The Delirium Index, a Measure of the Severity of Delirium: New Findings on Reliability, Validity, and Responsiveness

Jane McCusker, MD, DrPH,[*‡] Martin G. Cole, MD,[†§] Nandini Dendukuri, PhD,*[‡] and Eric Belzile, MSc**

OBJECTIVES: To assess the reliability, validity, and responsiveness of an instrument for measuring the severity of delirium, the Delirium Index (DI).

DESIGN: Prospective cohort study, with repeated patient assessments at multiple points in the hospital, at 8 weeks after discharge, and at 6 and 12 months after admission.

SETTING: The medical services of a primary acute-care hospital.

PARTICIPANTS: Medical admissions aged 65 and older: 165 with delirium and dementia, 57 with delirium only, 55 with dementia only, and 41 with neither.

MEASUREMENTS: Severity of delirium symptoms was measured using the DI. Delirium was diagnosed using the Confusion Assessment Method. Other measures included the Mini-Mental State Examination, Informant Questionnaire on Cognitive Decline in the Elderly, Barthel Index (BI), premorbid instrumental activities of daily living, Charlson Comorbidity Index, Clinical Severity of Illness scale (CSI), and the Acute Physiology Score (APS).

RESULTS: The intraclass correlation coefficient of interrater reliability was 0.98. Two measures of fluctuation were significantly higher in patients with delirium than in those without delirium. At baseline, the DI was correlated with the BI, APS, and CSI in delirious patients with (correlation coefficient (r) = -0.43, 0.17, and 0.36, respectively) or without ($r = -0.44$, 0.39, 0.22, respectively) dementia. At 8 weeks, in delirious patients with and without dementia, internal responsiveness as measured by effect sizes was -0.60 and -0.74, respectively, and the standardized response mean for both groups was -0.64. Low to good levels of external responsiveness were found.

CONCLUSION: The DI appears to be a reliable, valid, and responsive measure of the severity of delirium, in patients with delirium, with or without dementia. **J Am Geriatr Soc 52:1744–1749, 2004.**

Key words: aged; delirium; measurement; validity; reliability

From the Departments of *Clinical Epidemiology and Community Studies and [†]Psychiatry, St. Mary's Hospital, Montreal, Quebec, Canada; and Departments of [‡]Epidemiology and Biostatistics and [§]Psychiatry, McGill University, Montreal, Quebec, Canada.

Funded by the Medical Research Council of Canada (MA14709), Fonds de la Recherche en Santé du Québec (980892), and St. Mary's Hospital Center (96–27).

Address correspondence to Jane McCusker, MD, DrPH, Department of Clinical Epidemiology and Community Studies, St. Mary's Hospital, 3830 Lacombe Avenue, Montreal, Québec H3T 1M5, Canada. E-mail: jane.mccusker@mcgill.ca

The Delirium Index (DI)[1] was adapted from a diagnostic measure, the Confusion Assessment Method (CAM),[2] for use in two studies of delirium in medical inpatients: a randomized trial[3] and an observational prospective study of the 12-month outcomes of delirium.[4] The DI was intended as a measure of the severity of delirium for use in delirium research that a research assistant (nonpsychiatrist) could score based on patient observation, without additional information from family members, nursing staff, or the patient's medical chart.[1] Before deciding to use the DI, researchers and clinicians require information on the reliability and validity of this instrument and on its responsiveness to change over time. The objectives of this study were to assess these aspects of the performance of the DI in a much larger sample of older medical inpatients than in the original report.[1]

Aspects of reliability assessed included interrater and internal consistency reliability. Aspects of validity assessed included sensitivity to fluctuations during hospitalization and construct validity at enrollment. It was hypothesized that patients with delirium would show greater within-individual fluctuations in the severity of delirium symptoms than would patients without delirium, regardless of the presence of dementia. Using the method of convergent and divergent construct validation,[5] it was hypothesized that the DI would be correlated more highly with measures of associated constructs (particularly measures of concurrent physical function and acute clinical and physiological severity of illness) than with measures of previous function, chronic illness, or severity of dementia. Using the classification of responsiveness proposed by one study,[6] "internal responsiveness" is defined as the ability of the measure to

0002-8614/04/$15.00

change over a prespecified time, and "external responsiveness" is defined as the extent to which change in a measure reflects change in a reference measure of health status.

