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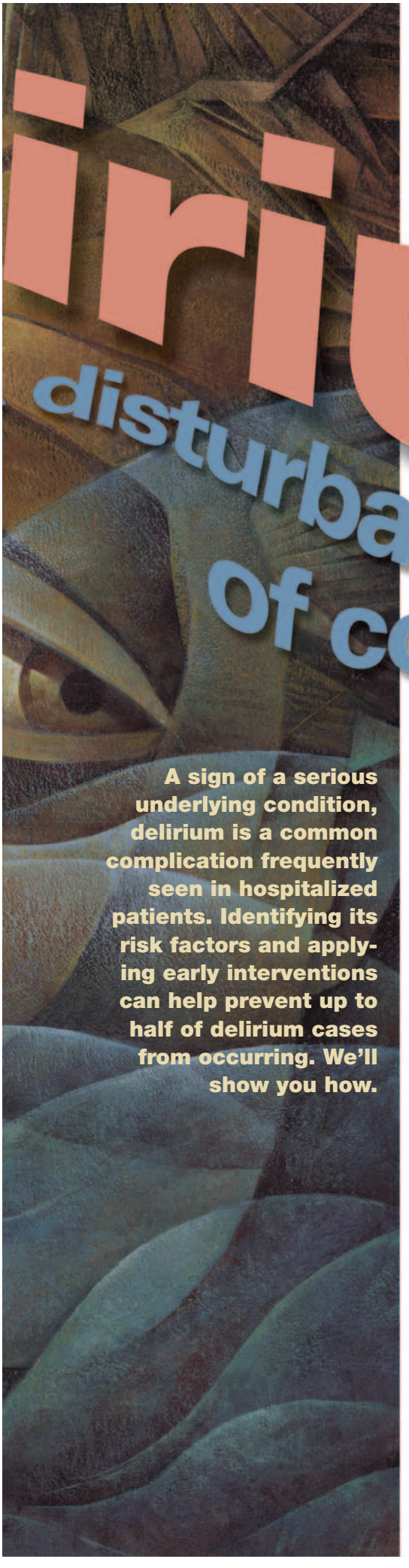

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Delirium
disturbance of consciousness

A sign of a serious underlying condition, delirium is a common complication frequently seen in hospitalized patients. Identifying its risk factors and applying early interventions can help prevent up to half of delirium cases from occurring. We'll show you how.

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The author has disclosed that she has no significant relationships with or financial interest in any commercial companies that pertain to this educational activity.

ALTHOUGH NOT A DISEASE, delirium, described as a disturbance of consciousness, is a set of symptoms resulting from an underlying disease process. As clinicians, we typically see confusion, disorientation, memory deficit, and hyper- or hypoactivity (combativeness or somnolence) in patients with delirium. Characterized by a sudden onset—an acute change in consciousness stemming from an underlying cause—delirium can occur over hours or days with fluctuation in mentation; however, symptoms can take many forms. Because of the morbidity and mortality associated with delirium, it's considered a medical emergency. Early recognition and treatment are necessary. The key to effective treatment is to identify the underlying cause and treat it appropriately.

In this article, I'll help you understand the risk factors, causes, signs and symptoms, and management options for delirium, all with an eye on prevention.

What exactly is delirium?

The diagnostic criteria for delirium, according to the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revision*, include a disturbance in consciousness with a reduced ability to focus or sustain attention and a change in cognition, such as memory deficit or disorientation, that isn't accounted for by a previously diagnosed condition such as dementia. The disturbance develops over a short period of time and can fluctuate over the course of a day. Evidence from the patient's history, physical exam, or lab findings indicates the disturbance is caused by direct physiologic

consequences of a general medical condition.

Delirium can be classified into three subtypes: hyperactive, hypoactive, and mixed. Patients who have ***hyperactive delirium*** are usually agitated, disoriented, and delusional, and they may experience hallucinations. This diagnosis can be confused with psychosis, schizophrenia, or dementia; it's often seen in patients experiencing alcohol intoxication or withdrawal. ***Hypoactive delirium*** is characterized by quiet, confused, disoriented, and apathetic behavior. This type of delirium may go undiagnosed or misdiagnosed as depression or dementia; it's often seen in patients experiencing encephalopathy or hypercapnia. ***Mixed delirium*** is a combination of hyperactive and hypoactive types, and the patient may exhibit all of the symptoms at different times, making it especially difficult to diagnose. It's commonly associated with daytime sedation and nighttime agitation.

