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Delirium is an acute, transient disturbance in consciousness that is characterized by impaired attention and awareness, with changes in cognition affecting thinking, perception, and memory. These changes develop over a short period of time (hours to days) and fluctuate during the course of the day, tending to be more pronounced at night. The cognitive abnormalities are not explained by an underlying dementia. Patients with delirium also commonly have psychomotor behavior and sleep pattern disturbances.¹⁻³ In practice, however, the ability of medical staff to detect delirium may not always be straightforward.⁴ In a typical busy emergency department (ED), constraints on time can impair the collection of salient historical points and observation of the more subtle clinical signs. Therefore, delirium often is missed, overlooked as senescence, or incorrectly diagnosed as a psychiatric disorder or dementia.⁵⁻⁸ Recent studies have suggested that this occurs with sufficient frequency to warrant consideration of systematic measures to improve accurate

diagnosis.⁹ It is important to note that psychiatric disorders, even when accompanied by acutely psychotic symptoms, do not impair consciousness or cause global cognitive dysfunction.^{10,11}

—The Editor

Delirium: A Systematic Approach to Diagnosis and Initial Management

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Historical Background

The term delirium stems from the Latin word “delirare.” In common usage it meant to be “crazy” and was derived from two other Latin words, “de” and “lira” (“the ridge between furrows”). The literal translation is “to go out of the furrow” while plowing.¹² In the first century AD, Celsus used the term delirium to distinguish a constellation of symptoms from that of hysteria, depression, and mania.¹³ It corresponded to “phrenitis” (English derivative—“frenzy”), which was known to Hip-

pocrates (460-366 BC), who observed the appearance of cognitive and sleep disturbances and agitated behavior in patients with febrile illnesses. The opposite of “phrenitis” was described as “lethargus,” or lethargy, and also occurred with fever.² It was observed that the

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two syndromes could alternate during the course of the illness, and their appearance was a harbinger of worsening disease. Basic management techniques also were known to early physicians and included encouragement of rest and appropriate manipulation of the patient's environment.² Unfortunately, despite early recognition and clinical description of delirium, its more recent history has been plagued by a "terminological muddle."¹⁰ Until the end of the 18th century, the term delirium also was used in reference to general insanity.² Many other labels also are found in medical literature; some 30 synonyms were found by one reviewer, including "acute brain syndrome," "encephalopathy," "acute confusional states," "clouded states," "toxic psychosis," "toxic delirium," "acute organic psychosyndrome," "exogenous psychosis," "acute brain failure," and "pseudosenility."¹⁴ These numerous definitions persisted until 1980, when the first modern standardized criteria for the diagnosis

of delirium appeared in the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition (DSM-III).^{5,15,16} The diagnostic criteria were altered for the 1987 revision of the manual, DSM-III-R,¹⁷ and again in the 1994 version, DSM-IV.¹ These criteria are based on the consensus of expert opinion. However, disagreement still persists regarding the precise definitions of some symptoms and signs. Further, the sensitivity and specificity of the criteria have not been evaluated sufficiently.^{5,16} Of note, "acute confusional state" is the only remaining acceptable synonym for delirium.³

Incidence

The incidence of delirium is difficult to assess. Not only is the prevalence of delirium highly variable and dependent on the clinical situation, but the diagnosis of delirium frequently is missed in a large number of patients. Further, disagreements on terminology and diagnostic criteria make cross-analysis of studies complicated. One study calculated the community point prevalence at 0.4% for persons ages 18-64 years, increasing to 1.1% for individuals 55 years and older.¹⁸ On the other hand, as many as one out of 10 hospitalized medical and surgical patients is delirious at any given time,^{19,20} causing delirium to be one of the leading mental disorders encountered in hospital practice. Delirium does not distinguish between persons based on age, sex, or race; hence, it has been termed "everyman's psychosis."²¹ Notwithstanding, there are certain populations that are more prone to delirium. Risk factors include advanced age, pre-existing dementia or cognitive impairment, severe chronic medical illness, intoxication with legal or illicit substances, and significant pre-existing psychiatric condition.¹³ Medication use, especially polypharmacy, is a factor strongly associated with delirium and tends to be more common in elderly patients.²² As the number of underlying risk factors increases, the likelihood becomes greater that the patient will become delirious during the course of his illness.²³

Delirium is highly prevalent in cancer and acquired immunodeficiency syndrome (AIDS) patients with advanced disease, especially during the last weeks of life, with rates ranging from 25% to 85%.²⁴⁻²⁹ Up to 51% of postoperative patients have delirium.^{2,30} Regarding the ED, data from four recent studies suggest an estimated 10% prevalence of delirium on presentation in patients older than 65^{7,8} or 70 years.^{6,31} The incidence of delirium is increasing as the elderly segment of the population continues to grow.³² Data from studies of elderly patients admitted to medical wards suggest that between 30% and 50% of patients age 70 years or older showed symptoms of delirium at some point during their hospital stay.^{33,34} More significantly, older adult patients who become delirious during hospitalization have an estimated 22-76% chance of dying during that hospitalization.³⁵

To date, there is scant data evaluating the pediatric population. Of the few published studies, it appears that patients with the highest risk of developing delirium are those with acute toxic, metabolic, or traumatic central nervous system (CNS) disorders. Due to limitations in the child's communicative skills and problems in cognitive testing, only the most severe cases are identified readily. Mild delirium in children more frequently is misdiagnosed as a behavioral or social problem.³⁶

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Table 1. Classes of Commonly Used Medications that May Cause Delirium

Antiarrhythmics (i.e., quinidine, disopyramide, amiodarone)
Anticholinergics
Antidepressants
Antiepileptics
Antiparkinson drugs
Antihistamines (H₁ and H₂)
Aspirin
Barbiturates
Benzodiazepines
Beta-blockers
Calcium channel blockers
Chemotherapeutic agents
Corticosteroids
Digitalis glycosides
Non-steroidal anti-inflammatory medications
Opiates
Quinolones

Delirium significantly impacts health care costs. In 1986, it was estimated that if the length of stay for each acutely confused, elderly hospitalized patient could be reduced by just one day, the savings to Medicare would amount to \$1 billion-\$2 billion per year.³⁷ Delirious patients are more likely to have longer hospitalizations, require more intensive nursing care and supervision, and have problems with placement after discharge.^{10,31,38} As mentioned previously, delirious patients have a higher rate of mortality than non-delirious patients with identical underlying medical conditions.^{16,39} Further, affected patients are unable to give informed consent, present a flight risk, are at risk for falls or self-injury, and may become aggressive toward health care staff. Finally, delirious patients tend to pull out their intravenous devices, catheters, drains, and sutures, presenting difficulties with completing necessary procedures and therapy.^{39,40}

Pathophysiology

The pathogenesis of delirium is poorly understood despite landmark studies dating back to the 1940s.⁴¹ Investigators observed that delirium was characterized by global cortical dysfunction associated with characteristic electroencephalographic changes, including slowing of the dominant alpha rhythm and abnormal slow wave activity (except in delirium due to alcohol and sedative withdrawal).⁴² In certain circumstances, such as hypoxia and hypoglycemia, these abnormalities could be reversed, indicating that delirium may involve a disorder of cerebral oxidative metabolism. Investigators also noted that structural brain disorders increase the risk of developing delirium; however, most delirious patients have no identifiable irregularities on imaging studies.⁴¹ These findings support the notion that delirium involves derangement on a biochemical and electrophysiological level.