Although the primary focus of this study was on the performance of the DI in patients with delirium (with and without dementia), the performance of the DI, a measure specific to delirium, in nondelirious patients (with and without dementia) was also assessed and compared with the performance of the Mini-Mental State Examination (MMSE), a widely used generic measure of cognitive impairment.

METHODS

The data presented are derived from two concurrent studies that used the same measurement instruments, follow-up schedule, and research staff. The methods and details of the numbers of patients enrolled and excluded have been described previously.[4,7] Study subjects were enrolled at a 400-bed, university-affiliated, primary acute-care hospital in Montreal during February 1997 to January 1999. The study was conducted at the same time as a randomized trial of the detection and treatment of delirium, and a subgroup of the patients also participated in the trial. Only patients aged 65 and older who were admitted from the emergency department to the medical services were included in the studies. Excluded patients were those with a primary diagnosis of stroke, admitted to the oncology unit, admitted to the intensive care unit or cardiac monitoring unit unless they were transferred to a medical ward within 48 hours of admission, and who did not speak English or French.

At admission and during the first week of hospitalization, a research nurse screened eligible patients for delirium using the Short Portable Mental Status Questionnaire (SPMSQ)[8] and review of the nursing notes. She administered the CAM[2] to those whose initial SPMSQ score was 3 or more, whose SPMSQ score increased at least 1 point from the first assessment, or whose nursing notes indicated symptoms of delirium. The delirium cohort comprised patients who met CAM criteria for definite or probable delirium.[9] The cohort without delirium was selected from patients screened for, but found to be free of, delirium. To balance the distributions of age and prior cognitive impairment between patients with and without delirium, a stratified sampling method was used based on the patient's age and initial SPMSQ score. Thus, patients without delirium were selected from those aged 70 and older, and only a subsample of patients with SPMSQ scores of less than 3 were included. Patients with an SPMSQ score of 4 or less gave informed consent to participate in the study; those with a score of 5 or more assented to participation, and a relative provided written consent. The hospital's research ethics committee approved the study.

A research assistant, blind to the measurements of the research nurse, interviewed a family member and administered all other study instruments (see below) within 24 hours of enrollment. Follow-up assessments (including the DI) were conducted at least three times during the first week and then weekly during hospitalization, at 8 weeks after discharge (for patients discharged before 8 weeks), and at 6 and 12 months after enrollment.

Delirium Index

The DI includes seven of the 10 symptom domains of the CAM (disorders of attention, thought, consciousness, orientation, memory, perception, and psychomotor activity), each scored on a scale from 0 (absent) to 3 (present and severe) using operational criteria for each score (see Appendix 1). Thus, the total DI score may vary from 0 to 21, a higher score indicating greater severity. The other three domains of the CAM (acute onset, sleep-wake disturbance, fluctuation) are excluded because they do not assess severity (acute onset) or cannot be assessed using patient observation only (fluctuation, sleep-wake disturbance). The DI was scored in conjunction with the MMSE.[10] The first five items of the MMSE were used as the basis of observation for the DI. Additional questions were asked as needed.

Measures of Current Functional and Health Status

The research assistant administered the MMSE,[10] a widely used instrument with established reliability and validity, at enrollment and follow-up.[11] The MMSE score ranges from 0 to 30, a lower score indicating greater cognitive impairment. The research assistant determined the Barthel Index (BI), measuring activities of daily living (ADLs),[12] at enrollment and at postdischarge follow-up, usually at a home visit. Using modified scoring,[13] the total, weighted score ranges from 0 (complete dependence) to 100 (complete independence). The research nurse completed the Clinical Severity of Illness scale at the time of diagnosis of delirium, or at enrollment for those without delirium.[14,15] The score ranges from 1 (minimal) to 9 (most severe). The Acute Physiology Score (APS), derived from the Acute Physiology and Chronic Health Evaluation II scale, was scored based on data in the patient's chart at the time of diagnosis of delirium or at enrollment.[16] The scale ranges from 0 to 56, a higher score indicating greater severity.

