Two articles in this issue focus on outcomes after cardiac surgery. Harrington et al.1 examine preoperative cognitive status as an independent marker of discharge location after cardiac surgery. Sanders et al.2 consider tissue oxygenation as a marker of outcomes after heart surgery.

Much has been written recently regarding delirium in the critically ill patient 3-8; specifically, there are data about negative outcomes (i.e., death) associated with delirium,9 attempts to elucidate the risk factors for delirium,9,10 and the development of early trials of pharmacotherapy to treat delirium.11,12 The literature is less clear, however, about the role of perioperative cognitive status as a marker of outcomes, particularly in patients undergoing heart surgery.

Cognitive Status and Outcomes

Harrington et al developed a study to analyze the relationship between preoperative cognitive status and hospital discharge outcomes. Their tool was called Clock-in-the-Box (CIB), a technique that “emphasized working memory and executive function by eliminating verbal cues, and requiring the clock to be drawn in a specific location.” The CIB has been shown to have high inter-rater reliability and is highly correlated with other cognitive measures. The authors hypothesized that patients with impaired preoperative cognitive status would be less able to engage with the postoperative environment, and therefore might have a prolonged postoperative course and be more likely to be discharged to a non-home environment.

This was a retrospective study, and the primary outcomes were postoperative length of stay and primary postoperative discharge status (home or not). One might imagine a future study with a prospective design, but it was surprising to see a center that still admits patients preoperatively for evaluation (generally a day prior) when “same-day admit” has become the national norm for most elective surgeries.

The directions for the tool are of particular interest. The patient is handed instructions as follows: “[I]n the blue box on the next page, draw a picture of a clock; put in all the numbers; set the time to ten past eleven.” Patients then are handed the response sheet: each quadrant contains a colored box, with the blue box in the lower right-hand corner. The response is graded from 0 to 8, with lower scores indicating lower cognitive status; the results are graded based on location in the correct box; how well the drawn object resembles a clock; number inclusion, order, and spacing; correct time; and appropriate size of the hands and circle.

At first glance, the results are somewhat difficult to interpret. Nevertheless, further evaluation offers helpful findings. Using multiple analytical
approaches, the authors were able to demonstrate that patients with a lower cognitive ability as measured by the CIB were less likely to return home after heart surgery; that those who didn’t return home had a statistically lower CIB score; and that, using a multivariate analysis, an increasing CIB score was associated with an increase in the likelihood that the patient would return home after surgery. However, they were unable to correlate CIB score with postoperative length of stay.

Readers can take home these crucial points: (1) that a significant portion of patients undergoing cardiac surgery have decreased cognitive abilities as measured by the CIB, (2) that the validated CIB tool can be administered by a cardiac surgery nurse practitioner with relative rapidity and facility, and (3) that patients with decreased cognitive abilities as measured by the CIB were less likely to return home after surgery. Given the aging population and the relationship between aging and dementia, there is significant clinical applicability and relevance to these findings from Harrington and colleagues.

Tissue Oxygenation

The study conducted by Sanders et al1 focused on another important area in cardiac surgery: non-invasive techniques to monitor tissue oxygenation and to help provide appropriate endpoints of resuscitation. As part of current routine postoperative care of patients who have undergone cardiac surgery, repeated measurements are frequently made of serum lactate as well as mixed venous oxygen saturation as markers of global hypoperfusion. The downsides of these markers are that they require repeated blood samples and, in the example of a mixed venous oxygen saturation value, a pulmonary artery catheter. Near-infrared spectroscopy (see Figure) is a completely noninvasive technique that uses electromagnetic waves (680-800 nm) to measure the percentage of hemoglobin that is oxygenated.

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Figure

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A significant portion of patients undergoing cardiac surgery have decreased cognitive abilities.
It is crucial to ensure that the ICU team knows which patients may be at risk for not being discharged home.
REFERENCES


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