Patho primer

The pathophysiologic process of delirium isn't fully understood; research is limited but ongoing. There are theories as to what may be occurring in the brain of a patient experiencing delirium. One of the main theories is that reversible changes to cerebral oxygen and metabolism take place. Studies have also suggested that the release of inflammatory cytokines toxic to the brain in high amounts may cause delirium. It's hypothesized that there are specific pathways in the brain that play a role in arousal and attention that may be affected in delirium as well. Stress and sleep deprivation have also been linked to delirium.

Researchers have also studied the role of neurotransmitters. The key neurotransmitters believed to play a role in delirium include:

- *acetylcholine:* an important neurotransmitter that's decreased in delirium and may be responsible for confusion in the patient
- *dopamine:* a neurotransmitter that has a reciprocal relationship with acetylcholine; whereas acetylcholine is decreased in delirium states, dopamine is increased
- *serotonin:* increased in delirium
- *gamma-aminobutyric acid:* increased in delirium.

Unraveling the risks and causes

A history of dementia is a very important predisposing risk factor for delirium. Patients with dementia are 40% more likely to develop delirium while hospitalized (see *Differences between dementia and delirium*). Delirium also affects 10% to 30% of hospitalized patients, with the highest occurrence in older patients in skilled nursing facilities, postoperative patients, patients with HIV, and patients with cancer. The older the patient and the more comorbidities he has, the greater the risk of delirium. See *Causes of postop delirium* for more information.

In the ICU, delirium is experienced by 60% to 80% of mechanically ventilated patients, but it often goes unrecognized. It's frequently overlooked or misdiagnosed due to the difficulty of assessing mental states in intubated patients.

A variety of signs and symptoms

A patient with delirium may present with:

- agitation
- somnolence
- withdrawal
- visual hallucinations (may be an indicator of a metabolic disturbance or adverse reaction to medication; may help differentiate between delirium and a psychiatric illness because visual hallucinations are more common in delirium)
- auditory hallucinations
- delusions
- neurologic symptoms, such as unsteady gait, tremor, myoclonus (brief, involuntary twitching of a muscle), paratonia (reduced ability of a muscle to stretch during passive movement), difficulty reading or writing, and visuoconstruction problems (can't copy a clock, difficulty word finding)
- fluctuating levels of consciousness
- attention difficulties

Causes of postop delirium

- Acid-base disturbances
- Age older than 80 years
- Fluid and electrolyte imbalance
- Dehydration
- History of dementia-like symptoms
- Hypoxia
- Hypercapnia
- Infection (urinary tract, wound, respiratory)
- Medications (anticholinergics, benzodiazepines, central nervous system depressants)
- Unrelieved pain
- Blood loss
- Decreased cardiac output
- Cerebral hypoxia
- Heart failure
- Acute myocardial infarction
- Hypothermia or hyperthermia
- Unfamiliar surroundings and sensory deprivation
- Emergent surgery
- Alcohol withdrawal
- Urinary retention
- Fecal impaction
- Polypharmacy
- Presence of multiple diseases
- Sensory impairments
- High stress or anxiety levels