Measures of Previous Functional and Health Status

The instrumental activity of daily living (IADL) questionnaire from the Older American Resources and Services project,[17] administered to an informant, was used to assess premorbid function at baseline (before the current illness but not more than 1 month before hospital admission) and current function at follow-up; the scale score ranges from 0 (completely dependent) to 16 (completely independent). Dementia was assessed using the 16-item Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE).[18] Family members reported cognitive change during the previous 10 years, up to the premorbid period. Cutpoints between 3.38[18] and 3.6[19] have been used; an intermediate cutpoint of 3.5 was used in the current study to define dementia. The IQCODE raw score was also used to measure the severity of dementia. A measure of postenrollment cognitive decline was developed, using the IQCODE questions to measure the informant's assessment of cognitive change after enrollment since the premorbid period preceding the index hospital admission. Postenrollment cognitive decline was administered at 6 and 12 months. Comorbidity at admission was assessed using chart review using the Charlson Comorbidity Index, a weighted index that takes into account the number and severity of comorbid conditions

diagnosed in the 12 months before admission, a higher score indicating greater comorbidity.[20]

Statistical Methods

All analyses were conducted in four patient groups, based on the CAM and IQCODE criteria described above: delirium and dementia (CAM positive and IQCODE >3.5; $n = 165$), delirium alone (CAM positive and IQCODE <3.5; $n = 57$), dementia alone (CAM negative and IQCODE >3.5; $n = 55$), and neither (CAM negative and IQCODE <3.5; $n = 41$). Interrater reliability was measured using the intraclass correlation coefficient. Internal consistency was measured using Cronbach alpha at baseline. Patients who could not be assessed on all symptoms were excluded. Fluctuation was assessed using the average within-subject standard deviation (SD) and range in DI scores during the index admission, weighted by number of observations per subject. Observations recorded up to discharge or 9 days, whichever was earlier, were used. Subjects had to have a minimum of two observations. Spearman correlation coefficients were computed between the DI and other instruments (MMSE, BI, Clinical Severity of Illness, APS, IADL, IQCODE, Charlson Comorbidity Index) at baseline. Internal responsiveness was assessed using the changes in DI from baseline to discharge, 8 weeks after discharge, and 6 and 12 months after enrollment. Two different measures of internal responsiveness were used:[6] (1) effect size (ratio of change in mean DI to SD at baseline) and (2) standardized response mean (ratio of change in mean DI to SD of change). The responsiveness of the DI was also examined in 15 patients with incident delirium (i.e., a negative initial CAM followed by a positive CAM). External responsiveness was assessed using Spearman correlation coefficient between change in DI and changes in BI, IADL from baseline to each follow-up assessment, and with postenrollment cognitive decline (6 and 12 months). Confidence intervals (CIs) were estimated for all measures; bootstrap methods were used for CIs for the measures of fluctuation and internal responsiveness. The measures of fluctuation and internal and external responsiveness were also calculated for the MMSE for comparison. For simplicity in describing the magnitude of the measures of correlation or effect size, these are referred to as none, low, moderate, good, and excellent when the absolute value of the Spearman correlation coefficient or effect size was in the range 0.19 or less, 0.20 to 0.39, 0.40 to 0.59, 0.60 to 0.79, and 0.80 and greater, respectively.

RESULTS

Study patients had a mean age of 83.5, 64% were female, 52% had not completed high school, and 71% lived in their own home. The baseline levels of the study variables are shown in Table 1. The majority of patients had delirium superimposed on dementia; these patients had the highest baseline DI scores and the poorest current functional and health status.

