See Article page 725.

Commentary: Finding delirium: It's harder than you think!

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Postoperative delirium carries a significant burden in patients undergoing cardiac surgery. The incidence of delirium varies between 16% and 73% of patients after cardiac surgery and is higher in patients with advanced age and comorbidities.^{1,2} Although delirium is generally regarded as a temporary fluctuation in awareness and attention, it has been increasingly recognized to have persistent adverse effects and is associated with short- and long-term outcomes, including cognitive and noncognitive morbidity, mortality, functional decline, and reduced quality of life. Given the complexity and heterogeneity of its presentation with hyperactive, hypoactive, or mixed symptoms, delirium can remain unrecognized. The hypoactive subtype in particular is more common, more difficult to detect, and is associated with poorer outcomes than hyperactive delirium.³

Dubiel and colleagues⁴ assessed the influence of 2 definitions of delirium on the prediction of poor functional survival, defined as a composite outcome of death or requiring a long-term-care facility admission at 1 year after cardiac surgery. Two cohorts of patients were compared, 1 for each definition of delirium. The first cohort consisted of cardiac surgery patients in whom delirium was measured in the Society of Thoracic Surgeons (STS) database in years 2007-2009 based exclusively on hyperactive symptoms. The second cohort utilized clinical data in years 2010-2012 and the Confusion Assessment Method for the intensive care unit (CAM-ICU) to detect delirium based

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A sensitive screening instrument for postoperative delirium is among several tools in the multicomponent strategy for delirium prevention and management.

on both hyperactive and hypoactive symptoms. In the propensity score matched subset of 1835 patients, delirium as defined in the CAM-ICU cohort was shown to be independently associated with poor 1-year functional survival (hazard ratio, 2.58; 95% confidence interval, 1.20-5.54), whereas delirium as per the restricted definition in the STS database was not (hazard ratio, 0.92; 95% confidence interval, 0.49-1.71). The more sensitive definition of delirium also improved prediction of secondary outcomes such as survival and re-hospitalization rates.

These results should be viewed in light of some limitations, including potential confounding and misclassification biases. Despite adjustment for several confounders through propensity score matching, unmeasured factors such as frailty, occult dementia, alcohol and drug withdrawal, and others may bias the results. Given the 2 different time periods during which data for the cohorts were drawn, temporal changes in the recognition and management of delirium and its complications may also confound the results, although the 2 eras were consecutive in time, limiting concerns over temporal bias. As acknowledged by the authors, a dichotomized composite outcome of death and institutionalization does not capture the full spectrum of functional capacity and nuanced changes in quality of life. Moreover, there is potential under-detection of postoperative delirium with both screening tools because the rates of postoperative delirium in this study were 7.6% in the STS cohort and 13.0% in the CAM-ICU cohort, both at

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the lower end of published incidence estimates.¹ It is assumed that the higher frequency of delirium in the CAM-ICU cohort was due to improved recognition of hypoactive delirium; however, the proportion of subtypes was not directly measured.

Early recognition of delirium and the implementation of multicomponent targeted interventions improves outcomes and reduces duration of delirium.⁵ This study suggests that sensitive screening tools such as the CAM-ICU instrument hold promise by casting a wider net, capturing the more-difficult-to-detect hypoactive symptoms so resources and interventions can be directed to affected patients to ultimately improve outcomes. However, without a gold standard to detect delirium, we cannot assess the performance of the CAM-ICU measure relative to other tools in this population. Furthermore, severity of delirium symptoms vary widely and the use of the CAM-ICU instrument provided only a binary response. The use of ordinal instruments may provide additional risk stratification insight. Whether the use of the CAM-ICU instrument has an effect on changing outcomes would require an impact evaluation study, which was beyond the scope of the work by Dubiel and colleagues.⁴ Their study also does not address which delirium screening tool is best suited for use in patients undergoing cardiac surgery. A number of delirium screening instruments have been developed and validated, and although the CAM-ICU method is widely used, a head-to-head comparison with other sensitive tools such as the Nursing Delirium Screening Scale, Memorial Delirium Assessment Scale, and the Delirium Rating Scale would be informative.⁶

Overall, Dubiel and colleagues⁴ are to be congratulated for highlighting such an important issue in cardiac surgery, particularly as we operate on older and frailer patients at high risk for delirium. Although an understanding of the effectiveness of screening tools is important, we must acknowledge that these tools are reactive rather than

preventative, leading to recognition and intervention in patients who have already developed delirium. Concerted efforts should be focused on intervening early, before development of delirium, to modify the risk. This would require robust delirium prediction models beyond the existing tools such as the recalibrated Prediction Model for Delirium in ICU Patients or Katznelson models that have only fair to moderate predictive accuracy.^{7,8} These tools should guide multidisciplinary primary prevention efforts such as cognitive prehabilitation and optimization of patients' perioperative conditions to reduce the risk of delirium. Comprehensive, multicomponent protocols should integrate strategies for primary prevention, early recognition, and management of complications. Dubiel and colleagues⁴ highlight the importance of using sensitive delirium screening tools as a key element in multicomponent delirium prevention protocols.

References

1. Evans AS, Weiner MM, Arora RC, Patel MB, Brummel NE, Thompson JL, et al. Current approach to diagnosis and treatment of delirium after cardiac surgery. *Ann Card Anaesth*. 2016;19:328-37.
2. Robinson TN, Raeburn CD, Tran ZV, Angles EM, Brenner LA, Moss M. Postoperative delirium in the elderly: risk factors and outcomes. *Ann Surg*. 2009;249:173-8.
3. Hayhurst CJ, Marra A, Han JH, Patel MB, Brummel NE, Thompson JL, et al. Association of hypoactive and hyperactive delirium with cognitive function after critical illness. *Crit Care Med*. 2020;48:e480-8.
4. Dubiel C, Hibert BM, Stammers AN, Sanjanwala RM, Tangri N, Singal RK, et al. Delirium definition influences prediction of functional survival in patients one-year postcardiac surgery. *J Thorac Cardiovasc Surg*. 2022;163:725-34.
5. O'Hanlon S, O'Regan N, MacLulich AM, Cullen W, Dunne C, Exton C, et al. Improving delirium care through early intervention: from bench to bedside to boardroom. *J Neurol Neurosurg Psychiatry*. 2014;85:207-13.
6. De J, Wand APF. Delirium screening: a systematic review of delirium screening tools in hospitalized patients. *Gerontologist*. 2015;55:1079-99.
7. Lindroth H, Bratzke L, Purvis S, Brown R, Coburn M, Mrkobrada M, et al. Systematic review of prediction models for delirium in the older adult inpatient. *BMJ Open*. 2018;8:e019223.
8. Lee A, Mu JL, Joynt GM, Chiu CH, Lai VKW, Gin T, et al. Risk prediction models for delirium in the intensive care unit after cardiac surgery: a systematic review and independent external validation. *Br J Anaesth*. 2017;118:391-9.