Editorial

Acute kidney injury in critical illness and long-term frailty: a new challenge for intensivists?

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Frailty is an age-related syndrome that has emerged at the end of the last century in the geriatrician language and is defined as a decrease in the physiological reserves that results in increased vulnerability to a stressor event (1). In the elderly, this clinical syndrome is associated with an increased risk of adverse events, disability and premature death, and operational strategies have been developed to detect and fight the key determinants that compete with its development (2-4).

Frailty has been recently recognized in older critically ill patients as an interesting tool to predict outcomes. Since the first publications on frailty, the growing body of literature has well-demonstrated that frailty at admission subsequently increases the risk of dependence, institutionalization and death and is thus a factor of poor health-related quality of life (5-7). In the ICU, the most popular evaluation of frailty is based on the multidimensional model proposed by Rockwood *et al.* (3,8). This model considers frailty to be an accumulation of deficits in various domains, and frailty can be determined by the calculation of a frailty index. The details of each item (up to 70 items) included in the frailty index are unwieldly in clinical practice, and measurement of frailty by the Clinical Frailty Scale (CFS) is now widely used, notably in the ICU (3). This scale is based on a clinical examination, patient's medical record, and an interview with the patient or proxy(ies) if the patient is not able to be interviewed. At the end of this evaluation, the patient is categorized on a scale ranging from 1 (fit) to 9 (terminally ill). Frailty and pre-frailty are defined as a score ≥5 and =4, respectively. This scale is in part subjective, but is useful in clinical practice and well-correlated with the frailty index (3,8).

In a recent single-center study published in *Critical Care Medicine*, Abdel-Kader *et al.* (9) aimed to determine whether there was an association between acute kidney injury (AKI) that occurred during a critical illness and frailty at 3 and 12 months after a stay in the ICU. This retrospective study was performed using data from a multicenter prospective study (BRAIN-ICU study in 5 medical centers), which included adults ≥18 years old who had acute respiratory failure and/or septic or cardiogenic shock. The study was limited to a cohort of patients evaluated in one center because the daily serum creatinine level was available. For this purpose, the authors used a careful estimation of the baseline serum creatinine level and AKI was staged according to the Kidney Disease Improving Global Outcome (KDIGO). Frailty was classified according to the CFS, which was determined during the first 72 hours of hospitalization in the ICU as well as at 3 and 6 months.

They found that in comparison with no AKI, the peak AKI stages 1, 2 and 3 were associated with higher CFS scores at 3 and 12 months. Regarding the subsequent analysis, it appears that the severity of AKI and persistence

of AKI at discharge from the hospital provided the most striking associations with frailty. In fact, these results are not totally surprising. It is well-known that frailty is more frequent in patients who have chronic kidney disease and that multiple metabolic and nutrition abnormalities may contribute to such an association (10). In the same way, complex physiologic derangements were associated with acute renal failure, and the level of care required in AKI contributed at least to a nutritional defect, poor mobility and possibly sarcopenia, which are key determinants of frailty (11,12).

Interestingly, this association between AKI and frailty decreased with time. Since there is no data regarding the level of kidney recovery at 3 and 12 months, notably in patients who had persistent AKI at discharge from the hospital, it is difficult to determine whether frailty was preferentially present in patients who maintained a chronic renal dysfunction. Additionally, the incidence of AKI during an ICU stay is 77%, and 27% of patients were discharged from the hospital with some degree of AKI, which may be explained by the type of patients included in the study and raises the question of whether these results can be generalized to all ICUs. Thus, further investigations are needed to confirm these initial results.

There is a proverb that says: "*what does not kill you makes you stronger*". It seems that ICU admission is an exception, especially when AKI occurs. We should not underestimate the long-term impact of AKI and should prevent it as much as possible. Improving nutrition and early physical rehabilitation are perhaps ways to limit the long-term consequences of acute renal failure; however, this assertion has yet to be proven.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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References

1. Clegg A, Young J, Iliffe S, et al. Frailty in elderly people. Lancet 2013;381:752-62.
2. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci 2001;56:146-56.
3. Rockwood K, Song X, MacKnight C, et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-95.
4. Negm AM, Kennedy CC, Thabane L, et al. Management of frailty: a protocol of a network meta-analysis of randomized controlled trials. Syst Rev 2017;6:130.
5. Le Maguet P, Roquilly A, Lasocki S, et al. Prevalence and impact of frailty on mortality in elderly ICU patients: a prospective, multicenter, observational study. Intensive Care Med 2014;40:674-82.
6. Bagshaw SM, Stelfox HT, McDermid RC, et al. Association between frailty and short- and long-term outcomes among critically ill patients: a multicentre prospective cohort study. CMAJ 2014;186:E95-102.
7. Bagshaw SM, Stelfox HT, Johnson JA, et al. Long-term association between frailty and health-related quality of life among survivors of critical illness: a prospective multicenter cohort study. Crit Care Med 2015;43:973-82.
8. McDermid RC, Stelfox HT, Bagshaw SM. Frailty in the critically ill: a novel concept. Crit Care 2011;15:301.
9. Abdel-Kader K, Girard TD, Brummel NE, et al. Acute Kidney Injury and Subsequent Frailty Status in Survivors of Critical Illness: A Secondary Analysis. Crit Care Med 2018;46:e380-8.
10. Chowdhury R, Peel NM, Krosch M, et al. Frailty and chronic kidney disease: A systematic review. Arch Gerontol Geriatr 2017;68:135-42.
11. McCarthy MS, Phipps SC. Special nutrition challenges: current approach to acute kidney injury. Nutr Clin Pract 2014;29:56-62.
12. Prowle JR, Kolic I, Purdell-Lewis J, et al. Serum creatinine changes associated with critical illness and detection of persistent renal dysfunction after AKI. Clin J Am Soc Nephrol 2014;9:1015-23.