Reliability

The Cronbach alpha (standardized) for the DI was 0.74 overall, indicating good internal consistency. The alpha coefficient increased to 0.82 after exclusion of perceptual disturbances, a symptom whose severity was essentially unrelated to the severity of any of the other symptoms. The values of the alpha coefficient in the subgroups of patients, including and excluding perceptual disturbances, were delirium and dementia—0.69 and 0.79; delirium only—0.67 and 0.78; dementia only – 0.55 and 0.59; and neither delirium nor dementia—0.44 and 0.52, respectively.

The interrater reliability of the DI was assessed for a sample of 26 patients spread over the course of the study. Some patients were evaluated multiple times, resulting in a total of 39 pairs of ratings. The intraclass correlation coefficient was 0.98 (SD = 0.06).

Validity

Both measures of fluctuation were significantly higher in those with delirium than in those without delirium, regardless of the presence of dementia The means of the SDs (and 95% CIs) were 2.35 (2.11–2.61) and 1.36 (1.18–1.52) for

Table 1. Baseline Values of Study Variables by Study Group

Variable (Ranges)	Delirium and Dementia (n = 165)	Delirium Only (n = 57)	Dementia Only (n = 55)	Neither (n = 41)	*P*-value*
	Mean ± Standard Deviation				
Delirium Index (range 0–21)†	9.4 ± 3.7	7.1 ± 3.5	5.4 ± 2.7	3.3 ± 2.4	<.001
Barthel Index (range 0–100)‡	36.2 ± 28.3	49.2 ± 30.5	56.2 ± 23.6	63.5 ± 25.5	<.001
Instrumental activities of daily living (range 0–16)	5.6 ± 3.4	10.0 ± 2.9	6.3 ± 3.2	9.1 ± 2.9	<.001
Informant Questionnaire for Cognitive Decline (range 1–5)†	4.5 ± 0.5	3.2 ± 0.2	4.2 ± 0.5	3.2 ± 0.2	<.001
Charlson Comorbidity Index†	2.6 ± 1.9	2.9 ± 2.3	2.0 ± 1.7	1.9 ± 1.8	.01
Acute Physiology Score (range 0–56)†	5.2 ± 3.5	4.9 ± 3.9	3.0 ± 2.6	3.0 ± 2.9	<.001
Clinical Severity of Illness (range 1–9)†	5.3 ± 1.5	5.4 ± 1.2	3.9 ± 1.4	4.0 ± 1.1	<.001
Mini-Mental State Examination (0–30)‡	13.5 ± 7.1	18.2 ± 6.3	19.6 ± 5.5	23.9 ± 3.9	<.001

* Two-tailed F-test.
† Higher score indicates greater severity.
‡ Lower score indicates greater severity.

Table 2. Spearman Correlation Coefficients Between the Delirium Index (DI) and Mini-Mental State Examination (MMSE) and Other Baseline Measures of Current and Prior Health and Functional Status Within Study Groups

	Delirium and Dementia (n = 165)		Delirium Only (n = 57)		Dementia Only (n = 55)		Neither (n = 41)	
Measure	DI	MMSE	DI	MMSE	DI	MMSE	DI	MMSE
MMSE	−0.83*		−0.79*		−0.78*		−0.66*	
Current status								
Barthel Index	−0.43*	0.49*	−0.44*	0.44*	−0.03	0.23	−0.17	0.14
Clinical Severity Index	0.36*	−0.32*	0.22	−0.18	0.04	−0.14	−0.09	−0.10
Acute physiology score	0.17*	−0.14	0.39*	−0.35*	0.24	−0.24	0.26	−0.36*
Prior status								
Instrumental activities of daily living	−0.33*	0.44*	0.04	−0.04	−0.10	0.27*	0.05	0.22
Informant Questionnaire for Cognitive Decline	0.49*	−0.52*	−0.35*	0.45*	0.26	−0.35*	0.01	−0.06
Charlson Comorbidity Index	0.07	−0.07	−0.02	0.09	−0.04	0.05	−0.19	0.04

* 95% confidence interval does not include 0.

patients with and without delirium, respectively. Similar results were found for the MMSE.

