

Delirium

ONDRIA C. GLEASON, M.D., University of Oklahoma College of Medicine, Tulsa, Oklahoma

Delirium is characterized by an acute change in cognition and a disturbance of consciousness, usually resulting from an underlying medical condition or from medication or drug withdrawal. Delirium affects 10 to 30 percent of hospitalized patients with medical illness; more than 50 percent of persons in certain high-risk populations are affected. The associated morbidity and mortality make diagnosis of this condition extremely important. Patients with delirium can present with agitation, somnolence, withdrawal, and psychosis. This variation in presentation can lead to diagnostic confusion and, in some cases, incorrect attribution of symptoms to a primary psychiatric disorder. To make the distinction, it is important to obtain the history of the onset and course of the condition from family members or caregivers. Primary care physicians must be able to recognize delirium so that the underlying etiology can be ascertained and addressed. The management of delirium involves identifying and correcting the underlying problem, and symptomatically managing any behavioral or psychiatric symptoms. Low doses of antipsychotic drugs can help to control agitation. The use of benzodiazepines should be avoided except in cases of alcohol or sedative-hypnotic withdrawal. Environmental interventions, including frequent reorientation of patients by nursing staff and education of patients and families, should be employed in all cases. (Am Fam Physician 2003;67:1027-34. Copyright© 2002 American Academy of Family Physicians.)

Without careful assessment, delirium can easily be confused with a number of primary psychiatric disorders because many of the signs and symptoms of delirium are also present in conditions such as dementia, depression, and psychosis. Some characteristic signs and symptoms of delirium are described in this article. All of these symptoms may not be present in every patient. The presentation of a patient with delirium will fluctuate during the course of the condition and even during the course of a day. The diagnostic criteria for delirium are listed in *Table 1*.¹

Acute Onset/Fluctuating Levels of Consciousness

Delirium is characterized by an acute change (usually over hours to days) in mental status. Patients demonstrate fluctuating levels

of consciousness that they often manifest by periodically falling asleep during an interview. This fluctuation in consciousness can result in conflicting reports from various caregivers about the patient's mental state. Fluctuations in cognitive skills, including memory, language, and organization, are also common.

ATTENTION IMPAIRMENT

Patients with delirium demonstrate attention difficulties. They may not remember instructions and may ask that directions and questions be repeated. Useful screening methods to identify attention problems include asking patients to spell a word backwards or perform "serial 7s" (counting backward from 100 by sevens).

MEMORY IMPAIRMENT AND DISORIENTATION

Memory deficits, especially where recent events are concerned (e.g., the reason for hospitalization or for care being given by nursing staff), are also prominent in patients with delirium. Patients may report not being bathed or bedding not being changed when, in fact, these events occurred earlier in the day. Disorientation to date, place, and situation is

The primary causes of delirium are an underlying medical condition, medication, or drug withdrawal.

common. However, the latter can go unrecognized if patients are not directly asked for the information. For example, hospital staff and family members may assume that a patient is fully oriented only to be surprised when the patient insists that he or she is at home and that the date is 10 years earlier.

AGITATION

Patients with delirium may become agitated as a result of the disorientation and confusion they are experiencing. For example, a patient who is disoriented may think he or she is at home instead of in a hospital, and nursing staff may be mistaken for intruders in the home. Consequently, this patient may not comply with bed or activity restrictions and may try to climb over the bedrails to get out of bed. Likewise, intravenous (IV) and oxygen tubing may not be recognized as such, and the patient may remove them.

APATHY AND WITHDRAWAL

Patients with delirium may present with apathy and withdrawal. They may appear to be depressed because of blunted affect, decreased appetite, decreased motivation, and disrupted sleep patterns.

SLEEP DISTURBANCE

Sleep disturbances are common in patients with delirium. They may periodically fall asleep during the day and then be awake for several hours during the night. This pattern, combined with confusion, disorientation, and decreased nighttime environmental cues, can create an especially hazardous situation in patients who are at risk for falling and pulling out an IV, Foley catheter, or nasogastric tubing.

