Editorial

The impact of critical care transition programs on outcomes after intensive care unit (ICU) discharge: can we get there from here?

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Although sometimes underestimated, the transition of care from the intensive care unit (ICU) to a medical or surgical hospital ward is a complex process with many potential challenges. Despite recovery from critical illnesses that lead to ICU admission, patients discharged from ICU remain at risk for successive clinical worsening during the hospital stay, which may result in readmission to ICU or even death (1-3). Moreover, ICU readmission is associated with poorer outcomes, such as lower ICU and hospital survival rates, prolonged hospitalisation, higher costs related to patient care, higher degrees of disability after ICU discharge and more emotional stress to patients and their families (1,2,4-6).

As a result, critical care transition programs (CCTPs) have been developed to decrease the risk of unplanned ICU readmission or unexpected death after ICU discharge (7). Although heterogeneously reported in the literature, CCTPs are often focused on follow-up by healthcare professionals to support the primary hospital ward and prompt care in case of deterioration of patient's condition (e.g., rapid response team, critical care outreach team, medical emergency team, and ICU nurse liaison program). However, in contrast to the theoretical reasons to support the widespread use of CCTPs, studies evaluating the impact of CCTP on patient outcomes are heterogeneous and dissonant: the majority of evidence for and against the effectiveness of CCTPs is from non-randomised studies with non-uniform interventions (8-11). Previous studies have reported mixed results with 1 meta-analysis of 9 before-after studies that demonstrated improvement of ICU readmission rates (but not short-term mortality) following implementation of CCTPs (11); however, a robust multicentre time series analysis has failed to detect any impact of CCTPs on relevant patient outcomes (10).

A recent publication by Stelfox *et al.* (12) titled "Critical care transition programs and the risk of readmission or death after discharge from ICU" emphasizes the current context of uncertainty about effectiveness of CCTPs. This study showed that the implementation of a multidisciplinary ICU provider team that serially evaluated each patient after ICU discharge had no impact on ICU readmission or short-term mortality. In this large, interrupted time series analysis, more than 32,000 patients discharged from mixed medical-surgical ICUs in eight hospitals from two cities in Alberta, Canada, were evaluated from January 2002 to January 2012. The intervention comprised a CCTP characterised by an ICU-independent multidisciplinary team (physician, nurse and respiratory therapist) that provided standardised support services for all consecutive patients discharged from ICU to a hospital ward 24 h a day, 7 days a week. Following discharge, members of the team serially evaluated each patient a minimum of once every 12 h. Patients were followed up for a minimum of two consecutive evaluations and signed off when considered stable. The team operated in a consultative way by providing advice and support to the hospital ward, reengaging the ICU provider team if necessary and facilitating readmission of patients with clinical deterioration. The program was implemented in three hospitals of one city (study group) but not in five hospitals of other city (control group). After implementation of the program, no significant changes were observed for readmission to ICU within 72 h or all-cause 14-day mortality between the two study groups.

The findings of Stelfox *et al*. reinforce the need to intensify CCTP research. The lack of effectiveness of these programs may be explained by the present CCTP policies, which do not encompass the majority of risk factors important for patient outcomes following discharge from ICU. Available evidence indicates a multifactorial intricate aetiology for clinical deterioration after the transition of care between ICU and hospital ward (13-16). This pathophysiological net involves not only the patient characteristics but also organisational aspects of patient care and hospital ward structure. This concept is justified by some examples in the literature, such as the association of out-of-hours discharge from ICUs with higher hospital mortality and ICU readmission rates (17-19); the risk of adverse events following a poor clinical handover (20,21) and the possible association between intermediate care unit's implementation and lower rates of hospital mortality and ICU-readmission (22). Therefore, the interaction among organisational and structural ward variables regarding specific patient characteristics should be incorporated into the plan of post-ICU care.

In addition, current CCTPs are mainly centred on recognizing an already initiated morbid process and not in developing specific strategies to prevent such clinical deterioration. This process of recognition has much value; however, without a specific plan for the prevention of clinical worsening of vulnerable patients, it may constitute an insufficient strategy to improve relevant patient outcomes. Moreover, the risk of ICU readmission for patients discharged from ICU is heterogeneous (2,4). The specific risk factors require specific prevention strategies, such as early removal of invasive devices to prevent nosocomial infections in patients who needed invasive monitoring or treatment (23); early pulmonary rehabilitation to avoid respiratory failure in patients with chronic respiratory diseases (24) and implementation of specific rehabilitation programs focused on recovery of functional abilities for patients with ICU-acquired muscular weakness with the aim of avoiding clinical worsening related to poor functional status (25).