Differences between delirium and dementia

	Dementia		
	Alzheimer's disease (AD)	**Vascular (multi-infarct) dementia**	**Delirium**
Etiology	Familial (genetic [chromosomes 14, 19, 21]) Sporadic	Cardiovascular (CVD) Cerebrovascular disease Hypertension	Drug toxicity and interactions; acute disease; trauma; chronic disease exacerbation Fluid and electrolyte disorder
Risk factors Occurrence Onset	Advanced age; genetics 50%–60% of dementias Slow	Preexisting CVD 20% of dementias Often abrupt Follows a stroke or transient ischemic attack	Preexisting cognitive impairment 20% of hospitalized older people Rapid, acute onset A harbinger of acute medical Illness
Age of onset (yr)	Early onset AD: 30s–65 Late onset AD: 65+ Most commonly: 85+	Most commonly 50–70	Any age, but predominantly in older persons
Gender Course	Males and females equally Chronic, irreversible; progressive, regular, downhill	Predominantly males Chronic, irreversible Fluctuating, stepwise progression	Males and females equally Acute
Duration Symptom progress	2–20 yr Onset insidious. *Early*—mild and subtle *Middle and late*—intensified Progression to death (infection or malnutrition)	Variable; years Depends on location of infarct and success of treatment; death due to underlying CVD	Lasts 1 day to 1 month Symptoms are fully reversible with adequate treatment; can progress to chronicity or death if underlying condition is ignored
Mood Speech/language	Early depression (30%) Speech remains intact until late in disease *Early*—mild anomia (can't name objects); deficits progress until speech lacks meaning; echoes and repeats words and sounds; mutism	Labile: mood swings May have speech deficit/aphasia depending on location of lesion	Variable Fluctuating; often can't concentrate long enough to speak
Physical signs	*Early*—no motor deficits *Middle*—apraxia (70%) (can't perform purposeful movement) *Late*—Dysarthria (impaired speech) *End stage*—loss of all voluntary activity; positive neurologic signs	According to location of lesion: focal neurologic signs, seizures Commonly exhibits motor deficits	Signs and symptoms of underlying disease
Orientation	Becomes lost in familiar places (topographic disorientation) Has difficulty drawing three-dimensional objects (visual and spatial disorientation) Disorientation to time, place, and person—with disease progression		May fluctuate between lucidity and complete disorientation to time, place, and person

(continued)

Differences between delirium and dementia *(continued)*

	Dementia		
	Alzheimer's disease (AD)	**Vascular (multi-infarct) dementia**	**Delirium**
Memory	Loss is an early sign of dementia; loss of recent memory is soon followed by progressive decline in recent and remote memory		Impaired recent and remote memory; may fluctuate between lucidity and confusion
Personality	Apathy, indifference, irritability *Early disease*—social behavior intact; hides cognitive deficits *Advanced disease*—disengages from activity and relationships; suspicious; paranoid delusions caused by memory loss; aggressive; catastrophic reactions		Fluctuating; can't focus attention to converse; alarmed by symptoms (when lucid); hallucinations; paranoid
Functional status, activities of daily living	Poor judgment in everyday activities; has progressive decline in ability to handle money, use telephone, function in home and workplace		Impaired
Attention span	Distractable; short attention span		Highly impaired; can't maintain or shift attention
Psychomotor activity	Wandering, hyperactivity, pacing, restlessness, agitation		Variable; alternates between high agitation, hyperactivity, restlessness, and lethargy
Sleep-wake cycle	Often impaired; wandering and agitation at nighttime		Takes brief naps throughout day and night

- memory deficits, such as not remembering that you bathed him, changed his sheets, or gave him his medications
- disorientation (may go unrecognized unless you ask the patient specific questions, such as his name and the date)
- changes in affect
- decreased appetite
- poor sleep
- emotional lability, such as fluctuations between anxiousness, sadness, tearfulness, and euphoria.

Pinning down the diagnosis

Delirium is often confused with other diagnoses, especially primary psychiatric disorders, due to the extreme differences in which delirium presents. Depression, dementia, and psychosis are a few of the differential diagnoses to consider when assessing your patient. The cause of delirium must be aggressively investigated in order to maximize treatment and improve outcomes.

The bedside nurse is usually the first to identify delirium in a patient. You're in a position to notice the subtle changes that may indicate the beginning of delirium. However, because delirium can wax and wane, it may be difficult for the healthcare provider to accurately diagnose it, depending on the timing of physical examination and assessment. The patient may appear completely alert and oriented at certain times, but this can quickly change to disorientation and combativeness or somnolence and confusion. The most important tools you can use are taking a thorough history, performing a physical exam, and identifying predisposing risk factors. For example, information from the patient's medical history and physical exam, lab workup, and diagnostic testing may show a physiologic reason for delirium, such as sepsis, urinary tract infection (UTI), or drug overdose. If your patient is older, a UTI or electrolyte imbalance can affect him greatly, causing acute delirium.

Assess the patient's current medication list for any potentially offending drugs. The pharmacist will be able to assist you with assessing potential interactions or concerns. The patient may recently have been started on a new medication or a medication may have been discontinued abruptly. Does he have a history of drug or alcohol use? Alcohol or drug

withdrawal may be embarrassing to the patient, but identifying the cause and providing treatment is important.

Psychiatric evaluation can be helpful in determining an underlying mental health issue or which medications are appropriate for the patient with delirium. A neurology consultation may be beneficial if a neurologic illness is suspected as the underlying cause or if the patient has a mixed diagnosis, such as a history of dementia and mental illness.

