

# Delirium in Older Persons: Evaluation and Management

VIRGINIA B. KALISH, MD, *National Capitol Consortium, Fort Belvoir, Virginia*

JOSEPH E. GILLHAM, MD, *Robinson Health Clinic, Fort Bragg, North Carolina*

BRIAN K. UNWIN, MD, *Carilion Clinic, Roanoke, Virginia*

Delirium is defined as an acute, fluctuating syndrome of altered attention, awareness, and cognition. It is common in older persons in the hospital and long-term care facilities and may indicate a life-threatening condition. Assessment for and prevention of delirium should occur at admission and continue throughout a hospital stay. Caregivers should be educated on preventive measures, as well as signs and symptoms of delirium and conditions that would indicate the need for immediate evaluation. Certain medications, sensory impairments, cognitive impairment, and various medical conditions are a few of the risk factors associated with delirium. Preventive interventions such as frequent reorientation, early and recurrent mobilization, pain management, adequate nutrition and hydration, reducing sensory impairments, and ensuring proper sleep patterns have all been shown to reduce the incidence of delirium, regardless of the care environment. Treatment of delirium should focus on identifying and managing the causative medical conditions, providing supportive care, preventing complications, and reinforcing preventive interventions. Pharmacologic interventions should be reserved for patients who are a threat to their own safety or the safety of others and those patients nearing death. In older persons, delirium increases the risk of functional decline, institutionalization, and death. (*Am Fam Physician*. 2014;90(3):150-158. Copyright © 2014 American Academy of Family Physicians.)

**CME** This clinical content conforms to AAFP criteria for continuing medical education (CME). See CME Quiz Questions on page 145.

Author disclosure: No relevant financial affiliations

► **Patient information:** A handout on this topic, written by the authors of this article, is available at <http://www.aafp.org/afp/2014/0801/150-s1.html>.

A 91-year-old woman with minimal English proficiency was admitted to the intensive care unit for an exacerbation of chronic obstructive pulmonary disease. Five days earlier, she had visited the emergency department for shoulder pain and was given acetaminophen with codeine. The patient's daughter reported that her mother did not comply with her chronic obstructive pulmonary disease inhaler regimen because of drowsiness brought on by the codeine. In the intensive care unit, oral food and fluids were withheld initially and the patient was given levofloxacin (Levaquin), methylprednisolone, nebulizer treatments, and ranitidine (Zantac). Overnight, she had urinary incontinence, which prompted placement of a catheter and initiation of tolterodine (Detrol) for bladder spasm. The next morning, her family arrived to find her in an anxious state, vacillating from mild fidgeting to abrupt sitting up to lying sideways on the bed. She had marked inattention and was unable to follow instructions or carry on conversation. She was confused about her whereabouts and claimed that hospital staff had attacked her.

Her daughter indicated that the patient had displayed increasing "memory problems," and was socially isolated and sedentary. The patient performed all of her activities of daily living, but had become increasingly dependent on family members for advanced tasks since a previous chronic obstructive pulmonary disease exacerbation in which the patient was intubated for 10 days.

## Background

### DEFINITION AND DIAGNOSTIC CRITERIA

Delirium is an acute, fluctuating syndrome of altered attention, awareness, and cognition precipitated by an underlying condition or event in vulnerable persons (*Table 1*).<sup>1</sup> In practice and in the literature, it has commonly been referred to by other names, including altered mental status, acute confusional state, sundowning, encephalopathy, and acute organic brain syndrome.<sup>1</sup>

Although delirium in general is common, many cases go unrecognized.<sup>2</sup> This can be disconcerting to patients and caregivers, and increases the risk of functional decline and poor long-term outcomes.<sup>3,4</sup> It was a long-held view that delirium was a completely

## SORT: KEY RECOMMENDATIONS FOR PRACTICE

<i>Clinical recommendation</i>	<i>Strength of recommendation</i>	<i>References</i>
Physicians should train nursing staff, home health aides, and family members/caregivers on recognizing and treating delirium.	C	3, 20, 21
The Confusion Assessment Method is the most effective tool in identifying delirium.	C	29
Assessment for and prevention of delirium should occur at admission to the hospital and throughout the stay.	C	3, 20, 21
Multicomponent prevention methods are effective in deterring delirium episodes.	B	20, 21, 33
Antipsychotic medications should be used as a last resort in treating delirium and should not be used indiscriminately in persons with delirium who have not been properly evaluated.	A	36-44

*A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <http://www.aafp.org/afpsort>.*

reversible process attributable to an underlying cause. More recently, investigators recognize that a single cause is rare, and instead delirium is usually the result of many factors.<sup>2</sup>