Table 2 shows the correlations between the initial DI and MMSE scores and the other baseline measures. Different patterns of correlation were observed in the four subgroups. Low to moderate correlations were found between the DI and the three measures of current status in delirious patients with or without dementia, but the correlations in nondelirious patients were nil except for low correlations between the DI and APS. With respect to the three measures of prior status, low to moderate correlations were found between the DI and the IQCODE in the two study groups with dementia. In patients with delirium alone, a moderate correlation between the DI and IQCODE was observed but in the opposite direction; patients with greater severity of delirium had significantly less prior cognitive change than those with less severe symptoms. A low correlation between the DI and IADL measures was found only in patients with both dementia and delirium. Comorbidity was not correlated with the DI in any subgroup.

Although the magnitudes of the correlations of the MMSE were generally similar to those of the DI, the MMSE had low to moderate correlations with the IADL and the IQCODE in patients with dementia alone and with the APS in patients with neither delirium nor dementia.

Responsiveness

Similar values of the effect size and the standardized response mean were found, indicating that the variability in the DI at baseline was comparable with the variability in the DI change scores. Both of these responsiveness measures were nil to low in all groups at discharge. At the 8-week follow-up, the DI had good responsiveness in delirious patients with and without dementia (effect sizes −0.60 and −0.74; standardized response mean −0.64 in both groups) and moderate responsiveness in nondelirious patients (−0.21 to −0.53). The DI had good to excellent responsiveness at 6 months (effect sizes −0.49 and −0.71; standardized response mean −0.45 and −0.81) and moderate responsiveness at 12 months (effect sizes −0.39 and −0.51; standardized response mean −0.34 and −0.51) in delirious patients with and without dementia. In nondelirious patients, low levels of responsiveness were found for the DI.

The MMSE had similar patterns of internal responsiveness to the DI, although it tended to be less responsive than the DI in patients with delirium, but more responsive than the DI in nondelirious patients, particularly at 6 and 12 months. In the 15 patients with incident delirium, the effect size was 0.38 and the standardized response mean 0.44.

DISCUSSION

The results of this study indicate that the DI is a reliable, valid, and responsive measure of the severity of delirium, with or without dementia. Unlike other measures of delirium severity that usually involve review of the chart and information from healthcare providers and relatives, a trained research assistant can complete the DI based on patient observation alone.

When a trained and experienced research assistant uses the DI, high levels of interrater reliability can be obtained. A good level of internal consistency reliability for the DI was also found in delirious patients with and without dementia. Levels of internal consistency were obtained after exclusion of perceptual disturbance; users of the DI may wish to analyze this symptom separately.

Fluctuations were significantly greater in patients with delirium than those without, supporting its validity. The construct validity of the DI also appears to be satisfactory in patients with delirium, with higher correlations between the DI and measures of current cognitive functional and health status, than with measures of prior status. A good correlation was found between delirium severity and acute physiological severity in patients with delirium alone but not in those with delirium and dementia. In the latter group, a correlation between delirium severity and severity of dementia (IQCODE and IADL) was more prominent. This finding may indicate different etiological factors in these two groups of patients; delirium in a patient without dementia may be linked to the illness leading to admission, whereas delirium in patients with dementia may reflect

primarily the severity of the dementia. Delirium is a strong predictor of 12-month mortality in patients without dementia, but less so in those with dementia.[4]

Several approaches were used to assess the responsiveness to change over time of the DI: two measures of internal responsiveness and several of external responsiveness. Based on these analyses, the DI appears to be a responsive measure over 2 to 12 months in delirious patients and more responsive in those with delirium alone than in those with delirium and dementia, although low values of internal responsiveness were found between admission and discharge. This surprising finding may be related to low levels of mean change (i.e., many patients discharged with symptoms) and high levels of between-patient variability in change during hospitalization. Further evidence of the responsiveness of the DI is its sensitivity to the effects of environmental risk factors and medications during hospitalization.[21,22]