Therefore, it may be unrealistic to expect a meaningful impact on outcomes in the critical care transitional scenario through a single intervention rooted on recognition of clinical deterioration after ICU discharge. The use of a broader CCTP capable of the following functions is probably needed to increase the coverage of risk factors for patient deterioration after ICU discharge: (I) matching specific patients' needs with hospital ward complexity; (II) providing a plan for the prevention of clinical worsening of vulnerable patients based on individual patient risk; (III) handover checklist from ICU to ward; (IV) rapid response team; (V) avoiding out of hours discharge; and (VI) rehabilitation program. Moreover, the evaluation of CCTPs using a more rigorous methodology, such as cluster randomized clinical trial, is necessary to elucidate the actual effectiveness of these programs and consequently to guide the clinical practice in transition of patients from ICU to hospital ward.

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Footnote

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References

1. Kramer AA, Higgins TL, Zimmerman JE. The association between ICU readmission rate and patient outcomes. Crit Care Med 2013;41:24-33.
2. Kaben A, Corrêa F, Reinhart K, et al. Readmission to a surgical intensive care unit: incidence, outcome and risk factors. Crit Care 2008;12:R123.
3. Rosa RG, Roehrig C, Oliveira RP, et al. Comparison of Unplanned Intensive Care Unit Readmission Scores: A Prospective Cohort Study. PLoS One 2015;10:e0143127.
4. Capuzzo M, Moreno RP, Alvisi R. Admission and discharge of critically ill patients. Curr Opin Crit Care 2010;16:499-504.
5. Daly K, Beale R, Chang RW. Reduction in mortality after inappropriate early discharge from intensive care unit: logistic regression triage model. BMJ 2001;322:1274-6.
6. Hickman RL Jr, Douglas SL. Impact of chronic critical illness on the psychological outcomes of family members.

AACN Adv Crit Care 2010;21:80-91.
7. Chaboyer W, James H, Kendall M. Transitional care after the intensive care unit: current trends and future directions. Crit Care Nurse 2005;25:16-8, 20-2, 24-6 passim; quiz 29.
8. Choi S, Lee J, Shin Y. Effects of a medical emergency team follow-up programme on patients discharged from the medical intensive care unit to the general ward: a singlecentre experience. J Eval Clin Pract 2016;22:356-62.
9. Harrison DA, Gao H, Welch CA, et al. The effects of critical care outreach services before and after critical care: a matched-cohort analysis. J Crit Care 2010;25:196-204.
10. Gao H, Harrison DA, Parry GJ, et al. The impact of the introduction of critical care outreach services in England: a multicentre interrupted time-series analysis. Crit Care 2007;11:R113.
11. Niven DJ, Bastos JF, Stelfox HT. Critical care transition programs and the risk of readmission or death after discharge from an ICU: a systematic review and meta-analysis. Crit Care Med 2014;42:179-87.
12. Stelfox HT, Bastos J, Niven DJ, et al. Critical care transition programs and the risk of readmission or death after discharge from ICU. Intensive Care Med 2016;42:401-10.
13. Badawi O, Breslow MJ. Readmissions and death after ICU discharge: development and validation of two predictive models. PLoS One 2012;7:e48758.
14. Brown SE, Ratcliffe SJ, Kahn JM, et al. The epidemiology of intensive care unit readmissions in the United States. Am J Respir Crit Care Med 2012;185:955-64.
15. Rosenberg AL, Watts C. Patients readmitted to ICUs*: a systematic review of risk factors and outcomes. Chest 2000;118:492-502.
16. Brandão PG, Syrio J, Machado L, et al. Causes of ICU readmission and mortality: analysis of a 6-month period. Crit Care 2013;17:P7.
17. Azevedo LC, de Souza IA, Zygun DA, et al. Association between nighttime discharge from the intensive care unit and hospital mortality: a multi-center retrospective cohort study. BMC Health Serv Res 2015;15:378.
18. Laupland KB, Shahpori R, Kirkpatrick AW, et al. Hospital mortality among adults admitted to and discharged from intensive care on weekends and evenings. J Crit Care 2008;23:317-24.
19. Gantner D, Farley K, Bailey M, et al. Mortality related to after-hours discharge from intensive care in Australia and New Zealand, 2005-2012. Intensive Care Med 2014;40:1528-35.
20. Greenberg CC, Regenbogen SE, Studdert DM, et al. Patterns of communication breakdowns resulting in injury to surgical patients. J Am Coll Surg 2007;204:533-40.
21. van Sluisveld N, Hesselink G, van der Hoeven JG, et al. Improving clinical handover between intensive care unit and general ward professionals at intensive care unit discharge. Intensive Care Med 2015;41:589-604.
22. vincent JL, Rubenfeld GD. Does intermediate care improve patient outcomes or reduce costs? Crit Care 2015;19:89.
23. Inweregbu K, Dave J, Pittard A. Nosocomial infections. Continuing Education in Anaesthesia. Cri Care Pain 2005;5:14-7.
24. Nava S. Rehabilitation of patients admitted to a respiratory intensive care unit. Arch Phys Med Rehabil 1998;79:849-54.
25. Calvo-Ayala E, Khan BA, Farber MO, et al. Interventions to improve the physical function of ICU survivors: a systematic review. Chest 2013;144:1469-80.

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