and commencement of the intervention in many of the studies. This is so for the intervention group as well as the control group, so that this limits meta-analysis. Intervention therapy started within a range of from 1 to 8 days after admission to the ICU. Therapy was daily and lasted for an average of from 15 to 31 min. Eleven studies used a protocol as the guide for intervention while 3 other studies developed personalised therapy for each patient. The progress of exercise depended on sedation, strength, fatigue, degree of mobility, function or a combination of these factors. Five studies offer few details about when the intervention took place, and 7 offer little information about the duration of the intervention.

Respecting intervention in the control group, the patients in 6 studies received daily therapy as part of their standard care. This mainly involved passive or active mobilisation, while in 8 studies they received therapy once or 3 times a week, with limited resources.

An outstanding strong point of this study is evaluation per pair of studies using the Cochrane analytical tool, as well as the bias analysis that was undertaken.

This study shows that there is currently limited evidence on the effect of long-term active mobilisation and rehabilitation in ICU patients. However, one finding of its overall analysis is that in clinical practice active mobilisation and rehabilitation in the ICU have no affect on patient mortality. Nevertheless, they seem to have a beneficial effect on functional capacity, given that they increase muscle strength and reduce limitations to activity by increasing the ability to walk at discharge from hospital.

This shows the need to carry out randomised multicentre clinical trials to measure the efficacy of active mobilisation and rehabilitation in patients admitted to the ICU, defining and standardising the dosage, intensity and progression of exercise and evaluation measures while setting clear follow-up times and ensuring an appropriate methodological design that includes a significant sample that makes it possible to determine the long-term effect of active mobilisation and rehabilitation in ICU patients.

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