Early intensive care unit mobility therapy in the treatment of acute respiratory failure


Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study examined the clinical and economic impact of a mobility protocol, based on physical therapy, versus the usual care, for patients with acute respiratory failure in an intensive care unit. The authors concluded that the protocol led to an earlier start of physical therapy and a shorter hospital stay, without compromising the quality of care or increasing the hospital costs. The clinical analysis was satisfactory, but the economic information was limited. The authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the clinical and economic impact of a mobility protocol, based on physical therapy, versus the usual care in the intensive care unit (ICU), for patients with acute respiratory failure, who required mechanical ventilation on admission.

Interventions
The mobility protocol was provided by an ICU Mobility Team that included a critical care nurse, a nursing assistant, and a physical therapist. It consisted of the standard, frequent (once per day) administration of physical therapy, which was initiated within 48 hours of the start of mechanical ventilation. The Mobility Team nurse did not have direct bedside nursing responsibilities. Four levels of activity for physical therapy were used depending on the strength and consciousness of the patients. The usual care consisted of conventional physical therapy delivered by the bedside nurse.

Location/setting
USA/hospital ICU.

Methods
Analytical approach:
The analysis was based on a single study with a short time horizon. The authors did not report the perspective.

Effectiveness data:
The clinical data were from a prospective study, in which the patients were allocated to interventions by block ICU assignment. There were 330 eligible patients, with 165 in each group. The mean age was 55.4 years (±16.8) in the usual care group (53.3% male) and 54.0 years (±16.8) in the intervention group (56.4% male). Each patient was followed-up until their discharge from the ICU to a normal ward. The primary outcome was the proportion of patients receiving ICU physical therapy who survived until hospital discharge. The potential impact of confounders was examined in a multiple linear regression analysis.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The primary endpoint of the clinical analysis was the proportion of patients receiving ICU physical therapy, who survived until hospital discharge. Other relevant endpoints were the number of days until out of bed for the first time, the hospital and ICU lengths of stay, and the number of days on a ventilator.
Cost data:
The economic analysis considered in-patient hospital costs including the Mobility Team salaries. These costs were from the hospital database, for the sample of patients included in the clinical analysis. They were in US dollars ($).

Analysis of uncertainty:
Not considered.

Results
The proportion of patients receiving at least one physical therapy session was 47.4% in the usual care group and 80.0% in the intervention group (p<0.001). Physical therapy was initiated during ICU treatment for 12.5% of patients receiving therapy, in the usual care group versus 91.4% in the intervention group (p<0.001). The number of sessions per patient was 4.1 for usual care versus 5.5 with the intervention (p=0.037).

After adjusting for potential confounders, the usual care patients were out of bed for the first time in 11.3 days while intervention patients were out of bed in 5.0 days (p<0.001). The number of days on a ventilator did not significantly differ between groups, but the adjusted ICU stay was significantly lower in the intervention group (5.5 days) than with usual care (6.9 days; p=0.025) as was the adjusted hospital stay at 11.2 days with the intervention versus 14.5 days with usual care (p=0.006).

The total direct in-patient costs were $7,309,871 ($44,302 per patient) in the usual care group and $6,805,082 ($41,142 per patient) in the intervention group (p=0.262).

Authors’ conclusions
The authors concluded that, compared with usual care, the mobility protocol led to an earlier start of physical therapy and a shorter hospital stay, without compromising the quality of care and without increasing the hospital costs.

CRD commentary
Interventions:
The interventions were appropriately selected as the proposed intervention was compared against the conventional approach in the authors’ institution. A detailed description of the two strategies was provided.

Effectiveness/benefits:
The study design appears to have been appropriate for examining the efficacy of the two interventions. A formal randomisation was not carried out, but patient allocation to study groups was based on the ICU admission unit. The inclusion and exclusion criteria were clearly reported and reasons were given for the ineligibility of patients admitted to the ICU. Power calculations were carried out in the preliminary phase of the study and the groups were comparable at baseline in their key clinical and demographic factors; a regression analysis was also carried out to consider any other confounding factors. The length of follow-up was short, but appropriate for capturing the impact of the interventions on the patients’ health. This was assessed using intermediate outcomes, such as the length of stay and use of physical therapy, but a summary benefit measure would have been more appropriate.

Costs:
The economic analysis focused only on the hospital costs, including the salaries of personnel delivering the physical therapy, and a hospital perspective appears to have been adopted. The data sources, unit costs, price year, and individual cost items were not provided, limiting the transparency of the analysis. Only the total costs were presented and the differences in these costs were estimated using standard statistical techniques.

Analysis and results:
The results were clearly reported, but the economic and clinical outcomes were not synthesised and a cost-consequences analysis was conducted. Conventional sensitivity analyses, to examine the issue of uncertainty, were not performed. The study focused on the experience of a single institution, which might not be representative of other medical centres and caution is required when generalising the results to other settings. The authors acknowledged some limitations of their analysis, such as the fact that the mobility protocol was limited to the ICU setting, and the lack of blinding of the physicians, nurses, and physical therapists to group allocation.
Concluding remarks:
The clinical analysis was satisfactory, but little information was provided on the economic impact of the two strategies. In general, the authors’ conclusions appear to be appropriate.

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