EMOTIONAL LABILITY

Patients with delirium may display a wide range of emotions, including anxiety, sadness or tearfulness, and euphoria. They may have more than one of these emotions during the course of delirium.

PERCEPTUAL DISTURBANCES

Disturbances in reality testing manifested by visual and auditory hallucinations and delusions may be present. Delusions associated with delirium are likely to be related to disorientation and memory impairment, and fluctuate with these symptoms.

NEUROLOGIC SIGNS

Several neurologic signs and symptoms may be present in delirium regardless of cause. They include unsteady gait; tremor; asterixis; myoclonus, paratonia (e.g., gegenhalten) of the limbs and especially of the neck; difficulty reading and writing; and visuoconstruction problems, such as copying designs and finding words.

Subtypes of Delirium

The three subtypes of delirium are hyperactive, hypoactive, and mixed. Patients with the hyperactive subtype may be agitated, disoriented, and delusional, and may experience hallucinations. This presentation can be confused with that of schizophrenia, agitated dementia, or a psychotic disorder. Patients with the hypoactive subtype of delirium are subdued, quietly confused, disoriented, and

TABLE 1
Diagnostic Criteria for Delirium

- A. Disturbance of consciousness (i.e., reduced clarity of awareness about the environment) with reduced ability to focus, sustain, or shift attention.
 - B. A change in cognition (e.g., memory deficit, disorientation, language disturbance) or development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia.
 - C. The disturbance develops over a short period of time (usually hours to days) and tends to fluctuate during the course of a day.
 - D. Evidence from the history, physical examination, or laboratory findings indicate that the disturbance is caused by direct physiologic consequences of a general medical condition.
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apathetic. Delirium in these patients may go unrecognized or be confused with depression or dementia. The mixed subtype is characterized by fluctuations between the hyperactive and hypoactive subtypes.

Screening Tools

Several screening tools are available to aid in identifying delirium. The Folstein Mini-Mental State Examination (MMSE)² is familiar to most physicians. It screens for deficits in orientation, attention, memory, language, and visuoconstruction abilities. Administering the MMSE several times during the course of delirium can be a way to assess improvement. Comparison with an MMSE performed before the onset of the delirium is ideal.

Another screening tool is the Confusion Assessment Method.³ The Delirium Rating Scale (DRS)⁴ and the Memorial Delirium Assessment Scale (MDAS)⁵ measure the severity of delirium.

Indications of Underlying Medical Conditions

Recognizing delirium is important because it is an indication of an underlying medical condition that should be identified and treated. The underlying etiology should be aggressively sought after. Delirium can be caused by a medical emergency or a subacute, chronic medical condition (*Table 2*).⁶ Prescription drugs, illicit drugs, and toxic substances can also cause delirium. The underlying medical condition is not always readily identifiable, and more than one etiology is often responsible for delirium. In fact, in almost one half of elderly patients with delirium, two or more underlying conditions are responsible for the delirium.⁷

Differentiating Delirium from Primary Psychiatric Disorder

Certain signs and symptoms can help physicians distinguish between delirium and a preexisting psychiatric disorder. For example, visual hallucinations are an indicator of an underlying metabolic disturbance or adverse

Visual hallucinations are more characteristic of delirium than of a primary psychiatric disorder.

effect of medication or substance abuse. While visual hallucinations can occur in patients with primary psychiatric illnesses such as schizophrenia, they are much less common than auditory hallucinations. In primary psychiatric disorders, visual hallucinations would be associated with other, more characteristic signs and symptoms of the disorders. Visual hallucinations that occur in patients with delirium can be formed (e.g., people, animals) or unformed (e.g., spots, flashes of light).

