

Three-minute assessment successfully identifies delirium in hospitalized elders

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Delirium is a state of confusion that develops suddenly, often following an acute medical illness, a surgical procedure or a hospitalization. Although delirium is estimated to complicate hospital stays for over 2.5 million elderly individuals in the U.S. each year, this common condition often goes undetected. The end result can be serious complications with sometimes devastating consequences for vulnerable hospitalized elders.

Now, investigators at Beth Israel Deaconess Medical Center (BIDMC) have developed a three-minute diagnostic assessment for [delirium](#) and demonstrated that it is extremely accurate in identifying the condition in a group of older hospital [patients](#).

In a study that appears in the October 21 issue of the *Annals of Internal Medicine*, the authors report that the assessment, the 3-Minute Diagnostic Interview for CAM-Defined Delirium (3D-CAM), detected delirium with greater-than-90-percent specificity and sensitivity when compared with a reference standard. Of particular note, the 3D-CAM was shown to be highly accurate in identifying delirium in patients with dementia, a group for whom diagnosis can be particularly challenging.

"Prompt recognition of delirium is the first step to timely evaluation and treatment, preventing complications and keeping older patients safe while in the hospital," says lead author Edward Marcantonio, MD, SM, Director of the Aging Research Program in the Division of General Medicine and Primary Care at BIDMC and Professor of Medicine at Harvard Medical School. "As growing numbers of older adults are being

hospitalized, it's critically important that doctors, nurses and other hospital care providers be able to recognize delirium. We wanted to develop a brief and simple method to make this easier to accomplish, and we are extremely happy with the 3D-CAM results. It appears that this easy-to-administer interview could significantly improve detection of this common and morbid condition in vulnerable older hospital patients. "

Delirium affects 30 to 40 percent of older medical patients and between 15 and 50 percent of older surgical patients. The condition remains distressingly under-recognized, with average detection rates of only 12 to 35 percent in most clinical settings. Moreover, the cases of delirium that are identified tend to be agitated patients who are disruptive to patient care, while the patients with hypoactive delirium, who are quiet and lethargic, often are undiagnosed.

The CAM algorithm was originally developed in 1990 by the study's senior author Sharon K. Inouye, MD, MPH, Director of the Aging Brain Center in the Institute for Aging Research at Hebrew Senior Life and HMS Professor of Medicine in the Division of Gerontology at BIDMC. To date, the CAM has been used in over 4,000 original studies and has been translated into more than 14 languages. The CAM diagnostic algorithm requires that the assessor determine the presence or absence of four key features of delirium: 1) acute change and fluctuating course; 2) inattention; 3) disorganized thinking; and 4) altered level of consciousness. To be diagnosed with delirium, a patient must have features 1 and 2 and either 3 or 4.

"We have found that there are many different cognitive tests that the person rating the CAM can use to assess for these four features, and we've shown that the quality of the assessment makes a big difference in the accuracy of identification of delirium," explains Inouye. "The 3D-CAM is a major advance since it provides a brief, easy-to-administer

approach that operationalizes the CAM algorithm in three minutes, and provides highly accurate results compared to a gold standard clinical assessment."

To develop the 3D-CAM assessment tool, the investigators reduced an original list of 160 questions and observations down to 20 items. To do this, each item was evaluated using a modern measurement approach called Item Response Theory, which is also used to create educational tests such as the Scholastic Aptitude Test (SAT). Only the most informative items for delirium diagnosis were selected for inclusion in the final 3D-CAM assessment. Examples included patient questions about symptoms ("Have you been feeling confused?"), structured observations ("Did the patient fall asleep during the interview?") and cognitive testing of attention and orientation.

After selecting the 20 best items and assembling the 3D-CAM interview, the authors embarked on a prospective validation study by enrolling 201 patients over age 75 who were hospitalized in BIDMC's General Medicine Service between 2010 and 2012.

The authors first conducted a "gold standard" clinical assessment for delirium and dementia, in which an experienced clinician conducted a full patient evaluation including a cognitive exam, a review of the patient's medical records and conversations with the patient's nurse and family caregiver. This assessment took between 60 and 90 minutes and resulted in data similar to a doctor's initial evaluation.

An expert panel then reviewed all of the data and made a judgment as to the presence or absence of delirium and dementia. The "gold standard" assessment, determined that 42 of 201 participants (21 percent) had delirium, 88 percent of which was hypoactive or "quiet." They also found that 56 patients (28 percent) had dementia prior to being admitted to the hospital. In some cases, patients had both delirium and dementia.

Research assistants subsequently administered the 3D-CAM assessment without knowledge of the gold-standard results.

"First, we timed the test, and found that, on average, it did indeed take only three minutes to administer," says Marcantonio. The researchers then compared the results of the 3D-CAM with the gold standard assessment and found that the 3D-CAM correctly identified 95 percent of the patients with delirium (95 percent sensitivity) while correctly identifying 94 percent of patients without delirium (94 percent specificity). When a second research assistant went back and administered the 3D-CAM without knowledge of the first test results, the answer was the same 95 percent of the time (95 percent reproducibility.) Importantly, the 3D-CAM performed nearly as well in patients with dementia, which is a particularly challenging group in which to diagnose delirium.

"Given its brevity, ease of use, and excellent accuracy and reproducibility, the 3D-CAM could be an important component of a program to improve recognition and management of delirium in older hospitalized adults," says Marcantonio. Adds Inouye, "Hospitals throughout the world are increasingly recognizing the importance of delirium as a major preventable adverse event. The 3D-CAM holds great promise as an important advance for delirium care specifically, and for acute care of elders more generally."

More information: The 3D-CAM instrument and instructions are available at www.hospitalelderlifeprogram.org

Provided by Beth Israel Deaconess Medical Center

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