

Sleep quality in survivors of critical illness: practical shortcomings unresolved

Mohamad F. El-Khatib¹ • Antonio M. Esquinas²

Received: 10 August 2018 / Revised: 31 August 2018 / Accepted: 6 September 2018 / Published online: 15 September 2018
© Springer Nature Switzerland AG 2018

Abbreviations

ARDS	Acute respiratory distress syndrome
ICU	Intensive care unit
SDB	Sleep-disordered breathing

To the Editor,

We read with great interest the manuscript of Alexopoulou et al. [1] in which the authors assessed sleep-disordered breathing (SDB) as well as sleep architecture in survivors of critical illness at 10 days and 6 months after hospital discharge. Also, the authors aimed to examine whether or not sleep abnormalities influenced the patients' quality of life. All of their patients received mechanical ventilation in the ICU, the majority of them (75%) because of acute respiratory distress syndrome (ARDS). Their results showed that in survivors of critical illness without hypercapnia and hypoxemia, sleep quality at 10-day post-hospital discharge was poor and was characterized by severe disruption of sleep architecture and excessive SDB mainly of the obstructive type. At 6-month post-hospital discharge, sleep quality remained relatively poor, however significantly better than at 10-day post-hospitalization. The quality of life was poor at 10 days and remained poorer than normal at 6-month post-hospital discharge. The authors reported no relationship between the change in quality of life and that of sleep disturbances.

However, we believe that the study has several shortcomings that might have affected the final results. First, the authors attributed their main results and findings to the patients stay in

ICU with all its related factors (e.g., ICU environment, noise), interventions (e.g., tracheal intubation), and management (e.g., mechanical ventilation) while in fact the patients were evaluated at 10 days and 6 months from their hospital discharge rather than from their ICU discharge. This would not be a significant factor if the hospital and ICU lengths of stay were the same. Obviously, this cannot be the case as most if not all ICU survivors spend some times in the hospital before their final discharge to home and as reported by Alexopoulou et al. there was a median difference of 11.5 days (range 8.8–28.5 days) between the hospital and ICU lengths of stay. It is fair to assume that these additional days of stay in the hospital post-ICU discharge should ease the effects of the ICU stay on patients and should somehow optimize the patients' general conditions in preparation for their discharge to home. In this regard, the results reported by Alexopoulou et al. could have significantly underestimated the true effect of ICU stay on patients sleep quality and their quality of life in general.

Second, the majority of patients (75%) in the study by Alexopoulou et al. had ARDS either as the admission diagnosis or during their stay in ICU yet the authors did not stratify their patients or indicated the classification of their ARDS (i.e., mild, moderate, or severe ARDS). The severity of ARDS is an important factor that has been shown to influence major outcomes and prognosis of such patients [2]. Generally speaking, patients with severe ARDS are managed differently than patients with either mild or moderate ARDS. In severe ARDS, patients receive aggressive and unconventional form of mechanical ventilation that might necessitate the use of neuromuscular blockade and/or prone positioning [3]. As such, the impact of ICU stay might have been of significantly different magnitudes as per the severity of ARDS and subsequently might have influenced the ultimate outcome of sleep disordered breathing and quality of life. It was not clear whether or not patients with mild to moderate ARDS were responsible for the improvement in SDB and quality of life seen at 6-month post-hospital discharge or if the ARDS severity was not a contributing factor.

✉ Mohamad F. El-Khatib
mk05@aub.edu.lb

¹ Department of Anesthesiology, American University of Beirut–Medical Center, P.O. Box 11-0236, Beirut, Lebanon

² Department of Intensive Care Unit, Hospital Morales Meseguer, Murcia, Spain

Third, the authors did not report on the strategy of mechanical ventilation applied in their patients. Specifically, the authors did not provide information on the use (if any) and duration of neuromuscular blockade in these patients. Prolonged disuse of respiratory muscles due to neuromuscular blockade can result in significant atrophy and can predispose to long-term morbidities [4]. Also, the authors did not provide valuable information on the patient-ventilator interaction during invasive ventilatory support and whether or not significant levels of patient-ventilator asynchronies were observed in their patients. In addition, the authors did not provide information on whether or not any of their patients received any form of noninvasive ventilatory support (e.g., noninvasive bilevel positive airway pressure) in the immediate post-extubation period that might have continued in the post-ICU discharge period.

Finally, it would have been worthwhile to describe the process of intubation in these patients while specifically reflecting on the ease of intubation, number of intubation attempts, range of endotracheal tube cuff pressures, and presence of air leaks prior to removal of endotracheal tubes in their patients. All of this might have affected the development and severity of SDB in their patients and in particular the development of obstructive sleep apnea [5].

Nevertheless and despite all of the above, Alexopoulou et al. [1] should be commended on work that shed insight on the long-term outcomes of critically ill patients after discharge

from the intensive care unit and open the way for further research work.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Alexopoulou C, Bolaki M, Akoumianaki E, Erimaki S, Kondili E, Mitsias P, Georgopoulos D (2018) Sleep quality in survivors of critical illness. *Sleep Breath*. <https://doi.org/10.1007/s11325-018-1701-z>
2. Villar J, Fernández RL, Ambrós A, Parra L, Blanco J, Domínguez-Berrot AM, Gutiérrez JM, Blanch L, Añón JM, Martín C, Prieto F, Collado J, Pérez-Méndez L, Kacmarek RM, Acute Lung Injury Epidemiology and Natural history Network (2015) A clinical classification of the acute respiratory distress syndrome for predicting outcome and guiding medical therapy. *Crit Care Med* 43(2):346–353
3. Fan E, Brodie D, Slutsky AS (2018) Acute respiratory distress syndrome: advances in diagnosis and treatment. *JAMA* 319(7):698–710
4. Levine S, Nguyen T, Taylor N, Friscia ME, Budak MT, Rothenberg P, Zhu J, Sachdeva R, Sonnad S, Kaiser LR, Rubinstein NA, Powers SK, Shrager JB (2008) Rapid disuse atrophy of diaphragm fibers in mechanically ventilated humans. *N Engl J Med* 358(13):1327–1335
5. Shah AC, Barnes C, Spiekerman CF, Bollag LA (2015) Hypoglossal nerve palsy after airway management for general anesthesia: an analysis of 69 patients. *Anesth Analg* 120(1):105–120