### INCIDENCE, PREVALENCE, AND SIGNIFICANCE

Delirium is common in older persons in hospitals and long-term care facilities, and it may indicate a life-threatening condition. Estimates of the prevalence of delirium vary based on the population studied, the timeframe in which delirium is assessed, and the method of assessment. *Table 2* outlines the incidence and prevalence of delirium in multiple care environments.<sup>2,5-8</sup> Immediate and long-term outcomes associated with a delirium episode include increases in the risk

of falls, length of hospital stay, hospital costs, duration of mechanical ventilation, degree of cognitive impairment, functional impairment after a hospital stay, long-term care facility placement, and mortality.<sup>4,5,9-13</sup> The estimated health care costs attributable to delirium and its complications range from \$38 billion to \$152 billion each year, based on 2008 calculations.<sup>14</sup> Delirium is still missed in as many as 32% to 66% of cases.<sup>2</sup> In many patients, global cerebral function may never return to baseline.<sup>15</sup>

### RISK FACTORS

Assessing a patient's medical disposition, physical and cognitive impairments, and social behaviors is essential for targeting at-risk patients with prevention strategies, as well as for identifying the multiple causes associated with a single delirium episode. Delirium shares risk factors with other geriatric syndromes, such as dementia, depression, malnutrition, pressure ulcers, elder abuse, urinary incontinence, chronic pain, and falls.<sup>16</sup> Frailty denotes a physical vulnerability and is linked to cognitive vulnerability (delirium) by uncertain pathways. It is indirectly suggested that frailty is an independent risk factor for delirium, but further research is needed.<sup>17</sup>

Risks for delirium can be divided into predisposing and precipitating factors (*Table 3*).<sup>2,15,18,19</sup> Patients at high risk of delirium because of multiple or severe predisposing factors need minimal precipitators to provoke a delirium episode. Alternatively, a patient with few predisposing factors would require multiple or severe triggers to provoke delirium.<sup>2,15</sup> Physicians should train nursing staff, home health aides, and family members/caregivers on recognizing and treating delirium.<sup>3,20,21</sup>

**Table 1. DSM-5 Diagnostic Criteria for Delirium**

- A. A disturbance in attention (i.e., reduced ability to direct, focus, sustain, and shift attention) and awareness (reduced orientation to the environment).
- B. The disturbance develops over a short period of time (usually hours to a few days), represents a change from baseline attention and awareness, and tends to fluctuate in severity during the course of a day.
- C. An additional disturbance in cognition (e.g., memory deficit, disorientation, language, visuospatial ability, or perception).
- D. The disturbances in Criteria A and C are not explained by another preexisting, established, or evolving neurocognitive disorder and do not occur in the context of a severely reduced level of arousal, such as coma.
- E. There is evidence from the history, physical examination, or laboratory findings that the disturbance is a direct physiological consequence of another medical condition, substance intoxication or withdrawal (i.e., due to a drug of abuse or to a medication), or exposure to a toxin, or is due to multiple etiologies.

*DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, 5th ed.*

*Reprinted with permission from American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Washington, DC: American Psychiatric Association; ©2013:596. All rights reserved.*

**Table 2. Incidence and Prevalence of Delirium in Older Persons**

Setting	Rate
<b>Incidence during hospital admission</b>	
After hip fracture	28% to 61%
After surgery	15% to 53%
During hospitalization (medical inpatients)	3% to 29%
<b>Prevalence</b>	
Intensive care unit	
With mechanical ventilation	60% to 80%
Without mechanical ventilation	20% to 50%
Hospice	29%
Community (persons 85 years or older)	14%
At hospital admission	10% to 31%
Long-term care facility and postacute care	1% to 60%

Information from references 2, and 5 through 8.

## Presentation in Various Settings

### HOSPITAL

There are three subtypes of delirium: hypoactive, hyperactive, and mixed. The older patient commonly presents in the hypoactive form, which often goes

unrecognized.<sup>18,19,22,23</sup> Hypoactive delirium consists of at least four of the following behaviors: unawareness, decreased alertness, sparse or slow speech, lethargy, slowed movements, staring, or apathy.<sup>18,19,22,23</sup> Alternatively, hyperactive delirium presents with at least three of the following characteristics: hypervigilance, restlessness, fast or loud speech, irritability, combativeness, impatience, swearing, singing, laughing, uncooperativeness, euphoria, anger, wandering, easy startling, fast motor responses, distractibility, tangentiality, nightmares, or persistent thoughts. The mixed subtype presents with characteristics of hypoactive and hyperactive delirium and is the most commonly diagnosed subtype.<sup>18,19,22,23</sup>

### COMMUNITY

Patients recently discharged directly to home are at an increased risk of delirium, particularly if they were delirious while hospitalized.<sup>4,14,22</sup> Patients may be discharged home in a persistent delirious state or while experiencing subsyndromal delirium, in which some but not all of the core symptoms of delirium persist.<sup>9,15</sup> Caregivers