Electroencephalography (EEG) can be useful in differentiating delirium from other conditions. In patients with delirium, the EEG shows a diffuse slowing of the background

TABLE 2
Differential Diagnosis of Delirium Using the Mnemonic 'I WATCH DEATH'

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TABLE 3
Indicators Suggesting Delirium

Acute change in mental status	Acute onset of new or different psychiatric symptoms with history of prior psychiatric illness
Presence of medical illness	
Visual hallucinations	
Fluctuating levels of consciousness	Patient described as "confused" or "disoriented"
Acute onset of psychiatric symptoms without prior history of psychiatric illness	Diffuse slow waves or epileptiform discharges on electroencephalogram

rhythm. An exception is patients with delirium tremens, where the EEG shows fast activity. EEGs are also useful in detecting ictal and postictal seizure activity, as well as nonconvulsive status epilepticus, all of which can present as delirium. Abnormal EEG readings would not be expected in patients with psychotic disorders or depression. However, slowing may occur in patients with dementia.

Finally, the acute onset and fluctuating nature of delirium are key features in distinguishing it from primary psychiatric disorders. Patients are often unable to provide an adequate history. It is important to interview family members and caregivers to determine the time of onset of symptoms and other pertinent medical and psychiatric information, including a review of medications and a history of sub-

stance abuse. It is equally important to know how patients are currently different from their normal cognitive state. Psychiatric symptoms that arise in persons 50 years and older without a prior psychiatric history or the development of new symptoms in patients with preexisting psychiatric illness should prompt a thorough medical work-up. *Table 3* provides a list of indicators suggesting delirium. *Table 4* lists some distinguishing characteristics of delirium, dementia, psychosis, and depression.

Risk Factors

Delirium affects 10 to 30 percent of hospitalized patients who are medically ill.⁸ The prevalence is even higher in certain subgroups. For example, 25 percent of hospitalized patients with cancer, 30 to 40 percent of hospitalized patients with human immunodeficiency virus (HIV) infection, and more than 50 percent of postoperative patients develop delirium during hospitalization.⁹⁻¹¹ Among nursing home residents older than 75, up to 60 percent may have delirium at any time.¹² *Table 5* lists the characteristics of patients who are at increased risk for delirium and some medical conditions that increase a patient's risk for developing delirium. Recognizing dementia as a risk factor for delirium can help physicians avoid attributing the confusion and agitation associated with delirium to preexisting dementia, which can

TABLE 4
Distinguishing Characteristics of Delirium, Dementia, Psychotic Disorders, and Depression

<i>Disorder</i>	<i>Distinguishing feature</i>	<i>Associated symptoms</i>	<i>Course</i>
Delirium	Fluctuating levels of consciousness with decreased attention	Disorientation, visual hallucinations, agitation, apathy, withdrawal, impairment in memory and attention	Acute onset; most cases remit with correction of underlying medical condition
Dementia	Memory impairment	Disorientation, agitation	Chronic, slow onset, progressive
Psychotic disorders	Deficits in reality testing	Social withdrawal, apathy	Usually slow onset with prodromal syndrome; chronic with exacerbations
Depression	Sadness, loss of interest and pleasure in usual activities	Disturbances of sleep, appetite, concentration, and energy; feelings of hopelessness and worthlessness; thoughts of suicide	Single episode or recurrent episodes; may be chronic

lead to a failure to search for underlying medical conditions or to discontinue medications that may be causing the delirium.

Management

IDENTIFYING UNDERLYING MEDICAL CONDITIONS

The definitive treatment for delirium is to correct the underlying medical condition causing the disorder. The initial steps in managing patients with delirium are to conduct a careful review of the medical history, physical examination findings, laboratory evaluations, and any drugs the patient is using, including over-the-counter agents, illicit drugs, and alcohol. Information from patients' current and past medical history, as well as the physical examination, should guide the initial work-up. Often the etiology will be fairly obvious from the history and basic laboratory tests.¹³ *Table 6*¹⁴ outlines a plan for assessing patients with delirium.