Currently, delirium is believed to be a disorder of neurotransmission in both cortical and subcortical areas of the brain. Either elevated or decreased levels of neurotransmitters appear to be involved.^{16,39} In particular, cholinergic pathways appear to play a

Table 2. Important Historical Elements in the Diagnosis of Delirium

PATIENT BASELINE

- Occupation
- Social support
- Activities of daily living
- Education
- Substance abuse

HISTORY OF PRESENT ILLNESS

- Time course after changes were first noticed (i.e., hours, days, months)
- Changes over a day (stable or fluctuant)
- Physical symptoms
- History of closed head injury

PRIOR MEDICAL AND SURGICAL HISTORY

- Specific diagnoses, hospitalizations, surgical procedures
- Current medications (including prescription, non-prescription, alternative, onset of regimen, and recent changes in dosage)

significant role in the pathogenesis of delirium. An increase in serum anticholinergic activity correlates with delirium severity in postoperative patients,^{30,43} and a decrease in acetylcholine production occurs in specific medical conditions that precipitate delirium.⁴¹ Serotonin and norepinephrine, given their effects on arousal and sleep, also have been implicated in the pathogenesis of delirium.⁴¹ Other involved neurotransmitters include histamine and gamma-aminobutyric acid (GABA).¹³ Level and activity of neurotransmitters may be affected by any of the following etiologies: drugs and toxins, metabolic abnormalities, infection, malignancy, low perfusion states, dehydration, and malnutrition.⁴⁴ Elderly patients, in particular, are more likely to have a combination of factors, thereby increasing their likelihood of developing delirium.⁴⁵ Fever of any origin may induce delirium, especially in children.³⁶ Of note, in elderly patients, the acute onset of altered mental status is a more common initial sign of severe physical illness (e.g., sepsis, myocardial infarction, and fecal impaction) than fever, pain, or even tachycardia.¹⁰ Drugs and medications, especially anticholinergic agents, are the single most common cause of delirium. Common medications causing delirium are listed in Table 1. Nearly any drug, even in therapeutic doses, can induce delirium; the condition has been reported in young, healthy patients who consume large quantities of cola and coffee.^{46,47} Patients with decreased hepatic or renal function or those individuals taking multiple medications are more likely to be affected.^{22,44,48} If an obvious intoxication cannot be determined, it is imperative to search for other underlying medical causes. In particular, diabetes is the most common metabolic disorder inducing delirium, and hypoglycemia is the most frequent cause of acute confusional state in diabetic patients.

Diagnosis

Delirium may develop at any time during hospitalization. The salient features of delirium as described in the DSM-IV include:¹

1. Disturbance of consciousness (i.e., reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention;

2. A change in cognition (e.g., memory deficit, disorientation, language disturbance) or the development of a perceptual disturbance that is not accounted for better by a pre-existing, established, or evolving dementia;

3. The disturbance develops during a short period (usually hours to days) and tends to fluctuate during the course of the day. There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by the direct physiologic consequences of a general medical condition, substance intoxication or side effect, substance withdrawal, multiple factors, or unidentified etiology. For substance intoxication, side effects, or withdrawal, there must be a temporal or etiologic relationship to the disturbance.

Diagnosis of delirium is obvious when the patient becomes acutely agitated, uncooperative, and confused. However, delirious patients can present in a hypoactive state, with a dulled response to their environment. As a consequence, these patients may not draw attention and easily are overlooked and misdiagnosed.³⁹ On the other hand, highly hyperactive patients who are combative, agitated, and aggressive are more likely to be transferred to the care of a psychiatrist without a proper medical examination.¹³

Delirium in patients with a known psychiatric diagnosis (e.g., depression or schizophrenia) may be attributed mistakenly to worsening of the underlying psychiatric illness. Patients with delirium typically have cognitive disturbances. Problems with the ability to focus may cause impairment in registering new information, thereby affecting recall. Of note, long-term memory is preserved.¹⁹ Thought processes typically are rambling and incoherent, and affected individuals are unable to plan actions or solve problems.¹⁰ These derangements can be subtle and may be overlooked by the treating clinician. Visual disturbances include alterations in perceived size, shape, and number of objects. Abnormal perceptions tend to have basis in reality; for instance, a blanket may appear as a pet cat. Hallucinations, or unrealistic perceptions, are less common and tend to be seen in younger patients with substance intoxication or withdrawal. Patients may exhibit rapid shifts between depression, paranoia, fear, and agitation. Euphoria is uncommon.¹³ The onset of delirium is sudden, evolving over hours to days. Symptoms usually fluctuate throughout the course of a day, and the most severe episodes often occur in the evening (sundowning) in association with excessive stimulation and disruption of the sleep-wake cycle. By definition, delirium is transitory, and full recovery to baseline within days to weeks is expected once the underlying disorder is resolved.

There are two diagnostic challenges in the assessment of delirium. First, the clinician must recognize that the disorder is present. Second, the patient needs to be evaluated for medical conditions precipitating the disorder. In spite of medical advances, the history and physical examination remain the cornerstones in the evaluation of delirium. Important historical elements are included in Table 2. If delirium is suspected, the evaluation shifts focus on eliciting the factors that characterize the dis-

Table 3. The Folstein Mini-Mental State Examination

MAXIMUM SCORE	SCORE	
		Orientation
5	—	• What is the (year) (season) (date) (day) (month)?
5	—	• Where are we: (state) (county) (town) (hospital) (floor)?
		Registration
3	—	• Name three objects: Allow one second to say each. Then ask the patient all three after you have said them. Give 1 point for each correct answer. Then repeat them until patient learns all 3. Count trials and record.) Trials: —
		Attention and Calculation
5	—	• Serial 7s. One point for each correct. Stop after five answers. Alternatively, have the patient spell the word "world" backward.
		Recall
3	—	• Ask for the three objects repeated above. Give 1 point for each correct.
		Language
9	—	• Show the patient a pencil and a watch and have him name each object. (2 points).
	—	• Repeat the following: "No ifs, ands, or buts." (1 point)
	—	• Follow a three-stage command: "Take a sheet of paper in your right hand, fold it in half, and put it on the floor." (3 points)
	—	• Read and obey the following: Close your eyes. (1 point) - Write a sentence. (1 point) - Copy design. (1 point)
		
		• Assess level of consciousness along a continuum: alert; drowsy; stupor; coma.
Total score	—	

Adapted from: 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.

order. Medical personnel who utilize the DSM-IV criteria as described increase the chance of making an accurate diagnosis.⁴¹ Initial assessment should commence with the patient's level of consciousness. Patients should be queried for their level of orientation and on routine items to reveal any memory deficits. Fre-

quently, the clinician may notice a disorganized thought process during the conversation. It also is important to talk with relatives and caregivers to find out the patient's baseline mental status.