**Table 3. Summary of Risk Factors for Delirium**

Predisposing factors	Precipitating factors	Delirium-inducing medications
Comorbidities	Acute insults	High risk
Alcoholism	Dehydration	Anticholinergics (e.g., antihistamines, muscle relaxants, antipsychotics)
Chronic pain	Fracture	Benzodiazepines
History of baseline lung, liver, kidney, heart, or brain disease	Hypoxia	Dopamine agonists
Terminal illness	Infection	Meperidine (Demerol)
Demographic factors	Ischemia (e.g., cerebral, cardiac)	Moderate to low risk
Age older than 65 years	Medications	Antibiotics (e.g., quinolones, antimalarials, isoniazid, linezolid [Zyvox], macrolides)
Male sex	Metabolic derangement	Anticonvulsants
Geriatric syndromes	Poor nutrition	Antidizziness agents
Dementia	Severe illness	Antiemetics
Depression	Shock	Antihypertensives (e.g., beta blockers, clonidine [Catapres])
Elder abuse	Surgery	Antivirals (e.g., acyclovir [Zovirax], interferon)
Falls	Uncontrolled pain	Corticosteroids
History of delirium	Urinary or stool retention	Low-potency antihistamines (e.g., histamine H <sub>2</sub> blockers, urinary and gastrointestinal antispasmodics)
Malnutrition	Environmental exposures	Metoclopramide (Reglan)
Polypharmacy	Intensive care unit setting	Narcotics other than meperidine
Pressure ulcers	Sleep deprivation	Nonsteroidal anti-inflammatory drugs
Sensory impairment	Tethers	Sedatives/hypnotics
Premorbid state		Tricyclic antidepressants
Inactivity		
Poor functional status		
Social isolation		

Information from references 2, 15, 18, and 19.

of persons with advanced disease or dementia often witness changes in behavior that may or may not suggest delirium. These patients may experience loss of behavior control, mood fluctuations, episodes of frank psychosis, or agitation.<sup>24</sup>

#### LONG-TERM CARE FACILITY

Patients in long-term care facilities are at high risk of delirium because of cognitive or physical disability. The prevalence of delirium in a long-term care facility is not firmly established, ranging from 1% to 60%.<sup>15</sup> Patients typically present with the hypoactive form of delirium in this setting.<sup>15</sup>

#### NEARING DEATH

Hypoactive delirium is most common in the hospice or palliative care setting; it occurs in 20% to 83% of inpatients in palliative care units.<sup>25,26</sup> Nevertheless, delirium in patients nearing death is often misdiagnosed, usually mistaken for depression or severe fatigue.<sup>25</sup> In patients with a terminal illness, delirium presages death within days to weeks.<sup>25,26</sup> Recognizing delirium is vital for treatment planning and for advising family members on what to anticipate.<sup>25</sup>

Regardless of the setting, caregivers should be educated on the signs and symptoms of delirium and conditions that would indicate the need for immediate evaluation, including dramatic changes in vital signs, acute respiratory distress, chest pain, hematuria, and new-onset neurologic focal deficits.<sup>27</sup>

#### Predicting Delirium

Efforts to predict delirium in older hospitalized patients should be made on initial evaluation. Paying close attention to the patient's history, changes in medications, laboratory values, and physical examination findings can assist with determining a patient's risk of delirium. These predisposing and eliciting factors have been developed into a validated prognostic model (*Table 4*) that can identify a subset of patients at high risk of delirium during their stay.<sup>3</sup> Although this predictive model is limited to use in medical inpatients, models have been derived for patients in alternative settings.

#### Diagnostic Testing

All older persons presenting with delirium require a basic workup including a complete blood count, measurement of electrolyte levels, renal and liver panel, urinalysis, and electrocardiography. Evaluation should be individualized based on the patient's chief concern, medical history, current illness, and physical

examination findings. Although imaging is not generally indicated, computed tomography of the head is recommended for patients presenting with new focal neurologic deficits, history of head trauma, or fever associated with encephalopathy. If seizures are suspected, or if the cause of delirium is unclear, electroencephalography should be considered. *Table 5* outlines studies that can identify medical conditions that may lead to delirium.<sup>18</sup> It is helpful if a baseline cognition assessment (e.g., Mini-Mental State Examination, Mini-Cog, Short Portable Mental Status Questionnaire) was performed and recorded before delirium occurrence.

#### Ongoing Assessment

Identification of delirium requires ongoing reassessment during the patient's hospital stay, at home, or in a nursing facility. The Confusion Assessment Method (*Table 6*<sup>19</sup>) is the most effective tool in identifying delirium, and can assist trained physicians and nursing staff in identifying delirium at admission or throughout a patient's course of illness.<sup>2,18,19</sup> Its sensitivity ranges from 94% to 100%.<sup>28,29</sup> Although more research is warranted, implementation of a new Confusion Assessment Method–Severity (CAM-S) may prove beneficial in determining patient response to interventions and target treatments.<sup>30</sup>

#### Prevention

Assessment for and prevention of delirium should occur at admission to the hospital and throughout the stay.<sup>3,20,21</sup> Prevention efforts targeting persons at risk may decrease

**Table 4. Predictive Model for the Risk of Delirium in Hospitalized Older Patients**

Risk factor	Points
Cognitive impairment (inability to think, concentrate, reason, remember, formulate ideas)	1
Elevated blood urea nitrogen/serum creatinine ratio (greater than 18)	1
Severe illness (APACHE score greater than 16, or nurse rating of severe)	1
Vision impairment (corrected near vision worse than 20/70 in both eyes)	1

Interpretation: 0 points = low risk (10% chance of developing delirium); 1 or 2 points = intermediate risk (25% chance of developing delirium); 3 or 4 points = high risk (80% chance of developing delirium).