TABLE 6
Assessment of Patients with Delirium

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TABLE 5
Risk Factors for Delirium

Patient characteristics

Hospitalized elderly
Multiple medical conditions
Multiple medications
Terminally ill
Children
Sensory (hearing or visual) deprivation
Sleep deprived

Medical conditions

Dementia
Postsurgical status
 Cardiac
 Hip
 Transplant
Burns
Abrupt discontinuation of alcohol or drugs
Malnourishment
Chronic hepatic disease
Dialysis
Parkinson's disease
HIV infection
Poststroke status

HIV = human immunodeficiency virus.

Delirium can be exacerbated by overstimulation or understimulation in the environment.

SYMPTOMATIC TREATMENT

During the search for an underlying medical condition, symptomatic treatment for delirium may include the use of antipsychotic drugs to control agitation and hallucinations, and to clear the sensorium (i.e., improve attention abilities and level of orientation). Haloperidol (Haldol) has been studied most often in the symptomatic management of delirium,⁸ but risperidone (Risperdal)^{15,16} and olanzapine (Zyprexa),¹⁷ which are newer, atypical antipsychotics, have been the subjects of a few case reports. Two small studies^{18,19} with olanzapine suggested that this drug might be a useful alternative in the treatment of delirium.

In most adult patients with delirium of moderate severity, haloperidol therapy can be initiated at 1 to 2 mg twice daily, repeated every four hours as needed, and can be administered via IV, oral, or intramuscular routes. The IV route has been shown to produce a lower incidence of extrapyramidal side effects²⁰; however, it does carry a risk for the development of torsades de pointes.^{21,22} Preferably, patients receiving IV haloperidol should be on a cardiac monitor. QTc prolongation greater than 450 msec or more than 25 percent above baseline should prompt the physician to consider discontinuing haloperidol therapy, or a cardiology consultation should be obtained.⁸

Elderly patients should be started at lower drug dosages. In these patients, haloperidol therapy can be started at 0.25 to 1.0 mg twice daily and repeated every four hours, as needed.⁸ Risperidone therapy can be initiated at a dosage of 0.5 mg twice daily and increased gradually if necessary. In all patients, response to antipsychotics and the amount of as-needed medication used should be monitored at least every 24 hours.

If as-needed medication is necessary on a regular basis, the amount of scheduled antipsychotic should be increased. When patients' cognitive states stabilize, antipsychotics should be continued over the next few days, then tapered and discontinued. Physicians should not automatically discontinue antipsychotics on the first day the patient's mental status shows improvement, because the improvement may just be a normal fluctuation in the delirium. Gradual tapering that ends in discontinuation allows time to assess patients, to ensure that the delirium has resolved and avoid rapid rebound of symptoms.

ENVIRONMENTAL INTERVENTIONS

Environmental interventions that can help in managing patients with delirium are listed in *Table 7*.²³ Assigning patients to a room near the nursing station will allow for closer monitoring. The presence of a family member or close friend can also be helpful. In more severe cases, the use of 24-hour, one-on-one supervision may be necessary to monitor the patient and assist in controlling agitation. Frequent reorientation by nursing staff and family members is important. Patients should be reminded of the month, year, day of the week, time of day, and reason for hospitalization. Patients should also be reminded of the name of the hospital, city, and state. A calendar, clock, and family pictures displayed within patients' view can be beneficial.

Understimulation resulting from absence of cues about the time of day and the situation should be avoided, but overstimulation should also be avoided. The activity, light, and

The Author

ONDRIA C. GLEASON, M.D., is assistant professor of psychiatry and director of psychiatry residency training at the University of Oklahoma College of Medicine, Tulsa. She is also a staff psychiatrist at Saint Francis Hospital, Tulsa, Okla. Dr. Gleason earned her medical degree from the University of Nebraska College of Medicine, Omaha, and completed a residency in psychiatry at the University of Iowa Hospitals and Clinics, Iowa City.