Formal cognitive testing is important in the evaluation of a patient with suspected delirium. The current American College of Emergency Physicians (ACEP) clinical policy regarding patients with altered mental status encourages the use of the Folstein Mini-Mental Status Exam (MMSE, shown in Table 3) when initial assessment reveals agitated or lethargic states or raises suspicion of cognitive abnormalities.^{49,50} Since its introduction in 1975, the MMSE's performance has been widely studied. MMSE score variability due to specific patient characteristics is well known; adjustments to the passing score (usually greater than or equal to 24) that account for patient age and educational level, for example, have been established.⁵¹ While this exam is familiar to most clinicians, it is by no means alone in the arena of clinical cognitive testing. During the past 40 years, diagnostic systems have evolved and a myriad formal cognitive tests or assessments of mental status have been developed and evaluated in the medical literature. Table 4 lists some systems and several delirium-specific tests as well as general cognitive tests that have been applied to delirium assessment.^{1,15,19,50,52-73} It is by no means an exhaustive compilation, but illustrates their abundance. However, since the presence of dementia must be considered as an alternate or additional diagnosis (see below), particularly in the elderly, it is worth noting that only the MMSE, the Blessed Information-Memory-Concentration (BIMC) test, the Blessed Orientation-Memory-Concentration (BOMC) test, and the Short Test of Mental Status (STMS) were recommended for use in the 1996 Agency for Health Care Policy and Research guidelines regarding the initial assessment of the dementia patient.^{50,66-68,74}

Attempts to refine cognitive testing for speed, ease of use, and accuracy in the ED environment continue, consistent with a perceived need for a short, standardized MSE in emergency medicine.⁷⁵ Tables 5a-b show one recent example, a derivative of the BOMC test called the Quick Confusion Scale (QCS).^{73,76}

Once cognitive deficits have been elicited, the clinician should determine whether delirium is present. While no instrument can substitute for clinical acumen, several tools are available that may aid in diagnosis and allow for standardized observations. In 1994, one reviewer noted 18 published instruments designed and used specifically in the assessment of delirium, some of which are included in Table 4.⁵ Two of these, the Confusion Assessment Method (CAM) and the Delirium Rating Scale (DRS), are validated means to distinguish between delirium and dementia.^{16,54,57,74} The CAM shown in Table 6 is a delirium screening instrument based on operationalization of DSM-III-R criteria for use by non-psychiatric clinicians in high-risk settings.¹⁶ Published in 1990, it has become popular in clinical research and has been used in several studies of ED patients as an expeditious, standardized tool for diagnosing delirium.^{6-8,31} In comparison with other instruments, it has been found to have the best combination of ease, speed of use, reliability, and validity.⁷⁷ The aforementioned ACEP guidelines suggest use of the CAM in the same clinical circumstances that warrant administration of an MMSE

Table 4. Delirium Assessment Methods

DIAGNOSTIC CLASSIFICATION SYSTEMS ^{2,16,18,53,54}

- DSM-III, III-R, IV, ICD 9, 10

DIAGNOSTIC INSTRUMENTS AND RATING SCALES FOR DELIRIUM ⁵⁵⁻⁶⁶

- Confusion Assessment Method
- Delirium Symptom Interview
- Cognitive Test for Delirium
- Confusion Rating Scale
- Memorial Delirium Assessment Scale
- Organic Brain Syndrome Scale
- Confusion Assessment Method—ICU
- Delirium Rating Scale
- Abbreviated Cognitive Test for Delirium
- Saskatoon Delirium Checklist
- Delirium Writing Test
- Delirium Assessment Scale

COGNITIVE IMPAIRMENT SCREENING TESTS ⁶⁷⁻⁷⁴

- Mini-Mental State Exam
- Short Test of Mental Status
- Mental Status Questionnaire
- Abbreviated Mental Test
- Quick Confusion Scale
- Blessed Information Memory Concentration Test
- Blessed Orientation Memory Concentration Test
- Short Portable Mental Status Questionnaire
- Brief Mental Status Examination

evaluation.⁴⁹ In its initial validation trial, data from two study centers revealed a sensitivity of 94-100% and a specificity of 90-95% for delirium compared to formal assessment by a psychiatrist.⁵⁴ The authors of the CAM acknowledge, however, that this level of performance is dependent on the "proficiency and thoroughness of the primary observations on which the CAM ratings are based."⁵⁴ Notably, in the validation study and in several ED studies, the diagnosis of delirium by the CAM followed patient evaluation with schemes that included the MMSE.^{7,8,31,54} A derivative of the CAM, the CAM-ICU, recently was published for use with patients who are nonverbal due to mechanical ventilation.⁵⁵ It includes accommodations for visual and hearing impairment and is consistent with DSM-IV delirium criteria.

Dementia is the most significant differential diagnosis of delirium. Refer to Table 7 for a comparison between delirium and dementia. Both delirium and dementia are cognitive impairment disorders that share common features, including impaired memory, thinking, judgment, and disorientation.⁷⁸ However, patients with dementia do not have alterations in consciousness typical of delirium. Symptoms of dementia tend to be more subacute and progressive and, most importantly, usually are irreversible. Further, disorders of both long- and short-term memory, judgment, and abstract thinking are more common in dementia.⁷⁸ Of note, delirium in the last 24-48 hours of life may not be reversible and is referred to as terminal delirium in the palliative

Table 5a. The Quick Confusion Scale

ITEM	NUMBER CORRECT	x WEIGHT	=	TOTAL
1. What year is it now?	0 or 1 (score 1 if correct, 0 if incorrect)	x 2	=	—
2. What month is it?	0 or 1	x 2	=	—
3. Present memory phrase: “Repeat this phrase after me and remember it: <u>John Brown</u> , <u>42 Market Street, New York.</u> ”				
4. About what time is it? (Answer correct if within one hour)	0 or 1	x 2	=	—
5. Count backward from 20 to 1.	0, 1, or 2	x 1	=	—
6. Say the months in reverse.	0, 1, or 2	x 1	=	—
7. Repeat memory phrase (each underlined portion correct is worth 1 point)	0, 1, 2, 3, 4, or 5	x 1	=	—
Final score is the sum of the totals			=	—

Adapted from: Huff JS, Farace E, Brady WJ, et al. The quick confusion scale in the ED: Comparison with the mini-mental state examination. *Am J Emerg Med* 2001;19:461-464.