APACHE = Acute Physiology and Chronic Health Evaluation (<http://clincalc.com/IcuMortality/APACHEII.aspx>).

Information from reference 3.

**Table 5. Evaluation of Underlying Medical Conditions that May Lead to Delirium**

<i>Signs and symptoms</i>	<i>Evaluation</i>
Cardiovascular: chest pain, shortness of breath, diaphoresis	Electrocardiography; measurement of serum troponin and myoglobin levels; D-dimer test
Endocrine: unintentional weight gain/loss, temperature intolerance, anxiety/depression, unexplained diaphoresis, dysphagia, palpitations, signs and symptoms of hypo- or hyperglycemia	Measurement of thyroid-stimulating hormone and serum glucose levels; measurement of serum cortisol level or adrenocorticotropic hormone stimulation test
Environmental exposure: shivering, hypo- or hypertension, brady- or tachycardia, low or high respiratory rate, vasoconstriction	Measurement of patient's core temperature
Gastrointestinal: abdominal pain, abdominal distention, history of cirrhosis	Liver function tests; measurement of lipase level and ammonia levels
Infection suspected	Blood cultures, complete blood count, chest radiography, computed tomography, lumbar puncture, urinalysis with culture, skin examination
Malnutrition, social isolation	Measurement of vitamin B <sub>12</sub> , folate, albumin, and prealbumin levels
Neurologic: focal neurologic deficits, seizure	Neurologic examination, computed tomography of the head, electroencephalography
Pain, recent trauma or surgery	Pain assessment scale
Pharmacologic: addition or change to medication regimen, patient or caregiver unable to convey medication administration details	Medication reconciliation
Renal: history suggestive of impaired kidney function or electrolyte disturbance	Serum chemistries, blood urea nitrogen/creatinine ratio
Respiratory distress, hypoxia	Pulse oximetry, arterial blood gas measurement
Rheumatologic: fatigue, intermittent fevers, myalgias, arthralgias	Erythrocyte sedimentation rate, measurement of C-reactive protein level
Substance abuse, suicidal, report of empty pill bottles found at home	Review of social history and occupational or other exposures; urine drug screen; measurement of serum alcohol, salicylate, and acetaminophen levels
Volume depletion (dehydration or blood loss): fatigue, lightheadedness, falls, syncope, pallor, melena/hematochezia, decreased intake, nausea/vomiting, diarrhea, decreased skin turgor, dry mucous membranes, orthostasis, tachycardia	Complete blood count, urine-specific gravity test, serum osmolarity measurement, blood urea nitrogen/creatinine ratio

NOTE: See text for standard evaluation of all cases of delirium. Clinical judgment should dictate further testing.  
Information from reference 18.

delirium incidence, hospital costs, and associated poor outcomes.<sup>20,31,32</sup> Studies have demonstrated that a multi-component nonpharmacologic approach is highly effective and reduces the number and duration of episodes of delirium.<sup>20,21,33</sup> One such intervention, known as the Hospital Elder Life Program, is available at <http://www.hospitalelderlifeprogram.org>. This intervention has been shown to reduce the number of patients with functional decline<sup>32</sup> and placement in long-term care facilities.<sup>34</sup> Inpatient consultation focusing on geriatric syndromes has also been shown to decrease delirium incidence.<sup>33</sup>

These interventions reduce the development of delirium, but have no effect on duration of delirium when it develops, implying that prevention strategies should be emphasized in at-risk patients.

Nonpharmacologic prevention strategies consist of orientation and therapeutic activities, early and recurrent mobilization, minimizing the use of psychoactive medications, promoting normal sleep-wake cycles, providing easy access to adaptive equipment for sensory impairment (e.g., glasses, hearing aids), and preventing dehydration.<sup>15</sup> Orientation activities should include encouraging familiar

**Table 6. Confusion Assessment Method**

1. Acute onset and fluctuating course  
Is there evidence of an acute change in mental status from the patient's baseline? Did this behavior fluctuate during the past day (that is, did it tend to come and go or increase and decrease in severity)?
2. Inattention  
Does the patient have difficulty focusing attention; for example, being easily distracted or having difficulty keeping track of what was being said?
3. Disorganized thinking  
Is the patient's speech disorganized or incoherent; for example, rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?
4. Altered level of consciousness  
Overall, how would you rate this patient's level of consciousness: alert (normal); vigilant (hyperalert); lethargic (drowsy, easily aroused); stupor (difficult to arouse); coma (unarousable)?

NOTE: The diagnosis of delirium requires a present/abnormal rating for criteria 1 and 2, and either 3 or 4.