Although the MMSE performed similarly to the DI, the DI appears to be somewhat more responsive in patients with delirium, whereas the MMSE was more responsive in nondelirious patients. These results support the more-specific usefulness of the DI for monitoring the severity of symptoms in delirious patients, whereas the MMSE is a more generic measure of cognitive function suitable for use with different types of patients. Another advantage of using the DI rather than a generic measure such as the MMSE is that the specific symptoms of delirium are assessed systematically, allowing for analysis of the phenomenology and course of delirium.[23]

Strengths of this study include the large sample, with multiple measurements during hospitalization and at follow-up up to 12 months. The measurements of the DI and the MMSE were made independently of most of the other measures. Weaknesses include the nonindependent assessment of current function (BI) and the MMSE and lack of other cognitive measures for construct validation.

The DI appears to be a reliable, valid, and responsive measure for assessing and monitoring the severity of delirium in diagnosed patients. It is particularly appropriate for research using a trained research assistant who is blind to experimental interventions. Clinicians may also use the DI in the same way as other clinical signs to monitor delirium symptoms over time. Further work in different settings, including long-term care, is needed to determine the generalizability of the initial results.

REFERENCES

1. McCusker J, Cole MG, Bellavance F et al. Reliability and validity of a new measure of severity of delirium. Int Psychogeriatr 1998;10:421–433.
2. Inouye SK, VanDyck CH, Alessi CA et al. Clarifying confusion: The Confusion Assessment Method, a new method for detection of delirium. Ann Intern Med 1990;113:941–948.
3. Cole MG, McCusker J, Bellavance F et al. Systematic detection and multidisciplinary care of delirium in older medical inpatients: A randomized trial. Can Med Assoc J 2002;167:753–759.
4. McCusker J, Cole MG, Abrahamowicz M et al. Delirium predicts 12-month mortality. Arch Intern Med 2002;162:457–463.
5. Streiner DL, Norman GR. Health Measurement Scales, 2nd Ed. New York: Oxford University Press, 1995.
6. Husted JA, Cook RJ, Farewell VT et al. Methods for assessing responsiveness: A critical review and recommendations. J Clin Epidemiol 2000;53:459–468.
7. McCusker J, Cole MG, Dendukuri N et al. Delirium in older medical inpatients and subsequent cognitive and functional status: A prospective study. Can Med Assoc J 2001;165:575–583.
8. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. J Am Geriatr Soc 1975;23:433–441.
9. Lewis LM, Miller DK, Morley JE et al. Unrecognized delirium in ED geriatric patients. Am J Emerg Med 1995;13:142–145.
10. Folstein MF, Folstein SE, McHugh PR. 'Mini-mental state'. A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975;12:189–198.
11. Tombaugh TN, McIntyre NJ. The Mini-Mental State Examination: A comprehensive review. J Am Geriatr Soc 1992;40:922–935.
12. Mahoney FI, Barthel DW. Functional evaluation. The Barthel Index. MD State Med J 1965;14:61–65.
13. Shah S, Vanclay F, Cooper B. Improving the sensitivity of the Barthel Index for stroke rehabilitation. J Clin Epidemiol 1989;42:703–709.
14. Charlson ME, Sax FL, MacKenzie R et al. Assessing illness severity: Does clinical judgment work? J Chronic Dis 1986;39:439–452.
15. Inouye SK, Viscoli CM, Horwitz RI et al. A predictive model for delirium in hospitalized elderly medical patients based on admission characteristics. Ann Intern Med 1993;119:474–481.
16. Knaus W, Draper E, Wagner D et al. APACHE II. A severity of disease classification system. Crit Care Med 1985;13:818–829.
17. Fillenbaum G. Multidimensional functional assessment: The OARS methodology—A manual, 2nd Ed. Durham, NC: Center for the Study of Aging and Human Development, Duke University, 1978.
18. Jorm AF. A short form of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE): Development and cross-validation. Psychol Medical 1994;24:145–153.
19. Law S, Wolfson C. Validation of a French version of an informant-based questionnaire as a screening test for Alzheimer's disease. Br J Psychiatr 1995;167:541–544.
20. Charlson ME, Pompei P, Ales KL et al. A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. J Chronic Dis 1987;40:373–383.
21. McCusker J, Cole MG, Abrahamowicz M et al. Environmental risk factors for delirium in hospitalized older people. J Am Geriatr Soc 2001;49:1327–1334.
22. Han L, McCusker J, Cole MG et al. Use of medications with anticholinergic effect predicts clinical severity of delirium symptoms in older medical inpatients. Arch Intern Med 2001;161:1099–1105.
23. McCusker J, Cole M, Dendukuri N et al. The course of delirium in older medical inpatients: A prospective study. J Gen Intern Med 2003;18:696–704.

