

The Confusion Assessment Method for the ICU (CAM-ICU)

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WHY: The reported incidence of delirium among intensive care unit (ICU) patients ranges from 40-87%, with highest occurrence among older adults and those who receive mechanical ventilation. Delirium can be classified as either hypoactive (characterized by lethargy and less bodily movement), hyperactive (characterized by agitation and combativeness), or mixed (vacillating between hypo- and hyper- active forms). Delirium is associated with negative clinical outcomes (i.e., increased hospital length of stay, medical complications, physical restraint use, and prolonged neurocognitive deficits). Assessment of delirium using a clinically valid and reliable tool provides neurocognitive data necessary for the development of an appropriate treatment plan. One evidence-based, multi-component, interprofessional method of improving delirium assessment, prevention, and management of delirium is the ABCDEF Bundle.

BEST TOOL: Accurate delirium assessment cannot be obtained by informal bedside nurse-patient interaction. The CAM-ICU is an adaptation of the Confusion Assessment Method by Inouye (1990), the most widely used instrument for diagnosing delirium by internists and non-psychiatric clinicians. The CAM-ICU is one of two monitoring tools recommended by the Society of Critical Care Medicine's Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adults Patients in the ICU.

TARGET POPULATION: The CAM-ICU should be used on all adults admitted to the ICU in order to promptly identify delirium and prevent negative outcomes.

VALIDITY AND RELIABILITY: The CAM-ICU is valid and shows high inter-rater reliability ($\kappa=0.79-0.96$). Compared with a reference standard (psychiatrist) diagnosis of delirium, the CAM-ICU used by study nurses had sensitivities of 93-100% and specificities of 89-100%.

While not validated for use outside the ICU setting, the CAM-ICU can be used with a variety of ICU patients including those with medical, surgical, and neurobiologic conditions. A brief version for screening delirium is being tested for use in the Emergency Department. The Intensive Care Delirium Screening Checklist is an alternative method for delirium screening recommended by the Society of Critical Care Medicine. Other instruments that have been validated for screening for delirium in settings outside the ICU include the original CAM, the Delirium Rating Scale, the Memorial Delirium Assessment Scale, and the Nursing Delirium Screening Scale.

STRENGTHS AND LIMITATIONS: The CAM-ICU is rapid (<1 minute), easy to administer with minimal training, and has been translated into 26 different languages. It can be adapted for use with patients with hearing and visual disturbances and is easily reproducible. Staff training should include methods to assure reliability of assessment and to maintain performance after initial training. Although the CAM-ICU requires the use of special pictures, particularly for hearing impaired patients, materials and training manual can be downloaded from http://www.icudelirium.org/docs/CAM-ICU-training-manual-2016-08-31_Final.pdf. The CAM-ICU can also be accessed via MDALCALC app.

FOLLOW-UP: Because delirium can occur at any time during critical illness, ICU patients should be monitored every shift for delirium onset and/or resolution of these symptoms.

MORE ON THE TOPIC:

Best practice information on care of older adults: <https://consultgeri.org>.

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Table 1. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)