Information from reference 19.

visitors, minimizing changes in nursing staff, and ensuring that functional clocks and calendars are easily visualized.<sup>15,18</sup> All caretakers should be educated on preventive approaches and encouraged to implement them.<sup>21</sup> The Hospital Elder Life Program has also developed the Family Confusion Assessment Method, a validated screening tool that can be used by trained family members to detect delirium (<http://hospitalelderlifeprogram.org/private/famcam-disclaimer.php?pageid=01.09.00>). This tool has a demonstrated sensitivity of 86% and a specificity of 98% in one study of 58 caregivers.<sup>35</sup>

### Treatment in Various Settings

#### HOSPITAL

Once delirium is diagnosed in an inpatient setting, it is important to identify and treat the underlying causes. After the causative factors are addressed, focus should shift to nonphar-

**Table 7. Interventions to Prevent and Treat Delirium**

#### Cognitive impairments or disorientation

- Provide consistency in health care by limiting the number of staff and minimizing turnover
- Provide appropriate lighting and clear signage
- Provide a working/accurate clock and up-to-date calendar in patient's room
- Orient and reorient patients by explaining where they are, who they are, and the clinician's role in their health care
- Introduce cognitively stimulating activities
- Encourage/facilitate regular visits from family and friends
- Provide one-on-one care, if needed

#### Dehydration/constipation

- Encourage patient to drink adequate fluids
- Consider subcutaneous or intravenous fluids (to ensure adequate fluid intake and prevent dehydration) if the patient is unable to adequately hydrate by mouth
- Consult specialists if patient has comorbidities that would affect fluid balance (e.g., congestive heart failure, chronic kidney disease)

#### Hypoxia

- Assess for hypoxia
- Optimize oxygen saturation as appropriate

#### Immobility or limited mobility

- Encourage early mobilization and active range-of-motion exercises

#### Infection

- Assess for and treat infection
- Avoid unnecessary catheterization
- Implement infection control

#### Pain

- Continually assess for verbal and nonverbal signs of pain
- Initiate and reevaluate for appropriate pain management
- Avoid as-needed orders and consider using stop/hold orders

#### Poor nutrition

- Provide adequate supplementation between meals, and culturally sensitive meal choices
- Encourage presence of family members at meal times
- Ensure patient has dentures that fit properly (if needed)

#### Sensory impairment

- Ensure hearing and visual aids are available and in proper working condition

#### Sleep

- Promote good sleep patterns
- Avoid nursing or medical procedures during sleeping hours
- Schedule medication rounds to avoid sleep disturbances
- Reduce noise to a minimum during sleep periods
- Ensure proper and predictable sleep-wake cycles and avoid the patient napping

Information from references 18, 20, 32, and 34.



**Table 8. Pharmacologic Treatment of Delirium**

<i>Drug</i>	<i>Dosage</i>	<i>Adverse effect</i>	<i>Comment</i>
<b>Antipsychotic*</b>			
Haloperidol	0.5 to 1.0 mg twice daily orally every four hours or intramuscularly every 30 to 60 minutes as needed (maximum dosage of 20 mg in a 24-hour period)	Extrapyramidal effects, prolonged corrected QT interval/torsades de pointes, metabolic syndrome with long-term use	Agent of choice Avoid intravenous use because of short duration of action Avoid in patients with withdrawal syndrome, hepatic insufficiency, neuroleptic malignant syndrome, or Parkinson disease Associated with increased mortality rate in older patients with dementia-related psychosis
<b>Atypical antipsychotics*</b>			
Olanzapine (Zyprexa)	2.5 mg once daily orally (maximum dosing of 20 mg in a 24-hour period)	Extrapyramidal effects, prolonged corrected QT interval/torsades de pointes, increased risk of cerebrovascular accident, hypotension, anticholinergic effects, metabolic syndrome with long-term use	Associated with increased mortality rate in older patients with dementia-related psychosis
Quetiapine (Seroquel)	25 mg twice daily orally		
Risperidone (Risperdal)	0.5 mg twice daily orally		
<b>Benzodiazepine</b>			
Lorazepam (Ativan)	0.5 to 1.0 mg every four hours orally as needed	Paradoxical excitation, respiratory depression, oversedation	May worsen delirium
<b>Antidepressant</b>			
Trazodone	25 to 150 mg orally at bedtime	Oversedation	Second-line agent Associated with prolonged and worsening delirium symptoms

\*—Indiscriminate use of antipsychotics has been associated with potential dangers in older persons. Physicians should consult the U.S. Food and Drug Administration boxed warnings for each medication before prescribing.

Information from references 36, 37, 43, and 44.

macologic measures (Table 7<sup>18,20,32,34</sup>), providing supportive care, and preventing complications.<sup>15,18</sup> Although narcotics carry a risk of provoking delirium, guidelines recommend addressing uncontrolled pain through a pain management plan that may include a narcotic regimen.<sup>18</sup>

Pharmacologic therapy should be reserved for patients who are a threat to their own safety or the safety of others. By convention, haloperidol has been the agent of choice for treatment of delirium, despite a higher incidence of extrapyramidal adverse effects.<sup>36,37</sup> Haloperidol has the most evidence for this indication; comparison trials of delirium treatment with haloperidol and atypical antipsychotics have been limited to small studies in which no differences in effectiveness were found.<sup>36,37</sup> Antipsychotic medications should be used as a last resort in treating delirium and should not be used indiscriminately in persons with delirium who have not been properly evaluated.<sup>37-44</sup> More research in the area of pharmacologic management of delirium is needed. A list of medications and their risks is provided in Table 8.<sup>36,37,43,44</sup>

## COMMUNITY

A core principle of care in the home is the development of an individualized care plan that manages conditions independently. Physicians can provide a plan with parameters for the nonpharmacologic and pharmacologic management of problem behaviors. Although not developed for use by caregivers and family members, potential medical and psychiatric events requiring formal medical attention are described in Table 9.<sup>27,45</sup>

## LONG-TERM CARE FACILITY

The American Medical Directors Association has developed a clinical practice guideline for the management and treatment of delirium in long-term care facilities that attends to the medical, psychiatric, legal, cultural, environmental, and ethical issues of individual residents.<sup>45</sup> The general principle behind the guideline embraces structured multidisciplinary assessment and treatment of delirium.