Table 5b. Explanation of Scoring for Quick Confusion Scale

The highest number in category indicates correct response; decreased scoring indicates increased number of errors.	
1. What year is it now?	Score 1 if answered correctly, 0 if incorrect.
2. What month is it?	Score 1 if answered correctly, 0 if incorrect.
3. About what time is it?	Answer considered correct if within one hour; score 1 if correct, 0 if incorrect.
4. Count backward from 20 to 1.	Score 2 if correctly performed; score 1 if one error, score 0 if two or more errors.
5. Say the months in reverse.	Score 2 if correctly performed; score 1 if one error, score 0 if two or more errors.
6. Repeat memory phrase: <u>John Brown</u> , <u>42 Market Street, New York.</u>	Each underlined portion correctly recalled is worth 1 point in scoring; score 5 if correctly performed; each error drops score by one.

Final score is sum of the weighted totals; items one, two, and three are multiplied by 2 and summed with the other item scores to yield the final score.

Adapted from: Huff JS, Farace E, Brady WJ, et al. The quick confusion scale in the ED: Comparison with the mini-mental state examination. *Am J Emerg Med* 2001;19:461-464.

literature; in these cases, delirium likely is caused by irreversible processes such as multi-organ failure.⁷⁸

Patient Evaluation

Once the diagnosis of delirium is made, efforts should shift to identifying an underlying cause. Risk factors that can precipitate delirium should be sought as part of the medical history. (See Table 2.) Of significance is the patient’s age, existence of underlying brain abnormalities (e.g., cerebrovascular accident, closed head injury, and dementia), psychiatric illness, or chronic medical conditions (e.g., renal failure, liver disease, chronic obstructive pulmonary disease, and congestive heart failure). As mentioned before, a detailed medication history is imperative. Patients who abuse legal or illicit drugs may become delirious secondary to either intoxication or withdrawal symptoms. Table 8 lists the more common causes of delirium. Physical examination should be thorough to detect etiologic clues in the assessment of the neu-

rological, cardiopulmonary, metabolic, and gastrointestinal status of the patient. In particular, fluid status, vital signs, and the appearance of localizing signs of infection are important.⁴¹ Extensive laboratory testing has not been proven to be helpful in the absence of historical or physical findings.^{5,79} Accordingly, unless otherwise indicated, an initial laboratory evaluation, including a complete blood count looking for evidence of infection, malignancy, or anemia, and blood chemistry studies (i.e., electrolytes, calcium, magnesium, glucose, AST [aspartate aminotransferase], ALT [alanine aminotransferase], alkaline phosphatase, albumin, bilirubin, blood urea nitrogen [BUN], and creatinine) looking for electrolyte, glucose, hepatic, and renal abnormalities is appropriate.¹³ Hypoxia may be ruled out by pulse oximetry, and an arterial blood gas may be required if an acid-base disturbance is suspected. Chest radiography and urinalysis are required if pneumonia or urinary tract infection is suspected. An electrocardiogram should be performed in patients with a cardiac history or risk factors.

Table 6. The Confusion Assessment Method (CAM) Diagnostic Algorithm*

FEATURE 1. ACUTE ONSET AND FLUCTUATING COURSE

This feature usually is obtained from a family member or nurse and is shown by positive responses to the following questions: Is there evidence of an acute change in mental status from the patient's baseline? Did the (abnormal) behavior fluctuate during the day, that is, tend to come and go, or increase and decrease in severity?

FEATURE 2: INATTENTION

This feature is shown by a positive response to the following question: Did the patient have difficulty focusing attention, for example, being easily distractible or, having difficulty keeping track of what was being said?

FEATURE 3: DISORGANIZED THINKING

This feature is shown by a positive response to the following question: Was the patient's thinking disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?

FEATURE 4: ALTERED LEVEL OF CONSCIOUSNESS

This feature is shown by any answer other than "alert" to the following question: Overall, how would you rate this patient's level of consciousness (i.e., alert [normal]; vigilant [hyperalert]; lethargic [drowsy, easily aroused]; stupor [difficult to arouse]; or coma [unarousable])?

* The diagnosis of delirium by CAM requires the presence of features 1 and 2 and either 3 or 4.

Adapted from: Inouye S, van Dyck C, Alessi C, et al. Clarifying confusion: The confusion method. *Ann Intern Med* 1990;113:941-948.

Routine use of head computerized tomography (CT) and magnetic resonance imaging (MRI) is not recommended.⁴¹ Lumbar puncture (LP) may not be required for febrile, delirious patients without meningitic or encephalitic stigmata who have another obvious source of infection.^{5,39,80} In one study, investigators showed that of only one out of 81 elderly patients who presented with delirium and fever had a bacterial central nervous system infection.⁸⁰ Notwithstanding, LP should be considered strongly in patients who are immunocompromised, such as individuals with AIDS or who are taking chronic immunosuppressive therapy. Such individuals are unlikely to show the classic signs and symptoms of meningitis, including headache, fever, and stiff neck. Patients with evidence of increased intracranial pressure warrant a head CT scan prior to performing the LP. Depending on the clinical situation, further diagnostic testing may be modified to the suspected disease process. Electroencephalography has limited utility in the ED but may be diagnostic in nonconvulsive status epilepticus.

Management

The management of delirium in the ED is divided into four components: 1) treatment of the underlying disorder; 2) symptomatic treatment; 3) supportive care; and 4) disposition. As noted previously, the cause of delirium is multi-factorial and involves precipitating elements superimposed on patient susceptibility. Data suggest that there are six risk factors that trigger the development of delirium: cognitive impairment, sleep deprivation, immobility, visual impairment, hearing impairment, and dehydration.⁴¹ Intervention in these areas, beginning in the ED, may decrease the incidence of delirium by 34%.⁸¹ Delirium is associated with significant morbidity and mortality and should be perceived as a medical emergency. In some cases, delirium may be the first indication of a catastrophic event, such as myocardial infarction or sepsis. A detailed review of pre-existing factors and underlying

medical conditions is warranted. If a specific cause cannot be established, focus should be placed on supportive measures.