Appendix 1. The Delirium Index

The Delirium Index (DI) is an instrument for the measurement of severity of symptoms of delirium that is based solely upon observation of the individual patient, without additional information from family members, nursing staff, or the patient's medical chart. The DI was designed to be used in conjunction with the MMSE; at least the first five questions of the MMSE constitute the basis of observation. Additional questions may be necessary for scoring certain symptoms as noted.

1 Inattention
- 0 Attentive.
- 1 Generally attentive but makes at least one error in spelling "WORLD" backwards.
- 2 Questions can generally be answered but subject is distractible and at times has difficulty keeping track of questions. May have some difficulty shifting attention to new questions, or questions may have to be repeated several times.
- 3 Unresponsive or totally unable to keep track of or answer questions. Has great difficulty in focusing attention and is often distracted by irrelevant stimuli.
- 9 Cannot assess.

2 Disorganized thinking
- 0 Responses are logical, coherent, and relevant.
- 1 Responses are vague or unclear.
- 2 Thought is occasionally illogical, incoherent, or irrelevant.

3 Unresponsive or thought is fragmented, illogical, incoherent, and irrelevant.
9 Cannot assess.

3 Altered level of consciousness
0 Normal.
1 Hypervigilant or hypovigilant (glassy eyed, decreased reaction to questions).
2 Drowsy/sleepy. Responds only to simple, loud questions.
3 Unresponsive or comatose.

4 Disorientation (additional questions on age, birth date, and birthplace may be used)
0 Knows today's date (±1 day) and the name of the hospital.
1 Does not know today's date (±1 day) or does not know the name of the hospital.
2 Does not know the month or year or does not know that is in the hospital.
3 Unresponsive or does not know name or birth date.
9 Cannot assess.

5 Memory impairment (Additional questions may be asked on how long patient has been in the hospital, circumstances of admission.)
0 Recalls three words or details of hospitalization
1 Cannot recall one of the words or has difficulty recalling details of the hospitalization.
2 Cannot recall two of the three words or recalls few details of the hospitalization.
3 Unresponsive or cannot recall any of the three words or any details of the hospitalization.
9 Cannot assess.

6 Perceptual disturbances (Patient is asked whether she/he has had any unusual experiences or has seen or heard things that other people do not see or hear. If yes, she/he is asked whether these occur during the daytime or at night and how frequently. Patient is also observed for any evidence of disordered perception.)
0 Unresponsive, no perceptual disturbances observed, cannot assess.
1 Misinterprets stimuli (for example, interpreting a door closing as a gunshot).
2 Occasional nonthreatening hallucinations.
3 Frequent, threatening hallucinations.

7 Motor disturbances
0 Normal.
1 Responds well to questions but moves frequently or is lethargic/sluggish.
2 Moves continuously (and may be restrained) or very slow with little spontaneous movement.
3 Agitated, difficult to control (restraints are required) or no voluntary movement.

Scoring:
Total score is sum of seven item scores.
If questions 1, 2, 4, or 5 are checked "9," replace 9 by the score of item 3.