**Table 9. Medical and Psychiatric Events Requiring Urgent Evaluation****Medical issues**

Dramatic change in vital signs with associated signs and symptoms: systolic blood pressure less than 90 mm Hg; heart rate less than 50 beats per minute or greater than 120 beats per minute; respirations greater than 30 breaths per minute; temperature less than 96°F (36°C) or greater than 101°F (38°C)

New-onset focal deficits

New-onset respiratory distress, with increasing hypoxia and dyspnea

Signs of a serious underlying condition causing delirium (e.g., stroke, chest pain, hematuria)

**Psychiatric or behavioral issues**

Escalating physically aggressive behavior or threats of violence

Persistent danger to self or others

NOTE: The evaluation and treatment plan is conducted within the patient's (or surrogate's) overall goals of care and advance directives in mind.

Information from references 27 and 45.

**BEST PRACTICES IN GERIATRIC MEDICINE: RECOMMENDATIONS FROM THE CHOOSING WISELY CAMPAIGN**

<i>Recommendation</i>	<i>Sponsoring organization</i>
Do not use benzodiazepines or other sedative-hypnotics in older adults as first choice for insomnia, agitation, or delirium.	American Geriatrics Society
Avoid physical restraints to manage behavioral symptoms of hospitalized older adults with delirium.	American Geriatrics Society
Do not prescribe antipsychotic medications to patients for any indication without appropriate initial evaluation and appropriate ongoing monitoring.	American Psychiatric Association

Source: For supporting citations, see <http://www.aafp.org/afp/cw-table.pdf>. For more information on the Choosing Wisely Campaign, see <http://www.aafp.org/afp/choosingwisely>. To search Choosing Wisely recommendations relevant to primary care, see <http://www.aafp.org/afp/recommendations/search.htm>.

**NEARING DEATH**

Context-specific, nonpharmacologic interventions for delirium are still advised in this setting, but tranquilizers, such as haloperidol or atypical antipsychotics, are often required.<sup>46</sup> Palliative sedation with agents such as benzodiazepines, propofol (Diprivan), and opioids is required for control of delirium in some patients.<sup>6,46,47</sup>

**Prognosis**

A meta-analysis found that delirium in hospitalized older persons was associated with increased mortality, regardless of confounders such as age, sex, and comorbidities.<sup>4</sup> The mortality rate associated with delirium in patients in the hospital is estimated to be 14.5% to 37%.<sup>7</sup> Prognosis hinges on the subtype and duration of

delirium. Hypoactive delirium has a worse prognosis.<sup>48</sup> A prolonged state of delirium is associated with poorer outcomes, including functional decline, dementia, and death.<sup>4,5,8,9,12</sup> When delirium is unresolved at hospital discharge, functional and cognitive outcomes are poor.<sup>3,5</sup>

**Data Sources:** PubMed, Agency for Healthcare Research and Quality evidence reports, Clinical Evidence, the Cochrane database, Essential Evidence Plus, the Institute for Clinical Systems Improvement, and the National Guideline Clearinghouse database were searched using the key terms delirium, confusion, and restraints. The search included meta-analyses, randomized controlled trials, clinical trials, and reviews. Search dates: May 27, 2011, and May 26, 2014.

The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the U.S. Army Medical Department or the U.S. Army.

**The Authors**

VIRGINIA B. KALISH, MD, is the geriatric care coordinator of the Family Medicine Clinic at Fort Belvoir (Va.) Community Hospital, and is a faculty member of the National Capitol Consortium Family Medicine Residency in Fort Belvoir.

JOSEPH E. GILLHAM, MD, is a staff physician at Robinson Health Clinic and adjunct faculty of the Womack Army Medical Center Family Medicine Residency, both in Fort Bragg, N.C. At the time this article was written, he was a second-year family medicine resident at the National Capitol Consortium Family Medicine Residency.

BRIAN K. UNWIN, MD, is section chief for geriatrics and palliative medicine at Carilion Clinic and an associate professor of family medicine and medicine at the Virginia Tech Carilion School of Medicine and Research Institute, both in Roanoke. At the time this article was written, he was an associate professor of family medicine and geriatrics at the Uniformed Services University of the Health Sciences, Bethesda, Md.

Address correspondence to Virginia B. Kalish, MD, National Capitol Consortium, 9300 Dewitt Loop, Fort Belvoir, VA 22060 (e-mail: [virginia.b.kalish.civ@health.mil](mailto:virginia.b.kalish.civ@health.mil)). Reprints are not available from the authors.

