

## Unplanned Extubation and Mortality in Surgical Critically Patients: An Accidental Association or Cause?

Antonio M. Esquinas · Yalın Dikmen

Published online: 19 April 2014  
© Société Internationale de Chirurgie 2014

### To the Editor

Unplanned extubation (UE) is commonly associated with poor outcomes in mechanically ventilated, critically ill patients. Preventive strategies are still difficult in the intensive care unit (ICU) [1]. Understanding the causes and consequences of UE are complex and still being debated.

Lee et al. [2] describe the clinical conditions of UE in surgical patients. Their major findings were that UE was associated with higher ICU and hospital mortality, reintubation rates, and acute physiology, age, and chronic health evaluation (APACHE) II scores. It was also associated with prolonged mechanical ventilation (MV) and ICU days. UE was associated with less sedation as assessed by the Richmond Agitation-Sedation Scale, a low PaO<sub>2</sub>/FiO<sub>2</sub> ratio, and prolonged use of MV.

We have read their study, which opens with a good debate regarding information on how to design a proper protocol to prevent UE and for early prediction of high-risk patients. Although these results are congruent with those in previous studies, some aspects need clarification for adequate practical extrapolation.

First, for a practical point of view, it should be clarified whether the relation of UE and mortality in critical surgical patients is an association or a cause. Briefly, it is necessary to take into account some key details of the surgical

procedure: (1) during emergency surgery, some confounding factors (e.g., APACHE II score and neurologic diseases), which were more prevalent in UE patients, could influence the results [2]. There is no information on whether the UE subgroup patients were sicker than patients undergoing elective surgery. Commonly, as in this study, the latter group undergoes a shorter duration of MV and progress more favorably after extubation. Additionally, emergency surgery is associated with a higher mortality rate than elective cases, regardless of the UE rate. (2) Another issue is the finding that UE was more frequent in patients with unplanned admissions than in elective cases [2]. Knowing more about these factors could help us understand the differences.

Second, how sedation is applied and its influence on reintubation rates in the UE situation needs more clarification because it is a controversial issue [3]. For instance, De Groot et al. [4] found a significant association between UE and midazolam use. Curiously, Tung et al. [5] did not report patients suffering agitation and delirium or restraint use, which can interfere with the safety of MV. These clinical conditions may influence the UE rate and outcome.

Third, a key element is the relation between MV practice and UE. We know that during weaning from MV some factors—e.g., the weaning protocol, ventilation mode, gas exchange, inspiratory oxygenation fraction (FiO<sub>2</sub>)—influence UE [6]. These factors influence the patient–ventilator interaction, possibly shortening the duration of MV required and decreasing UE [7]. It would have been helpful to see some commentary on this subject by the authors.

Fourth, for preventive protocols, it would be interesting to know if the authors analyzed the timing for application of UE. Was there an association with the staff's workload or the nurse-to-patient ratio? Was the quality of care different during daytime and after hours?

---

A. M. Esquinas (✉)  
Intensive Care Unit and Noninvasive Ventilation Unit, Hospital Morales Meseguer, Avenida Marques de Los Velez, s/n, 3088 Murcia, Spain  
e-mail: antmesquinas@gmail.com

Y. Dikmen  
Department of Anesthesiology and Reanimation, Cerrahpasa Medical School, Istanbul University, Istanbul, Turkey

We think it is difficult to conclude that the increased mortality was due to UE—whether UE was a cause or occurred in association with it. It is possible to understand that patients who underwent UE also experienced different clinical conditions after surgery.

Further clinical trials are needed to identify clear associations and risk factors that could help to establish solid preventive strategies and protocols for UE in surgical ICUs.

## References

1. Krinsley JS, Barone JE (2005) The drive to survive: unplanned extubation in the ICU. *Chest* 128:560–566
2. Lee JH, Lee HC, Jeon YT et al (2014) Clinical outcomes after unplanned extubation in a surgical intensive care population. *World J Surg* 38:203–210. doi:[10.1007/s00268-013-2249-5](https://doi.org/10.1007/s00268-013-2249-5)
3. Chevron V, Ménard JF, Richard JC et al (1998) Unplanned extubation: risk factors of development and predictive criteria for reintubation. *Crit Care Med* 26:1049–1053
4. De Groot RI, Dekkers OM, Herold IH et al (2011) Risk factors and outcomes after unplanned extubations on the ICU: a case-control study. *Crit Care* 15:R19
5. Tung A, Tadimeti L, Caruna-Monaldo B et al (2001) The relationship of sedation to deliberate self-extubation. *J Clin Anesth* 13:24–29
6. Betbesé AJ, Pérez M, Bak E et al (1998) A prospective study of unplanned endotracheal extubation in intensive care unit patients. *Crit Care Med* 26:1180–1186
7. Kiekkas P, Aretha D, Panteli E et al (2013) Unplanned extubation in critically ill adults: clinical review. *Nurs Crit Care* 18:123–134