The most frequently used test for delirium is the Mini-Mental State Examination (MMSE). The MMSE is used to screen for the presence of cognitive impairment over a number of areas, such as deficits in orientation, attention, memory, language, and visuoconstruction abilities. Cognition is defined as mental activity, such as memory, thinking, attention and reasoning, decision making, and dealing with concepts. The MMSE is based on a series of questions and tests for which points are achieved when the patient answers a question or performs a task correctly. A maximum of 30 points is possible, with scores of 26 or less potentially signifying dementia (see *The Mini-Mental State Examination*).

Assessment tools that are specific to the ICU patient to help identify delirium include the Intensive Care Delirium Screening Checklist and the Confusion Assessment Method for the ICU (CAM-ICU) assessment tool. See *The Intensive Care Delirium Screening Checklist* for the eight features of delirium to assess for. Specifically designed for use in nonverbal patients, the CAM-ICU tool is the best documented method of diagnosing delirium in the ICU patient. With this tool, delirium is diagnosed by scoring demonstrated changes in the patient over the last 24-hour period. When administered by a nurse, it takes only 1 to 2 minutes to conduct.

Getting to the root cause

Besides a thorough history and physical exam and performing a mental status exam, there are imaging and lab studies that can be done to rule out other diagnoses or get to the root cause of the delirium. Neurologic imaging studies include a computed tomography scan, magnetic resonance imaging, and electroencephalography. A chest X-ray may be used to diagnose pneumonia or congestive heart failure. Pulse oximetry, an ECG, or lumbar puncture may also be used. Lab studies include:

- complete blood cell count
- electrolyte levels

The Mini-Mental State Examination

Orientation

5 What is the (year) (season) (date) (day) (month)?
5 Where are we (state) (county) (city) (hospital) (floor)?

Registration

3 Name three objects: 1 second to say each. Then ask the patient all three after you've said them. Give 1 point for each correct answer. Repeat them until he learns all three. Count the trials and record the number. Number of trials: ____.

Attention and calculation

5 Begin with 100 and count backwards by 7 (stop after five answers). Alternatively, spell the word "world" backwards.

Recall

3 Ask for the three objects repeated above. Give 1 point for each correct answer.

Language

2 Show a pencil and a watch, and ask the patient to name them.
1 Repeat the following: No ifs, ands, or buts.
3 A three-stage command: Take a paper in your right hand, fold it in half, and put it on the floor.
1 Read and obey the following: (Show the patient the written item.) CLOSE YOUR EYES.
1 Write a sentence.
1 Copy a design (complex polygon as in Bender-Gestalt).

Total score possible: 30

The Intensive Care Delirium Screening Checklist

For each item the patient exhibits, he receives a score of 1; if he doesn't exhibit the symptom, the score is 0:

- altered level of consciousness
- inattention
- disorientation
- hallucinations
- psychomotor agitation/retardation
- inappropriate mood/speech
- sleep/wake cycle disturbance
- symptom fluctuation.

Assess the patient every 8 hours and compare the score to the previous shift. A score of 4 or higher is positive for delirium and should be reported to the healthcare provider for further evaluation and treatment of the cause.

- blood glucose levels
- renal and liver function tests
- thyroid studies
- urine analysis
- thiamine levels
- sedimentation rate
- drug screens
- HIV testing or other tests for bacterial or viral infection.

Taking the guesswork out of treatment

Because delirium is a symptom of another underlying problem, treating the patient with drugs involves a high degree of skill. Besides medications, nutrition is important in these patients, especially multivitamins, as well as adequate hydration. Low doses of antipsychotic drugs can help with some of the behavioral or psychiatric symptoms. The use of benzodiazepines should be avoided except in patients experiencing drug or alcohol withdrawal. The American Psychiatric Association and the Society of Critical Care Medicine clinical practice guidelines recommend haloperidol for the treatment of delirium, as does the CDC.

Haloperidol is a dopamine receptor antagonist that works by inhibiting dopamine neurotransmission, which results in a sedative effect, improving hallucinations, agitation, and combative behavior. Overuse of medications such as haloperidol can cause oversedation and may result in permanent extrapyramidal reactions. Haloperidol can be administered via oral or I.V. route. The I.V. route has been shown to cause fewer extrapyramidal reactions; however, there's a risk for torsades de pointes. Patients receiving I.V. haloperidol should be monitored; a QTc interval greater than 450 msec requires notification of the healthcare provider to discontinue use.

