Factors effecting one-year outcome after mechanical ventilation

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There is a marked increase in the number of patients requiring intensive care unit (ICU) stay, particularly receiving mechanical ventilation in last decades. Mortality and morbidity rates for ICU are high and depend on patients' underlying disease status, age (especially older age) and duration of mechanical ventilation (1-5). After discharge from ICU, the mortality rate and the disability risk of these patients continue to be high (1,6).

There are many factors affecting the disability status and mortality of the patients within the period after ICU discharge. These include length of hospital/ICU stay, age, concomitant illnesses, socioeconomic and psychological status, family's care and education regarding the disease, having the opportunity to get self-directed post-ICU rehabilitation and physiotherapy and prolonged dependence on mechanical ventilation at home (6-9).

Carson et al. (3) defined and validated a prediction model, the so called "ProVent score", to estimate long term mortality in patients receiving prolonged mechanical ventilation. In this scoring system, authors calculated the predicted probability of death within one-year of mechanical ventilation. They considered the variables including "age", "platelet count", requirement to receive "vasopressors" and "hemodialysis" on day 21. Leroy et al. (10) and Mok et al. (11) also used and validated this formula in non-US country population. Udeh et al. (12) used a modified ProVent model to estimate one year outcome following prolonged ventilation. In this retrospective study, most of the patients (75%) had undergone surgery. They reported that the modified ProVent model had an accurate performance particularly in surgical cases. They also concluded that older age, vasopressor use and new receipt of hemodialysis were the most significant predictor variables for those patients

ventilated for 14 days or more. On the other hand, older ages (≥ 65 years) and vasopressor use were associated with survival among patients ventilated for 21 days or more.

Recently, Ferrante *et al.* (13) studied one year outcome following mechanical ventilation in elderly population. They concluded that half of the population died within first month after critical illness. Moreover, they specified that presence of premorbid disability is associated with poor outcome after ICU discharge. In another study, Barnato *et al.* (7) compared the long-term functional status among elderly hospitalized patients who received or not mechanical ventilation. So, they reported that survivors of mechanical ventilation have a significantly higher functional disability than survivors of without mechanical ventilation. Hence, they concluded that physicians should take into account an exact mortality and disability risk assessment while making decision about the use of mechanical ventilation in elderly patients.

Recently, we read with great interest the article entitled "The RECOVER Program: Disability Risk Groups & One Year Outcome after \geq 7 Days of Mechanical Ventilation" published in *American Journal of Respiratory Critical Care Medicine* by Herridge *et al.* (14). In this study, the authors concluded that age and length of stay (LOS) are independent predictors on determining 1-year survival, disability and post ICU healthcare use in ICU survivors who received more than 1 week of mechanical ventilation. They also stratified all participants to four disability groups according to these independent risk factors (age and LOS). In this paper, authors highlighted that increase in age and LOS of the patients in ICU (Oldest and Long LOS) is related with worst disability and increased in 1-year mortality rate and vice versa.

In this study, Herridge *et al.* reported that almost half of the ICU patients underwent tracheostomy. So, we

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think that these patients needed prolonged ventilation. Number of tracheostomized patients was also higher in the "Older Long LOS" and "Oldest Long LOS" groups (57% and 67%, respectively) and lower in "Young Short LOS" and "Mid age Variable LOS" groups (33% and 57%, respectively) (P=0.0002). In our opinion, prolonged ventilation is also another important variable affecting mortality and disability rates in this cohort.

In conclusion, age, LOS, the need to receive prolonged ventilation, presence of comorbid diseases, vasopressor use and receiving hemodialysis are important variables to predict one-year outcome of the ICU survivors. Nevertheless, further studies are warranted to make a good estimation for one-year outcome following mechanical ventilation.

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Footnote

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