Prehospital care involves close adherence to the ABCs of emergency management (airway, breathing, and circulation) and, if trauma is suspected, cervical spine immobilization. If it is not possible to determine the patient's oxygenation saturation, the patient should be placed on supplemental oxygen during transport. Accordingly, if the patient is suspected to be hypoglycemic or if the serum glucose level cannot be assessed, the patient should be administered 50 mL of 50% intravenous (IV) dextrose solution or 1 mg of glucagon intramuscularly (IM). Patients who appear to be nutritionally deficient may be predisposed to Wernicke's encephalopathy; such individuals likely would benefit from immediate treatment with 100 mg of IV thiamine prior to the administration of glucose. Additional thiamine doses may be titrated until the ophthalmoplegia resolves. Of note, patients with resistance to thiamine may have hypomagnesemia because magnesium is a cofactor for thiamine transketolase. Control of fever and pain may be accomplished via sensible selection of antipyretics and analgesics. Delirium secondary to hyponatremia, hypernatremia, hypercalcemia, dehydration, endocrine, renal, or hepatic disease requires management according to established standards and supportive care until the underlying abnormality is corrected over a period of hours to days. Drug-intoxication-induced delirium also typically resolves over several hours as the patient detoxifies. Prompt attention in the ED is required for acute intoxication from a number of drugs or chemical agents, including carbon monoxide, tricyclic antidepressants, anticholinergic agents, cholinesterase inhibitors, cyanide, and methanol. Supportive therapy is the mainstay of treatment for most of these poisonings, but a few require specific antidotes.⁸² For example, pesticides containing anticholinergic agents may require pralidoxime chloride (2-PAM) and significant amounts of atropine; conversely, intoxications from pesti-

cides containing cholinesterase inhibitors may be distinguished and treated with IV physostigmine (with due regard for the possibility of serious side effects, including bradycardia, asystole, bronchospasm, increased secretions, aspiration, and seizures).⁸²

Indications for sedation are directed toward behavioral manifestations of delirium.¹³ Aggressive management of agitation may be required to prevent injury or to permit further evaluation and treatment. Caution is imperative in the use of physical restraint, as it can lead to increased agitation, social isolation, and increased morbidity.⁸³ To date, there have been no large, controlled studies using standardized techniques for diagnosing delirium and monitoring improvement of delirium symptoms that have established the superiority of specific drug regimens.^{13,84} However, antipsychotic agents, notably haloperidol (Haldol), used alone or in conjunction with benzodiazepines, commonly are cited as the optimal pharmacological management.⁴⁴ Antipsychotic efficacy has been shown in numerous case reports and uncontrolled trials involving delirious patients, as well as controlled trials in which they were used to treat agitation and psychotic behavior in medically ill and geriatric patient groups.⁸⁵⁻⁹¹ In one study of 30 patients with delirium diagnosed and monitored by standardized measures, antipsychotics were superior to benzodiazepines.²⁴ Haloperidol generally is considered to be the antipsychotic of first choice in delirium treatment, as it is effective in controlling agitation and psychotic behavior, has little or no anticholinergic activity, and causes relatively minimal sedation and hemodynamic change.^{10,44} Haloperidol may be given orally, IM, or IV; IV use however, is not FDA-approved. Oral dosing can be subject to unpredictable absorption, but may be appropriate if less acute control is needed or one is negotiating treatment options with a frightened or suspicious patient. Starting doses of 1-2 mg repeated every 2-4 hours as needed, or 0.5-2 mg every four hours for the elderly, have been suggested.⁸⁴ Bolus IV doses usually range from 0.5-20 mg.¹⁶ The onset of action of haloperidol is relatively fast, within 3-19 minutes, and its elimination half-life is 10-19 hrs.¹⁶ During the initial phase of treatment, supplementary parenteral doses may be given after reassessment at 30 minutes. Higher doses and shorter dosing intervals may be required for more severely agitated patients according to clinical judgment in individual cases. Total daily doses of hundreds of milligrams and continuous infusions of 15-25 mg/hr have been reported in intensive care unit (ICU) settings.⁹² Droperidol (Inapsine) can be considered for patients with delirium when more rapid control of agitation is needed, but is more likely to cause sedation and hypotension.⁹¹ Significant potential side effects of antipsychotics include extrapyramidal symptoms and neuroleptic malignant syndrome. Haloperidol also may lower the seizure threshold and prolong the QT interval, leading to torsades de pointes and ventricular fibrillation. The latter is associated with higher doses (more than 35 mg/day) of IV haloperidol, but also has been reported with both lower IV and oral dosing regimens.^{93,94} QT interval prolongation and subsequent ventricular dysrhythmias also may occur with droperidol. Special attention, therefore, should be given to the corrected QT interval on baseline and subsequent electrocardiograms when antipsychotic therapy is administered. Prolongation beyond 440 msec in males (450 msec in females), or more than 25% over baseline may warrant telemetry,

Table 7. The Differential Diagnosis of Delirium and Dementia

	DELIRIUM	DEMENCIA
ONSET	Acute, often at night	Insidious
COURSE	Fluctuating, day-time lucid intervals, night-time exacerbation	Stable over the course of the day
DURATION	Days to weeks, reversible	Months or years, progressive
CONSCIOUSNESS	Reduced	Clear
ATTENTION	Impaired	Normal, except in severe dementia
ORIENTATION	Usually impaired for time; unfamiliar tendency to mistake for familiar places and persons as severity increases	Often impaired
MEMORY	Immediate and recent impaired, remote memory intact	Recent and remote impaired
THINKING	Disorganized, incoherent	Impoverished
PERCEPTION	Illusions and hallucinations common, visual more often than auditory	Often absent
SPEECH	Incoherent, hesitant, slow or rapid	Difficulty in finding words
PSYCHOMOTOR	Increased, reduced or unpredictable changes	Often normal
PHYSICAL ILLNESS OR DRUG TOXICITY	One or both present	Often absent, especially in Alzheimer's disease

discontinuation of the medication, and cardiology consultation.⁸⁴ Newer neuroleptics, such as olanzapine and risperidone, appear to have similar efficacy with reduced side effects; however, there is less evidence to support their use at this time.