Address correspondence to Ondria C. Gleason, M.D., University of Oklahoma College of Medicine at Tulsa, Department of Psychiatry, 4502 E. 41st St., Tulsa, OK 74135-2512 (e-mail: ondria-gleason@ouhsc.edu). Reprints are not available from the author.

noise (including that from beepers) in and around the patients' rooms should be monitored. Frequent checking of vital signs during the night should be avoided unless the necessity is clearly indicated, because frequent waking can lead to sleep deprivation, which may worsen delirium.²⁴

The use of physical restraints should be avoided, if possible. Physical restraint can increase agitation and the risk for injury in patients who are cognitively impaired. However, if other measures to control a patient's behavior are ineffective and it seems likely that the patient, if unrestrained, may cause personal injury or injure others, restraints can be used with caution. Patients who are restrained should be monitored closely, and restraints should be discontinued as soon as possible. Physicians should be aware of hospital policies and other regulations regarding the use of physical restraints.²⁵

Delirium can be a frightening experience for patients and family members. Patients may fear that they are losing their minds. Educating patients and family members about delirium and its association with underlying medical conditions is important. Unless there is reason to believe that a patient has experienced permanent loss of cognitive function, the patient and family members should be reassured that the symptoms are temporary and should resolve. Neurologic consultation can help establish a differential diagnosis in patients with delirium. Psychiatric consultation can aid in distinguishing delirium from a primary psychiatric disorder and in managing the behavior disturbances associated with delirium.

COURSE AND PROGNOSIS

Considerable morbidity and mortality are associated with delirium. Patients with delirium have longer hospital stays and more medical complications, such as pneumonia and pressure ulcers. Mortality is also higher in patients with delirium, probably as a result of more severe underlying medical pathology.

The mortality rate among elderly hospitalized patients with delirium is estimated to range from 22 to 76 percent.⁸

The course of delirium can last from several hours to several months. Through appropriate identification and correction of the underlying etiology, most patients experience complete resolution of delirium, although full recovery of mental function may lag behind

TABLE 7
Environmental Interventions in Treating Patients with Delirium

Provide support and orientation

Communicate clearly and concisely; give repeated verbal reminders of the day, time, location, and identity of key persons, such as members of the treatment team and relatives.

Provide clear signposts to patient's location, including a clock, calendar, and chart with the day's schedule.

Place familiar objects from patient's home in the room.

Ensure consistency in staff (e.g., a key nurse).

Use television or radio for relaxation and to help the patient maintain contact with the outside world.

Involve family members and caregivers to encourage feelings of security and orientation.

Provide an unambiguous environment

Simplify care area by removing unnecessary objects; allow adequate space between beds.

Consider using private room to aid rest and avoid extremes of sensory experience.

Avoid using medical jargon in patient's presence because it may encourage paranoia.

Ensure that lighting is adequate; provide a 40- to 60-watt night light to reduce misperceptions.

Control sources of excess noise (e.g., staff, equipment, visitors); aim for fewer than 45 dB during the day and fewer than 20 dB during the night.

Maintain room temperature between 21.1°C (69.98°F) and 23.8°C (74.8°F)

Maintaining competency

Identify and correct sensory impairments; ensure patients have their glasses, hearing aids, and dentures. Consider whether interpreter is needed.

Encourage self-care and participation in treatment (e.g., ask patient for feedback on pain).

Arrange treatments to allow maximum periods of uninterrupted sleep.

Maintain activity levels: ambulatory patients should walk three times daily; nonambulatory patients should undergo full range of movement exercise for 15 minutes three times daily.

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corrected laboratory values by several days. Without treatment, however, progression to stupor, coma, or death can occur. Patients who are elderly and those who have HIV infection are less likely to fully recover.^{26,27}

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