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Commentary: 4A's for effort: Diagnosing delirium after cardiac surgery

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Postoperative delirium (POD) is an underdiagnosed sequela and increases morbidity and mortality following cardiac surgery.^{1,2} The long-term cognitive impairment associated with POD following cardiac surgery is akin to Alzheimer disease.³ The Confusion Assessment Method (CAM) has arisen as the most widely used delirium instrument in intensive care units but may not be adequately sensitive for use outside of intensive care units and requires special training.⁴ The 4 A's Test (4AT) appears to be a more streamlined tool with improved relative accuracy.⁵ The 4AT consists of 4 straightforward components: alertness, the Abbreviated Mental Test-4 screening instrument, attention (naming the months backward), and acute change or fluctuating course.

Chang and colleagues⁶ compared the accuracy of 4AT with the CAM in detecting POD in an elective cardiac surgery population following transfer to the acute care floor. The study was segmented into 2 phases. Phase 1 compared the researcher-administered 4AT with the bedside nurse CAM assessment and reference standards. Patients with previous neurocognitive deficits were notably not excluded. The authors found that the sensitivity of 4AT and CAM was 85% and 23%, respectively. Patients with a positive 4AT also had a prolonged length of stay when compared with negative 4AT patients, whereas CAM results had no effect on postoperative outcomes. In Phase 2, nurses administered the 4AT and the sensitivity decreased from 85% to 58%. This suggests a possible discrepancy between reported 4AT accuracy in the literature and real-world diagnostic efficacy. Although 94% of nurses surveyed stated that the

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The 4AT delirium assessment may have improved sensitivity when compared with the confusion assessment model, but efforts must be made to improve adherence amongst frontline providers.

4AT was not too cumbersome, the reported adherence rates indicate the need for user experience evaluation at the hospital level. An objective measurement of completion times or witnessed nursing evaluation by an expert evaluator may have augmented assessment instrument usability. A difference between the positive predictive value of the 4AT (58%) versus the CAM (83%) suggests that the 4AT test may have an increased false positive rate.

This study is limited by questions of generalizability and potential confounding. This is a single-center study from a tertiary care center and a group with expertise in cardiac surgical critical care and delirium, and these results may not be reproducible at other centers. Additionally, the simultaneous use of both CAM and 4AT in Phase 2 raises concerns about the effect of this interaction on the results from each test. Despite these limitations, this is a very important and robust real-world assessment of 4AT as a delirium diagnostic and alludes to future quality improvement for delirium prediction in cardiac surgery. This study highlights the barriers that still exist to effectively diagnosis of delirium. Among the more striking findings from the survey was that nurses believed physicians never asked about the results of delirium testing. Until delirium is recognized as a real and significant problem, any efforts to better diagnose and treat it will be limited. An accurate and easy-to-use test that has been validated

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in cardiac surgery patients will go a long way toward improving this.

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Commentary: The pervasive yet elusive problem of delirium after cardiac surgery

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Delirium after cardiac surgery is a common and often under-recognized problem, associated with increased risk of probability of death and hospital readmission, decreased cognitive function, and reduced health-related quality of life.¹ It may be greater in patients who have perioperative complications after cardiac surgery.² Any attempt to improve the prognosis of this postoperative complication must start with early recognition. Several screening tests, such as the Confusion Assessment Method, have been developed in an effort to improve delirium detection.³ The 4 'A's Test, or 4AT, is another established screening tool that has demonstrated good sensitivity and specificity when administered across a variety of clinical settings internationally.⁴ The effectiveness of this tool in the postcardiac surgery setting is not yet known.

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Improved detection of delirium after cardiac surgery is essential. The 4AT may be an effective screening tool, but further research demonstrating its clinical applicability is warranted.

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In this issue of the *Journal*, Chang and colleagues⁵ seek to evaluate the effectiveness of the 4AT in detecting delirium among patients postcardiac surgery after transfer from the intensive care unit. The study analyzes the screening tool's accuracy when administered by research assistants and by nursing staff on the ward and compares it with reference standards in an effort to establish its clinical relevance and practicality. This topic represents a critical gap in the literature on postoperative delirium; it is necessary not only to acknowledge the effects of delirium on outcomes and to establish a validated screening tool but also to prove that such a tool actually works in the clinical setting. The next steps would be to link increased detection of delirium with an improvement in outcomes by identifying actionable targets.