**REFERENCES**

- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Association; 2013.
- Inouye SK. Delirium in hospitalized older patients: recognition and risk factors. *J Geriatr Psychiatry Neurol*. 1998;11(3):118-125.
- Inouye SK, Zhang Y, Jones RN, Kiely DK, Yang F, Marcantonio ER. Risk factors for delirium at discharge: development and validation of a predictive model. *Arch Intern Med*. 2007;167(13):1406-1413.
- Witlox J, Eurelings LS, de Jonghe JF, et al. Delirium in elderly patients and the risk of postdischarge mortality, institutionalization, and dementia: a meta-analysis. *JAMA*. 2010;304(4):443-451.



## Delirium

- Lee KH, Ha YC, Lee YK, Kang H, Koo KH. Frequency, risk factors, and prognosis of prolonged delirium in elderly patients after hip fracture surgery. *Clin Orthop Relat Res*. 2011;469(9):2612-2620.
- Alici Y, Breitbart W. Delirium in palliative care. *Prim Psychiatry*. 2009;16(5):42-48.
- Siddiqi N, House AO, Holmes JD. Occurrence and outcome of delirium in medical in-patients: a systematic literature review. *Age Ageing*. 2006;35(4):350-364.
- Shehabi Y, Riker RR, Bokesch PM, et al.; SEDCOM (Safety and Efficacy of Dexmedetomidine Compared With Midazolam) Study Group. Delirium duration and mortality in lightly sedated, mechanically ventilated intensive care patients. *Crit Care Med*. 2010;38(12):2311-2318.
- Kiely DK, Marcantonio ER, Inouye SK, et al. Persistent delirium predicts greater mortality. *J Am Geriatr Soc*. 2009;57(1):55-61.
- van Rijsbergen MW, Oldenbeuving AW, Nieuwenhuis-Mark RE, et al. Delirium in acute stroke: a predictor of subsequent cognitive impairment? A two-year follow-up study. *J Neurol Sci*. 2011;306(1-2):138-142.
- Quinlan N, Rudolph JL. Postoperative delirium and functional decline after noncardiac surgery. *J Am Geriatr Soc*. 2011;59(suppl 2):S301-S304.
- Pisani MA, Kong SY, Kasl SV, Murphy TE, Araujo KL, Van Ness PH. Days of delirium are associated with 1-year mortality in an older intensive care unit population. *Am J Respir Crit Care Med*. 2009;180(11):1092-1097.
- Rudolph JL, Harrington MB, Lucatorto MA, et al.; Veterans Affairs and Delirium Working Group. Validation of a medical record-based delirium risk assessment. *J Am Geriatr Soc*. 2011;59 (suppl 2):S289-S294.
- Leslie DL, Marcantonio ER, Zhang Y, Leo-Summers L, Inouye SK. One-year health care costs associated with delirium in the elderly population. *Arch Intern Med*. 2008;168(1):27-32.
- Inouye SK. Delirium in older persons [published correction appears in *N Engl J Med*. 2006;354(15):1655]. *N Engl J Med*. 2006;354(11):1157-1165.
- Inouye SK, Studenski S, Tinetti ME, Kuchel GA. Geriatric syndromes: clinical, research, and policy implications of a core geriatric concept. *J Am Geriatr Soc*. 2007;55(5):780-791.
- Quinlan N, Marcantonio ER, Inouye SK, Gill TM, Kamholz B, Rudolph JL. Vulnerability: the crossroads of frailty and delirium. *J Am Geriatr Soc*. 2011;59(suppl 2):S262-S268.
- National Institute for Health and Clinical Excellence. Delirium: diagnosis, prevention, and management. July 2010. <http://www.nice.org.uk/cg103>. Accessed March 19, 2014.
- Confusion Assessment Method (CAM) training manual and coding guide. Yale University School of Medicine. <http://www.innovations.ahrq.gov/content.aspx?id=1407>. Accessed March 19, 2014.
- Inouye SK, Bogardus ST Jr, Charpentier PA, et al. A multicomponent intervention to prevent delirium in hospitalized older patients. *N Engl J Med*. 1999;340(9):669-676.
- Martinez FT, Tobar C, Beddings CI, Vallejo G, Fuentes P. Preventing delirium in an acute hospital using a non-pharmacological intervention. *Age Ageing*. 2012;41(5):629-634.
- Banerjee A, Girard TD, Pandharipande P. The complex interplay between delirium, sedation, and early mobility during critical illness: applications in the trauma unit. *Curr Opin Anaesthesiol*. 2011;24(2):195-201.
- Steiner LA. Postoperative delirium. Part 1: pathophysiology and risk factors. *Eur J Anaesthesiol*. 2011;28(9):628-636.
- Ouimet S, Riker R, Bergeron N, Cossette M, Kavanagh B, Skrobik Y. Subsyndromal delirium in the ICU: evidence for a disease spectrum [published correction appears in *Intensive Care Med*. 2007;33(9):1677]. *Intensive Care Med*. 2007;33(6):1007-1013.
- Ross CA, Peysers CE, Shapiro I, Folstein MF. Delirium: phenomenologic and etiologic subtypes. *Int Psychogeriatr*. 1991;3(2):135-147.
