## Predicting post-ICU mortality risk



A prospective, observational, multicentre cohort study (FROG-ICU) has confirmed the striking prevalence of death at one year after ICU discharge. More importantly, the study identified clinical and biological factors at the time of ICU discharge that were associated with an increased risk of long-term death.

"The FROG-ICU [French and European Outcome reGistry in Intensive Care Units] study confirmed that increasing age and number of comorbidities are independently associated with an increased long-term risk of death. In contrast to previous findings, with the exception of blood transfusion and prolonged length of ICU stay, we found no "in-ICU" factor was associated with an increased risk of post-ICU death," study authors write.

Survivors of critical illness will face a period of increased risk of reduced long-term survival and impaired quality of life compared to the general population. This period, lasting several years, is associated with an increased risk of post-traumatic stress, depression, cognitive impairment and physical weakness, all grouped under the entity "post-intensive care syndrome" (PICS).

To reduce the mortality rate of ICU survivors, it is important to identify the group of patients who have a higher probability of death in the year following ICU discharge and to recognise the adjustable factors associated with mortality. Although data have been published regarding the long-term outcome of ICU patients, there are no recommendations for the long-term management of these patients, the study authors point out.

The FROG-ICU investigators hypothesised that clinical and biological abnormalities present on the day of ICU discharge are associated with worse long-term outcome. In particular, they hypothesised that ICU survivors are at long risk of increased cardiovascular events. This cohort study of ICU survivors, who were followed one year after discharge, included 21 medical, surgical or mixed ICUs in France and Belgium. All consecutive patients admitted to intensive care with a requirement for invasive mechanical ventilation and/or vasoactive drug support for more than 24 hours following ICU admission and discharged from ICU were included.

The study's main outcome measure was all-cause mortality at one year after ICU discharge. Clinical and biological parameters on ICU discharge were measured, including the circulating cardiovascular biomarkers N-terminal pro-B type natriuretic peptide, high-sensitive troponin I, bioactive-adrenomedullin and soluble-ST2. Socioeconomic status was assessed using a validated deprivation index (FDep).

Of 1,570 patients discharged alive from the ICU, 333 (21%) died over the following year. Multivariable analysis identified age, comorbidity, red blood cell transfusion, ICU length of stay and abnormalities in common clinical factors at the time of ICU discharge (low systolic blood pressure, temperature, total protein, platelet and white cell count) as independent factors associated with one-year mortality. In addition, elevated biomarkers of cardiac and vascular failure independently associated with one-year death when they are added to multivariable model, with an almost threefold increase in the risk of death when combined (adjusted odds ratio 2.84 (95% confidence interval 1.73–4.65), $p < 0.001$).

"Our findings suggest recommending a comprehensive clinical examination and targeted biological testing, including biomarker measures in ICU survivors, to guide personalised discharge long-term planning. Future trials should assess whether actions targeting the pathophysiology underlying the abnormal cardiac or vascular biomarkers may translate into improved post-ICU outcomes," the authors conclude.

Source: Critical Care
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