Benzodiazepines are the drugs of choice in patients suffering from alcohol and sedative withdrawal syndromes and also are useful in gamma-hydroxybutyrate withdrawal syndrome.^{41,95} In other forms of delirium, however, benzodiazepine monotherapy can produce paradoxical excitation through disinhibition and has been shown to cause further cognitive impairment.²⁴ Thus, ben-

zodiazepines generally are used in combination with neuroleptics to facilitate lower doses of these agents and thereby reduce extrapyramidal side effects. Agents that are metabolized predominantly by simple glucuronidation and have no active metabolites such as lorazepam (Ativan) are preferred, particularly for patients who have hepatic insufficiency or who are taking medications that are metabolized by the cytochrome P450 system.⁸⁴ Following a study of combined lorazepam and haloperidol therapy for delirium in cancer patients, researchers suggested that 0.5-1 mg lorazepam and 3 mg haloperidol be given initially, both by the IV route.⁸⁵ Reassessment in 20 minutes and additional IV doses of 0.5-2 mg lorazepam and 5 mg haloperidol as needed also is recommended. Side effects of benzodiazepines include oversedation, hypotension, and respiratory depression, which can be life-threatening. Benzodiazepines usually are contraindicated in hepatic encephalopathy due to the accumulation of glutamine, which chemically is related to GABA.⁸⁴

Adjunctive therapies include manipulation of the patient's physical environment. A quiet, well-lit examination room set at a comfortable temperature with a clearly visible clock is ideal. If the patient normally wears glasses or a hearing aid, these devices should be readily available. Attention to basic physical requirements, including food, clean bedding, and bowel and bladder needs is important.^{20,40} Delirious patients require continuous observation, frequent reassurance and reorientation, and simple but firm communication. The presence of family members, familiar caregivers, and familiar objects may be helpful by providing reassurance and minimizing agitation.

Consultation and admission to the hospital is likely to be required in cases where the cause of delirium has not been identified and treated or when delirium symptoms have not resolved completely during the ED stay.^{13,49} Depending on availability, other continued care options may be more appropriate to certain situations.⁴⁹

Summary

Delirium is a true medical emergency that is associated with substantial patient morbidity and mortality. Due to the variability in its presentation, delirium can mimic chronic dementia or another psychiatric illness, obscuring the underlying physical or toxic problem. Elderly patients are particularly at risk for delirium, and studies reveal that approximately 10% of older ED patients will meet the criteria for delirium.^{6-8,31} Of note, 26-40% of older ED patients will show cognitive impairment when formal mental status testing is performed, and the vast majority of affected individuals will have no previous history of dementia or cognitive difficulties.^{6,31} Unfortunately, most cases of delirium go unnoticed; ED staff only seem recognize a small percentage of patients (17-33%) with delirium or cognitive impairment.⁶⁻⁸ Consequently, many older patients with delirium are being discharged from the ED. In one study, 38% of patients who met criteria for delirium were sent home from the ED with the most common discharge diagnosis being "status post fall."⁷ Investigators also showed that the three-month mortality rate for patients with delirium was 14% as compared to 8% for patients without delirium.⁷ As acute mental status

Table 8. Causes of Delirium

The causes of delirium are listed according to the "I Watch Death" mnemonic.

CAUSE	FORM
Infectious (especially in immunosuppressed patients)	Sepsis, urinary tract infection, pneumonia, encephalitis, meningitis, syphilis, CNS abscess
Withdrawal	Alcohol, barbiturates, sedative hypnotics
Acute metabolic	Acidosis, electrolyte disturbance, hepatic and renal failure, other metabolic disturbances (glucose, Mg 2+ , Ca 2+)
Trauma	Head trauma, burns
CNS disease	Hemorrhage, cerebrovascular accident, vasculitis, seizures, tumor
Hypoxia	Acute hypoxia, chronic lung disease, hypotension
Deficiencies	B ₁₂ , hypovitaminosis, niacin, thiamine
Environmental and endocrine	Hypothermia, hyperthermia Diabetes, adrenal, and thyroid dysfunction
Acute vascular	Myocardial infarction, hypertensive emergency, subarachnoid hemorrhage, sagittal vein thrombosis
Toxins & drugs	Medications, street drugs, alcohols, pesticides, industrial poisons: carbon monoxide, cyanide, solvents, etc.
Heavy metals	Lead, mercury

CNS = Central nervous system

Adapted from: Wise MG. Delirium: Differential diagnosis for delirium: Critical items (I WATCH DEATH). In: Yudofsky SC, Hales RE, eds. *The American Psychiatric Press Textbook of Neuropsychiatry*. 2nd ed. Washington, DC: American Psychiatric Publishing; 1992.

changes may be the first sign of serious underlying disease, data from these studies raise legitimate concerns about the quality of care of older patients in ED. Demographic projections in the United States demonstrate that the elderly are the fastest-growing segment of the population. In 1996, the Society for Academic Emergency Medicine (SAEM) Geriatric Emergency Medicine Task Force recommended that all older ED patients receive some assessment for delirium and cognitive impairment.⁹⁶ Screening questions for orientation and three-item recall may help identify patients who should undergo further evaluation with standardized formal instruments, such as the MMSE and CAM.

Due to the nature of delirium, the diagnostic workup is not algorithmic and must be adapted to the individual. If there is no readily identifiable cause, treatment should focus on the disorder itself. Supportive care should consist of a multidisciplinary

approach, including medication and modification of physical environment aimed at maximizing the patient's medical status and conscientiously avoiding the conditions that are known to precipitate delirium. Delirious patients whose symptoms do not resolve totally in the ED should be admitted for further evaluation or observation. Clinical decision support systems have been shown to improve and standardize the quality of care.⁹ Charts may be used to remind ED staff to perform more comprehensive mental status evaluations for the elderly and for all patients with suspected delirium. In addition, implementation of protocols to assist with further evaluation and disposition of delirious patients may be required. Finally, educational projects to raise awareness of the prevalence of delirium and quality control programs are other considerations that ultimately may aid in improving the detection and management of this ancient but still exceedingly common affliction.

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Emergency Medicine Reports

CME Objectives

To help physicians:

- quickly recognize or increase index of suspicion for specific conditions;
- understand the epidemiology, etiology, pathophysiology, and clinical features of the entity discussed;
- be educated about how to correctly perform necessary diagnostic tests;
- take a meaningful patient history that will reveal the most important details about the particular medical problem discussed;
- apply state-of-the-art therapeutic techniques (including the implications of pharmaceutical therapy discussed) to patients with the particular medical problems discussed;
- understand the differential diagnosis of the entity discussed;
- understand both likely and rare complications that may occur;
- and provide patients with any necessary discharge instructions.

of agitated and combative patients. *Ann Emerg Med* 1992;21:407-413.

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Physician CME Questions

121. Which of the following is the most common cause of delirium?
- A. Sepsis
 - B. Medications
 - C. Hypoglycemia
 - D. Hypoxia
122. Delirium may be the earliest presenting symptom in an elderly patient suffering from:
- A. acute coronary syndrome.
 - B. sepsis.
 - C. fecal impaction.
 - D. all of the above.
123. Patients suffering from delirium may exhibit all of the following symptoms *except*:
- A. visual disturbances.
 - B. loss of long-term memory.
 - C. inability to plan actions or solve problems.
 - D. rambling thought processes.
124. Initial laboratory workup of a patient suspected of delirium should include all of the following *except*:
- A. complete blood count.
 - B. serum electrolytes.
 - C. liver function tests.
 - D. thyroid function tests.
125. Routine head computerized tomography is recommended in the workup of delirious patients.
- A. True
 - B. False
126. Which of the following is true of haloperidol?
- A. It generally is considered to be the antipsychotic of first choice for delirium treatment.
 - B. It is effective in controlling agitation and psychotic behavior.
 - C. It has little or no anticholinergic activity.
 - D. It causes relatively minimal sedation.
 - E. All of the above.
127. Benzodiazepines are the drug of choice in treating patients suffering

from alcohol and sedative withdrawal syndromes.