- Leonard M, Raju B, Conroy M, et al. Reversibility of delirium in terminally ill patients and predictors of mortality. *Palliat Med*. 2008;22(7):848-854.
- American Medical Directors Association. Delirium and acute problematic behavior in the long-term care setting. Columbia, Md.: American Medical Directors Association; 2008. <http://www.guideline.gov/content.aspx?id=12379>. Accessed March 19, 2014.
- Inouye SK, van Dyck CH, Alessi CA, Balkin S, Siegel AP, Horwitz RL. Clarifying confusion: the confusion assessment method. A new method for detection of delirium. *Ann Intern Med*. 1990;113(12):941-948.
- Wong CL, Holroyd-Leduc J, Simel DL, Straus SE. Does this patient have delirium?: value of bedside instruments. *JAMA*. 2010;304(7):779-786.
- Inouye SK, Kosar CM, Tommet D, et al. The CAM-S: development and validation of a new scoring system for delirium severity in 2 cohorts. *Ann Intern Med*. 2014;160(8):526-533.
- Rizzo JA, Bogardus ST Jr, Leo-Summers L, et al. Multicomponent targeted intervention to prevent delirium in hospitalized older patients: what is the economic value? *Med Care*. 2001;39(7):740-752.
- Inouye SK, Bogardus ST Jr, Baker DI, et al. The Hospital Elder Life Program: a model of care to prevent cognitive and functional decline in older hospitalized patients. *J Am Geriatr Soc*. 2000;48(12):1697-1706.
- Deschodt M, Braes T, Flamaing J, et al. Preventing delirium in older adults with recent hip fracture through multidisciplinary geriatric consultation. *J Am Geriatr Soc*. 2012;60(4):733-739.
- Leslie DL, Zhang Y, Bogardus ST, Holford TR, Leo-Summers LS, Inouye SK. Consequences of preventing delirium in hospitalized older adults on nursing home costs. *J Am Geriatr Soc*. 2005;53(3):405-409.
- Inouye SK, Puelle MR, Saczynski JS, Steis MR. *The Family Confusion Assessment Method (FAM-CAM): Instrument and Training Manual*. 2011. Boston, Mass.: Hospital Elder Life Program.
- Loneragan E, Britton AM, Luxenberg J, Wyller T. Antipsychotics for delirium. *Cochrane Database Syst Rev*. 2007;(2):CD005594.
- Lacasse H, Perreault MM, Williamson DR. Systematic review of antipsychotics for the treatment of hospital-associated delirium in medically or surgically ill patients. *Ann Pharmacother*. 2006;40(11):1966-1973.
- Kalisvaart KJ, de Jonghe JF, Bogaards MJ, et al. Haloperidol prophylaxis for elderly hip-surgery patients at risk for delirium: a randomized placebo-controlled study. *J Am Geriatr Soc*. 2005;53(10):1658-1666.
- Wang W, Li HL, Wang DX, et al. Haloperidol prophylaxis decreases delirium incidence in elderly patients after noncardiac surgery: a randomized controlled trial. *Crit Care Med*. 2012;40(3):731-739.
- Pandharipande PP, Pun BT, Herr DL, et al. Effect of sedation with dexmedetomidine vs lorazepam on acute brain dysfunction in mechanically ventilated patients: the MENDS randomized controlled trial. *JAMA*. 2007;298(22):2644-2653.
- Riker RR, Shehabi Y, Bokesch PM, et al.; SEDCOM (Safety and Efficacy of Dexmedetomidine Compared With Midazolam) Study Group. Dexmedetomidine vs midazolam for sedation of critically ill patients: a randomized trial. *JAMA*. 2009;301(5):489-499.
- Al-Aama T, Brymer C, Gutmanis I, et al. Melatonin decreases delirium in elderly patients: a randomized, placebo-controlled trial. *Int J Geriatr Psychiatry*. 2011;26(7):687-694.
- Seitz DP, Gill SS, van Zyl LT. Antipsychotics in the treatment of delirium: a systematic review. *J Clin Psychiatry*. 2007;68(1):11-21.
- Candy B, Jackson KC, Jones L, et al. Drug therapy for delirium in terminally ill adult patients. *Cochrane Database Syst Rev*. 2012;(11):CD004770.
- American Medical Directors Association. Acute change of condition in the long-term care setting. Columbia, Md.: American Medical Directors Association; 2003. <http://www.guideline.gov/content.aspx?id=4950>. Accessed March 19, 2014.
- Breitbart W, Alici Y. Agitation and delirium at the end of life: "We couldn't manage him". *JAMA*. 2008;300(24):2898-2910, E1.
- Fainsinger RL, Waller A, Bercovici M, et al. A multicentre international study of sedation for uncontrolled symptoms in terminally ill patients. *Palliat Med*. 2000;14(4):257-265.
- Liptzin B, Levkoff SE. An empirical study of delirium subtypes. *Br J Psychiatry*. 1992;161:843-845.