

LETTER



# Improvement in functional abilities at ICU discharge is feasible without prolongation of the length of stay ICU

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Dear Editor,

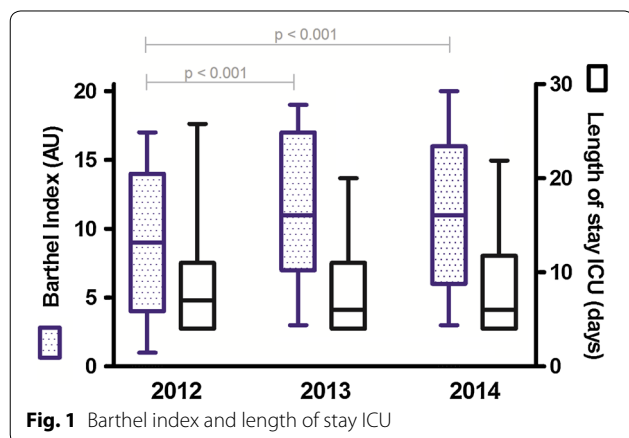
Although survival of patients treated in the intensive care unit (ICU) is increasing, a prolonged ICU stay is still associated with severe physical and mental problems. Disabilities associated with a long ICU stay often result in readmissions, reduction in quality of life and substantial use of healthcare resources [1, 2]. Although specific therapies to prevent this form of unfavourable outcome seem to be lacking, substantial progress is made in the reduction of functional loss, associated with standard ICU treatment. In 2013 we adopted a set of previously described interventions aiming to prevent post-ICU disabilities. This included reduction of sedation, enabling speech during mechanical ventilation, early mobilisation of ventilator-dependent patients and non-drug treatment of delirium [3, 4]. The aim of the present study is to investigate whether the introduction of this set of interventions is associated with an increase in functional abilities after ICU discharge. And, if so, what will be the impact on the length of stay (LOS) in the ICU.

In order to assess the severity of post-ICU disabilities we systematically assessed the Barthel index (BI) in all patients 24–48 h post ICU discharge [5]. This BI is an instrument to semi-quantitatively score patients' abilities on 10 domains of daily life activities, such as feeding, mobility, incontinence, transfer, etc. We performed a single-centre retrospective cohort study, including all

patients admitted to the ICU between 2012 and 2014 and a LOS of greater than 48 h. Patients readmitted to the ICU were excluded, but their data remained part of the analysis with respect to the first ICU admission. Patients' baseline characteristics were recorded and descriptive statistics as well as uni- and multivariate analyses were applied. In this 3-year period we included 825 patients. At baseline, patients were not different in age and gender. Severity of illness expressed as APACHE III score did not differ over time from 69 [54–87] in 2012 to 73 [57–95] in 2014,  $p = 0.13$ . In this period the BI increased from 9 [4–14] in 2012 to 11 [6–16] in 2014,  $p < 0.001$  (Fig. 1). The observed increase in BI between 2012 and 2014 was also significant in all individual domains of the BI. After correction for baseline confounders in a multivariate analysis, the BI in the cohort year 2012 remained significantly lower in comparison to 2013 and 2014. In addition, the duration of mechanical ventilation decreased significantly between 2012 and 2014 from 1.8 [0.5–5.5] to 1.6 [0.1–3.8] days,  $p = 0.005$ . However, the observed improvement in functional ability over time was not associated with a rise in ICU LOS (7 [5–12] versus 6.5 [4–13] respectively,  $p = 0.56$ ).

In conclusion, our data suggest that the introduction of a set of interventions aimed at the reduction in ICU-acquired disabilities is indeed associated with an improvement in independence during daily life activities.

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**Fig. 1** Barthel index and length of stay ICU

Moreover, this improvement of functional abilities does not come at the price of an extended length of stay in the ICU.

#### Compliance with ethical standards

#### Conflicts of interest

The authors declare that they have no conflict of interest.

#### Ethics

As a result of the non-interventional character of the study, the institutional review board (RTPO, Medical Centre Leeuwarden) approved this study, without the need for informed consent (nWMO 2015-143).

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