- A. True
 - B. False
128. Which of the following risk factors may trigger delirium?
- A. Sleep deprivation
 - B. Visual impairment
 - C. Dehydration
 - D. Immobility
 - E. All of the above
129. In contrast to delirium, dementia tends to be stable during the course of a day.
- A. True
 - B. False
130. Which of the following adjunctive therapies may be helpful to delirious patients?
- A. A noisy, bright room set at a cool temperature
 - B. Little observation from medical personnel is required until the patient recovers on his own.
 - C. Frequent reassurance and familiar people or objects
 - D. Manipulation of the patient's environment is not helpful.

In Future Issues:

Cardiotoxins

CME Answers

	126. E
121. B	127. A
122. D	128. E
123. B	129. A
124. D	130. C
125. B	

CME Instructions

Physicians participate in this continuing medical education program by reading the article, using the provided references for further research, and studying the questions at the end of the article. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to evaluate their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material. **After completing this activity, you must complete the evaluation form that is provided in this issue and return it in the reply envelope provided to receive a certificate of completion.** When your evaluation is received, a certificate will be mailed to you.

Emergency Medicine Reports

The Practical Journal for Emergency Physicians

Delirium

Classes of Commonly Used Medications that May Cause Delirium

- Antiarrhythmics (i.e., quinidine, disopyramide, amiodarone)
- Anticholinergics
- Antidepressants
- Antiepileptics
- Antiparkinson drugs
- Antihistamines (H₁ and H₂)
- Aspirin
- Barbiturates
- Benzodiazepines
- Beta-blockers
- Calcium channel blockers
- Chemotherapeutic agents
- Corticosteroids
- Digitalis glycosides
- Non-steroidal anti-inflammatory medications
- Opiates
- Quinolones

Causes of Delirium

The causes of delirium are listed according to the "I Watch Death" mnemonic.

CAUSE	FORM
Infectious (especially in immunosuppressed patients)	Sepsis, urinary tract infection, pneumonia, encephalitis, meningitis, syphilis, CNS abscess
Withdrawal	Alcohol, barbiturates, sedative hypnotics
Acute metabolic	Acidosis, electrolyte disturbance, hepatic and renal failure, other metabolic disturbances (glucose, Mg 2+ , Ca 2+)
Trauma	Head trauma, burns
CNS disease	Hemorrhage, cerebrovascular accident, vasculitis, seizures, tumor
Hypoxia	Acute hypoxia, chronic lung disease, hypotension
Deficiencies	B ₁₂ , hypovitaminosis, niacin, thiamine
Environmental and endocrine	Hypothermia, hyperthermia Diabetes, adrenal, and thyroid dysfunction
Acute vascular	Myocardial infarction, hypertensive emergency, subarachnoid hemorrhage, sagittal vein thrombosis
Toxins & drugs	Medications, street drugs, alcohols, pesticides, industrial poisons: carbon monoxide, cyanide, solvents, etc.
Heavy metals	Lead, mercury

CNS = Central nervous system

Adapted from: Wise MG. Delirium: Differential diagnosis for delirium: Critical items (I WATCH DEATH). In: Yudofsky SC, Hales RE, eds. *The American Psychiatric Press Textbook of Neuropsychiatry*. 2nd ed. Washington, DC: American Psychiatric Publishing; 1992.

The Folstein Mini-Mental State Examination

MAXIMUM SCORE	SCORE	
5	___	Orientation • What is the (year) (season) (date) (day) (month)?
5	___	• Where are we: (state) (county) (town) (hospital) (floor)?
3	___	Registration • Name three objects: Allow one second to say each. Then ask the patient all three after you have said them. Give 1 point for each correct answer. Then repeat them until patient learns all 3. Count trials and record.) Trials: ___
5	___	Attention and Calculation • Serial 7s. One point for each correct. Stop after five answers. Alternatively, have the patient spell the word "world" backward.
3	___	Recall • Ask for the three objects repeated above. Give 1 point for each correct.
9	___	Language • Show the patient a pencil and a watch and have him name each object. (2 points). • Repeat the following: "No ifs, ands, or buts." (1 point) • Follow a three-stage command: "Take a sheet of paper in your right hand, fold it in half, and put it on the floor." (3 points) • Read and obey the following: Close your eyes. (1 point) - Write a sentence. (1 point) - Copy design. (1 point)
		
Total score	___	• Assess level of consciousness along a continuum: alert; drowsy; stupor; coma.

Adapted from: 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.

Delirium Assessment Methods

DIAGNOSTIC CLASSIFICATION SYSTEMS

- DSM-III, IRR, IV, ICD 9, 10

DIAGNOSTIC INSTRUMENTS AND RATING SCALES FOR DELIRIUM

- Confusion Assessment Method
- Confusion Assessment Method—ICU
- Delirium Symptom Interview
- Delirium Rating Scale
- Cognitive Test for Delirium
- Abbreviated Cognitive Test for Delirium
- Confusion Rating Scale
- Saskatoon Delirium Checklist
- Memorial Delirium Assessment Scale
- Delirium Writing Test
- Organic Brain Syndrome Scale
- Delirium Assessment Scale

COGNITIVE IMPAIRMENT SCREENING TESTS

- Mini-Mental State Exam
- Blessed Information Memory Concentration Test
- Short Test of Mental Status
- Blessed Orientation Memory Concentration Test
- Mental Status Questionnaire
- Short Portable Mental Status Questionnaire
- Abbreviated Mental Test
- Brief Mental Status Examination
- Quick Confusion Scale

Important Historical Elements in the Diagnosis of Delirium

PATIENT BASELINE

- Occupation
- Social support
- Activities of daily living
- Education
- Substance abuse

HISTORY OF PRESENT ILLNESS

- Time course after changes were first noticed (i.e., hours, days, months)
- Changes over a day (stable or fluctuant)
- Physical symptoms
- History of closed head injury

PRIOR MEDICAL AND SURGICAL HISTORY

- Specific diagnoses, hospitalizations, surgical procedures
- Current medications (including prescription, non-prescription, alternative, onset of regimen, and recent changes in dosage)

Instructions for Administration of Mini-Mental State Examination

ORIENTATION

- Ask for the date. Then ask specifically for parts omitted, e.g., "Can you also tell me what season it is?" Give one point for each correct answer.
- Ask in turn "Can you tell me the name of this hospital?" (town, county, etc.). Give one point for each correct answer.

