EDITORIAL

Predicting outcomes in very old ICU patients: time to focus on the past?

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“I believe that the more you know about the past, the better you are prepared for the future”.

Theodore Roosevelt

Outcome prediction has a long history, and especially intensive care medicine has been in the forefront of developing severity models for outcome prediction. Most contemporary models emphasise acute changes in physiology and acute organ dysfunction, although the more recent SAPS-3 severity model puts more weight on other aspects of acute care admissions, like co-morbidity and pre-ICU data [1].

Although we have been testing and updating our ICU severity models for over 35 years, our models are still not perfect but many perform reasonably well on a mixed population level. They are, however, not accurate enough to be of much help in prognostication at the individual patient level or for a particular subpopulation like very old patients [2].

A group of ICU patients that has gained significant attention over the past few years is the elderly (≥ 80 years old). The proportion of elderly ICU patients is anticipated to increase in the coming decades because of the increased life expectancy in many countries. Improved tools for prognostication at patient level in this particular group would be extremely helpful. However, searching for the perfect discriminating tool, with an area under the receiver operating curve of 0.99, is much like the search for the Holy Grail: tempting but futile! On the other hand, it should be possible to develop prognostic scores, with much better sensitivity and specificity, in particularly for the group of very old ICU patients.

What we do know, however, is that age and decline of the human body (functions) are intimately intertwined. The ability of elderly patients to cope with physical stressors, such as ICU treatment, is diminished. This state of increased vulnerability is called “frailty”. Frailty on its part is associated with many geriatric syndromes like loss of muscle mass (sarcopenia), cognitive decline (dementia) and difficulties in performing ordinary tasks of daily life (Fig. 1). Frailty is also associated with an increased occurrence of comorbidity [3]. Frailty is strongly linked with age, but not all elderly patients are frail, and younger individuals may also show signs of frailty. Geriatricians have for a long time, for obvious reasons, been occupied with these topics, but only more recently have other fields in medicine found this to be important [4, 5]. At present, frailty is probably one of the most investigated syndromes in the subgroup of elderly patients, but comparisons between these studies is hampered by the different ways used to describe frailty. The frailty phenotype [6] and the frailty index [7] differ in many ways, and the former is difficult to perform in acute settings like intensive care.

The use of the concept of frailty in critically ill patients is a recent occurrence [8] and the first prospective studies in ICU patients to include frailty assessment were published in 2014 [9, 10] showing that frailty is common and independently associated with an adverse outcome. More recently the VIP1 study in 5021 patients at least 80 years old found 43% to be frail at admission, and there was a linear relation between increasing frailty class and mortality [11]. Other pre-ICU assessment of specific geriatric conditions are less frequently tested.

In a recent article in *Intensive Care Medicine*, a Finnish register-based study in 1827 patients at least 80 years old reports the use of a premorbid functional status (PFS) based on the WHO/ECOG performance classification [12]. This classification uses a six-item scale describing decreasing performance in different categories. It is

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Fig. 1 Occurrence of three common geriatric syndromes: frailty, cognitive impairment and dementia, and sarcopenia, in very old patients (≥ 80 years). The numbers represent the approximate occurrence of the individual syndrome in the group [15, 16], but the size of overlaps between the groups is largely unknown, although they often occur simultaneously

quite comparable to the “activity of daily life” classifications and also shares similarities with the clinical frailty scale. Pietiläinen et al. found that the PFS was poor for 43.3% of the very old patients in their cohort. Moreover, a poor PFS was predictive of death in the ICU (OR 1.5) and at 1 year (OR 2.18). Adding the PFS to other baseline characteristics improved prognostication in this very old patient group. Their data, however, reveals a lower overall ICU mortality than in the recent European and Canadian studies, but it must be commented that about 1 in 4 of their patients was an elective postoperative patient, and as such has a much lower expected mortality than emergency ICU admissions [11].

However, this study, together with several other recent prospective studies in very old ICU patients, underlines the importance of using alternative tools for prognostication in this group. The importance of pre-ICU status with regards to frailty, sarcopenia, activities of daily life, cognition and comorbidity could be key to making a new type of prognostic score for the very old [13]. Recently pre-ICU factors were found to have prognostic value for quality of life in 1-year survivors after critical illness [14].

If developed properly, such a new score may also guide the process of pre-ICU triage since most of these variables are already known, with less focus on acutely deranged physiology and organ dysfunction, although the latter remains important for short-term survival. It may be time to focus on the past in order to avoid unnecessary suffering in the future.

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Compliance with ethical standards

Conflicts of interest

The authors declare that there is no conflict of interest.

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