FEATURES AND DESCRIPTIONS	ABSENT	PRESENT
I. Acute onset or fluctuating course*		
A. Is there evidence of an acute change in mental status from the baseline? B. Or, did the (abnormal) behavior fluctuate during the past 24 hours, that is, tend to come and go or increase and decrease in severity as evidenced by fluctuations on the Richmond Agitation Sedation Scale (RASS) or the Glasgow Coma Scale?		
II. Inattention†		
Did the patient have difficulty focusing attention as evidenced by a score of less than 8 correct answers on either the visual or auditory components of the Attention Screening Examination (ASE)?		
III. Disorganized thinking		
Is there evidence of disorganized or incoherent thinking as evidenced by incorrect answers to three or more of the 4 questions and inability to follow the commands? Questions 1. Will a stone float on water? 2. Are there fish in the sea? 3. Does 1 pound weigh more than 2 pounds? 4. Can you use a hammer to pound a nail? Commands 1. Are you having unclear thinking? 2. Hold up this many fingers. (Examiner holds 2 fingers in front of the patient.) 3. Now do the same thing with the other hand (without holding the 2 fingers in front of the patient). (If the patient is already extubated from the ventilator, determine whether the patient's thinking is disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject.)		
IV. Altered level of consciousness		
Is the patient's level of consciousness anything other than alert, such as being vigilant or lethargic or in a stupor or coma? ALERT: spontaneously fully aware of environment and interacts appropriately VIGILANT: hyperalert LETHARGIC: drowsy but easily aroused, unaware of some elements in the environment or not spontaneously interacting with the interviewer; becomes fully aware and appropriately interactive when prodded minimally STUPOR: difficult to arouse, unaware of some or all elements in the environment or not spontaneously interacting with the interviewer; becomes incompletely aware when prodded strongly; can be aroused only by vigorous and repeated stimuli and as soon as the stimulus ceases, stuporous subject lapses back into unresponsive state COMA: unarousable, unaware of all elements in the environment with no spontaneous interaction or awareness of the interviewer so that the interview is impossible even with maximal prodding		
Overall CAM-ICU Assessment (Features 1 and 2 and either Feature 3 or 4):	Yes ___	No ___

* The scores included in the 10-point RASS range from a high of 4 (combative) to a low of -5 (deeply comatose and unresponsive). Under the RASS system, patients who were spontaneously alert, calm, and not agitated were scored at 0 (neutral zone). Anxious or agitated patients received a range of scores depending on their level of anxiety: 1 for anxious, 2 for agitated (fighting ventilator), 3 for very agitated (pulling on or removing catheters), or 4 for combative (violent and a danger to staff). The scores -1 to -5 were assigned for patients with varying degrees of sedation based on their ability to maintain eye contact: -1 for more than 10 seconds, -2 for less than 10 seconds, and -3 for eye opening but no eye contact. If physical stimulation was required, then the patients were scored as either -4 for eye opening or movement with physical or painful stimulation or -5 for no response to physical or painful stimulation. The RASS has excellent interrater reliability and intraclass correlation coefficients of 0.95 and 0.97, respectively, and has been validated against visual analog scale and geropsychiatric diagnoses in 2 ICU studies.

† In completing the visual ASE, the patients were shown 5 simple pictures (previously published) at 3-second intervals and asked to remember them. They were then immediately shown 10 subsequent pictures and asked to nod "yes" or "no" to indicate whether they had or had not just seen each of the pictures. Since 5 pictures had been shown to them already, for which the correct response was to nod "yes," and 5 others were new, for which the correct response was to nod "no," patients scored perfectly if they achieved 10 correct responses. Scoring accounted for either errors of omission (indicating "no" for a previously shown picture) or for errors of commission (indicating "yes" for a picture not previously shown). In completing the auditory ASE, patients were asked to squeeze the rater's hand whenever they heard the letter A during the recitation of a series of 10 letters. The rater then read 10 letters from the following list in a normal tone at a rate of 1 letter per second: S, A, H, E, V, A, A, R, A, T. A scoring method similar to that of the visual ASE was used for the auditory ASE testing.

Ely, E.W., Inouye, S.K., Bernard, G.R., Gordon, S., Francis, J., May, L., Truman, B., Speroff, T., Gautam, S., Margolin, R., Hart, R.P., & Dittus, R. (2001). Delirium in mechanically ventilated patients: Validity and reliability of the confusion assessment method for the intensive care unit (CAM-ICU). *JAMA*, 286(21), 2703-2710. Table 1, p. 2705. © American Medical Association. All rights reserved.

Training Manual: http://www.icudelirium.org/docs/CAM-ICU-training-manual-2016-08-31_Final.pdf. Copyright © 2002, E. Wesley Ely, MD, MPH and Vanderbilt University, all rights reserved

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