An atypical antipsychotic, such as olanzapine, risperidone, ziprasidone, or quetiapine, may be a better choice to treat delirium, although few studies have been done. Monitor patient response to antipsychotic medication at least every 24 hours. Patients receiving antipsychotics should be monitored for QT prolongation, arrhythmias, and extrapyramidal reactions. When the patient stabilizes or cognition improves, medications should be slowly titrated down and never stopped suddenly to avoid rebound symptoms.

As previously mentioned, ICU delirium is a common problem. The entire ICU experience tends to facilitate, if not promote, delirium; even young patients experiencing the noise, lights, constant beeping, revolving medications, and continuous assessment develop delirium while in the ICU. Prevention strategies for the ICU patient include frequent orientation, allowing for sleep, early extubation, and mobilization and removal of invasive devices. Pain management and adequate nutrition are also necessary. Minimizing noise, although difficult in the ICU, can be accomplished by private rooms or glass doors that allow nurses to visualize the patient while keeping outside noises from entering his room.

The challenge of care

Nursing care of the patient with delirium can be challenging. Because the symptoms of delirium may vary, patients often wax and wane in their presentation; a somnolent patient can quickly become agitated and combative. The patient is at risk for climbing over bedrails; refusing medications; or pulling out I.V. lines, endotracheal tubes, or catheters. Frequent assessment or 1:1 observation may be necessary to ensure patient safety.

According to The Joint Commission's regulations for restraining patients, the least restrictive environment must be provided. This often means having a sitter with the patient at all times. Utilizing a sitter can also provide a calming effect for the patient and maintain as normal an environment as possible. If a sitter isn't available and the patient needs 24-hour observation, utilizing family and friends to stay with him can provide a calming environment and help him be more trusting of staff and treatment. The family can also provide items from home and familiar objects, such as pictures or favorite books or music. Families are often very willing to help with the caregiving of a loved one in the hospital; however, you must assess to determine if the family is appropriate and comforting or if they have the potential to further agitate the patient.

If restraints are necessary, follow your facility's policy and The Joint Commission regulations to ensure the safety of the patient. Enlisting the assistance of his family will help the patient feel more comfortable and allows the family to ensure that he's being cared for.

Frequent reorientation is important. Providing conversation, stimulation, and reorientation at regular intervals may help the patient feel more in control, decreasing his fears. Provide a clock and calendar and remind him of the time and date. Remember that just as understimulation can cause increased delirium symptoms, overstimulation can do the same. Frequent activities, keeping the lights on at night, and frequent checking of vital signs at night are a few things that can worsen delirium.

Use television or radio to help the patient maintain contact with the outside world. Speak clearly and concisely, avoiding medical

jargon or unfamiliar terms to lessen confusion and help the patient take part in his care. Use a private room when possible to prevent him from being overstimulated or feeling overwhelmed by visitors. Ensure lighting is sufficient for the patient's need. Control noise, traffic flow, and the number of visitors. Ensure the patient has the items necessary to function in his usual manner, such as his glasses, dentures, or hearing aid. Help him continue to care for himself as much as possible, such as bathing, feeding, ambulating, and sleeping at normal intervals.

All in the family

When a patient experiences delirium, it's frightening to the family, as well as the patient. There will be many questions: What happened? Did something go wrong? Will he ever recover? Will he need to go to a nursing home? Answering these questions honestly and allowing a dialogue will ease the minds of the patient's family. Provide your answers from experience, knowledge, and education. There will be many times when you'll need to say, I don't know. The alcohol withdrawal patient with delirium will recover in a more predictable time frame and manner than the elderly, critically ill patient who has been through a surgery, intensive care, multiple medications, and a lengthy hospitalization. Provide support, open conversation, frequent updates, and emotional care to the family. Keep them up-to-date on treatments and evaluations being done. Provide them with the support of case managers and social workers to assist with discharge planning to home or a care facility.

Keeping delirium at bay

The development of delirium is an independent predictor of length of stay, cost, and cognitive outcomes on discharge. Early recognition and treatment of the underlying cause are imperative to promote the best outcome for your patient. Now you have a clearer understanding of the warning signs and preventive strategies you can implement to reduce your patient's risk. **LPN**

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