REGISTRATION

- Ask the patient if you may test his memory. Then say the names of three unrelated objects, clearly and slowly, about one second for each. After you have said all three, ask the patient to repeat them. This first repetition determines the score (0-3), but keep saying them until the patient can repeat all three, up to six trials. If the patient does not eventually learn all three, recall cannot be meaningfully tested.

ATTENTION AND CALCULATION

- Ask the patient to begin with 100 and count backward by 7s. Stop after five subtractions (93, 86, 79, 72, 65). Score the total number of correct answers.
- If the patient cannot or will not perform this task, ask the patient to spell the word "world" backward. The score is the number of letters in the correct order, e.g., dlrow = 5, dlrow = 3.

RECALL

- Ask the patient to recall the three words you previously asked him to remember. Score 0-3.

LANGUAGE

- **Naming:** Show the patient a wrist watch and ask what it is. Repeat for the procedure with a pencil. Score 0-2.
- **Repetition:** Ask the patient to repeat the sentence after you. Allow only one trial. Score 0 or 1.
- **Three-Stage Command:** Give the patient a piece of plain blank paper and repeat the command. Score 1 point for each part correctly executed.
- **Reading:** On a blank piece of paper print the sentence "Close your eyes," in letters large enough for the patient to see clearly. Ask the patient to read it and do what it says. Score 1 point only if the patient actually closes his eyes.
- **Writing:** Give the patient a blank piece of paper and ask him to write a sentence. Do not dictate a sentence, it is to be written spontaneously. It must contain a subject and verb and be sensible. Correct grammar and punctuation are not necessary.
- **Copying:** On a clean piece of paper, draw intersecting pentagons, each side about 1 inch, and ask him to copy it exactly as it is. All 10 angles must be present, and two must intersect to score 1 point. Tremor and rotation are ignored.

- Estimate the patient's level of sensorium along a continuum, from alert on the left to coma on the right.

Adapted from: 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.

The Quick Confusion Scale

ITEM	NUMBER CORRECT	x WEIGHT	=	TOTAL
1. What year is it now?	0 or 1 (score 1 if correct, 0 if incorrect)	x 2	=	—
2. What month is it?	0 or 1	x 2	=	—
3. Present memory phrase: "Repeat this phrase after me and remember it: <u>John Brown</u> , <u>42 Market Street, New York.</u> "				
4. About what time is it? (Answer correct if within one hour)	0 or 1	x 2	=	—
5. Count backward from 20 to 1.	0, 1, or 2	x 1	=	—
6. Say the months in reverse.	0, 1, or 2	x 1	=	—
7. Repeat memory phrase (each underlined portion correct is worth 1 point)				
	0, 1, 2, 3, 4, or 5	x 1	=	—
Final score is the sum of the totals			=	—

Adapted from: Huff JS, Farace E, Brady WJ, et al. The quick confusion scale in the ED: Comparison with the mini-mental state examination. *Am J Emerg Med* 2001;19:461-464.

Explanation of Scoring for Quick Confusion Scale

The highest number in category indicates correct response; decreased scoring indicates increased number of errors.

1. What year is it now? Score 1 if answered correctly, 0 if incorrect.
2. What month is it? Score 1 if answered correctly, 0 if incorrect.
3. About what time is it? Answer considered correct if within one hour; score 1 if correct, 0 if incorrect.
4. Count backward from 20 to 1. Score 2 if correctly performed; score 1 if one error, score 0 if two or more errors.
5. Say the months in reverse. Score 2 if correctly performed; score 1 if one error, score 0 if two or more errors.
6. Repeat memory phrase: John Brown, 42 Market Street, New York. Each underlined portion correctly recalled is worth 1 point in scoring; score 5 if correctly performed; each error drops score by one.

Final score is sum of the weighted totals; items one, two, and three are multiplied by 2 and summed with the other item scores to yield the final score.

Adapted from: Huff JS, Farace E, Brady WJ, et al. The quick confusion scale in the ED: Comparison with the mini-mental state examination. *Am J Emerg Med* 2001;19:461-464.

The Confusion Assessment Method (CAM) Diagnostic Algorithm

This feature usually is obtained from a family member or nurse and is shown by positive responses to the following questions: Is there evidence of an acute change in mental status from the patient's baseline? Did the (abnormal) behavior fluctuate during the day, that is, tend to come and go, or increase and decrease in severity?

FEATURE 2: INATTENTION

This feature is shown by a positive response to the following question: Did the patient have difficulty focusing attention, for example, being easily distractible or, having difficulty keeping track of what was being said?

FEATURE 3: DISORGANIZED THINKING

This feature is shown by a positive response to the following question: Was the patient's thinking disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?

FEATURE 4: ALTERED LEVEL OF CONSCIOUSNESS

This feature is shown by any answer other than "alert" to the following question: Overall, how would you rate this patient's level of consciousness (i.e., alert [normal]; vigilant [hyperalert]; lethargic [drowsy, easily aroused]; stupor [difficult to arouse]; or coma [unarousable])?

* The diagnosis of delirium by CAM requires the presence of features 1 and 2 and either 3 or 4.

Adapted from: Inouye S, van Dyck C, Alessi C, et al. Clarifying confusion: The confusion method. *Ann Intern Med* 1990;113:941-948.

The Differential Diagnosis of Delirium and Dementia

	DELIRIUM	DEMENCIA
ONSET	Acute, often at night	Insidious
COURSE	Fluctuating, day-time lucid intervals, night-time exacerbation	Stable over the course of the day
DURATION	Days to weeks, reversible	Months or years, progressive
CONSCIOUSNESS	Reduced	Clear
ATTENTION	Impaired	Normal, except in severe dementia
ORIENTATION	Usually impaired for time; unfamiliar tendency to mistake for familiar places and persons as severity increases	Often impaired
MEMORY	Immediate and recent impaired, remote memory intact	Recent and remote impaired
THINKING	Disorganized, incoherent	Impoverished
PERCEPTION	Illusions and hallucinations common, visual more often than auditory	Often absent
SPEECH	Incoherent, hesitant, slow or rapid	Difficulty in finding words
PSYCHOMOTOR	Increased, reduced or unpredictable changes	Often normal
PHYSICAL ILLNESS OR DRUG TOXICITY	One or both present	Often absent, especially in Alzheimer's disease

Supplement to *Emergency Medicine Reports*, June 16, 2003: "Delirium: A Systematic Approach to Diagnosis and Initial Management."

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