Delirium: First, Rule It Out

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Course price: $10

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Course Summary

Delirium is a deeply concerning diagnosis that challenges a clinician to decide whether it is symptomatic of an underlying medical condition or psychological in nature. This course covers what delirium is, the underlying medical conditions that can cause delirium, assessments used to assist in forming an accurate diagnosis of delirium, similar conditions with which delirium is confused, and some appropriate actions to take to diminish or prevent delirium.

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Criteria for Successful Completions

80% or higher on the post test, a completed evaluation form, and payment where required. No partial credit will be awarded.

Course Objectives

When you finish this course you will be able to:

1. Define *delirium* and list at least 4 common symptoms.
2. Identify at least 5 causes of delirium.
3. Discuss the risk factors for delirium in the ICU.
4. Name the most commonly used delirium assessment tool.
5. Compare and contrast delirium and dementia.
6. Distinguish between delirium and depression.
7. Identify the medications used in the treatment of delirium.
8. Discuss 4 simple interventions when addressing delirium in your patient.

Understanding Delirium

Delirium is a common and often misunderstood syndrome. Consider these facts:

- More than 7 million hospitalized Americans suffer from delirium each year.
- Among hospitalized patients who survived their delirium episode, the rates of persistent delirium at discharge are 45%, at one month are 33%, at three months are 26%, and at six months are 21%.
- More than 60% of patients with delirium, it goes unrecognized by clinicians.
- Compared to hospitalized patients with no delirium (adjusted for age, gender, race, comorbidity), delirious patients have:
    - Higher mortality rates at one month (14% vs. 5%), at six months (22% vs. 11%), and 23 months (38% vs. 28%)
    - Longer hospital lengths of stay (21 days vs. 9 days)

- A higher probability of receiving care in long-term care settings at discharge (47% vs. 18%), 6 months (43% vs. 8%), and at 15 months (33% vs. 11%)
- A higher probability of developing dementia at 48 months (63% vs. 8%) (American Delirium Society, 2013)

Although rare in younger people, the condition can be found in as many 0.5% in those aged between 18 years and 55 years, and about 1% of those aged between 56 years and 85 years. The greatest incidence of delirium occurs in those older than 85 years, at more than 13%. Delirium is also present in about 15% to 20% of patients who are admitted to hospital (Robertson, 2015).

Not only is delirium a serious issue for patients, family, and care providers, it costs the U.S. healthcare system $182 billion each year (Inouye et al., 2014).

What's more, delirium is preventable in as many as 40% of cases, adding to its importance as a public health priority and an opportunity for containing healthcare costs (Inouye et al., 2014).

While delirium has been noted for thousands of years, it can be maddeningly difficult to recognize because its symptoms are found in many other conditions, for example, dementia or depression (Inouye et al., 2014; Wetherell & Jeste, 2003). Unfortunately, despite the prevalence of delirium and the burden on our healthcare system, it continues to go undiagnosed (Teodorczuk et al., 2012).

Defining Delirium

I get delirious whenever you're near
Lose all self-control, baby just can't steer
Wheels get locked in place
Stupid look on my face
          Prince, "Delirious" (1982)

Delirium is a condition hallmarked by rapidly changing mental states. Confusion, behavioral changes, and even loss of consciousness can occur (NIH, Medline Plus, 2015).

The term *delirium* literally means, "out of the track," and was first used by Aulus Cornelius Celsus (c. 25 B.C.– c. 50 A.D.), a Roman scientist, to describe either states of agitation or excessive somnolence (Cerejeira & Mukaetova-Ladinska, 2011). Over time the term *delirium* was used to designate reversible states of acute brain dysfunction, associated with fever or medical and/or surgical conditions (Cerejeira & Mukaetova-Ladinska, 2011).

The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition, more commonly known as the DSM-5, defines delirium due to a general medical condition as having:

- A disturbance of consciousness (ie, reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention
- A change in cognition (such as memory deficit, disorientation, or language disturbance) or the development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia
- A disturbance develops over a short period of time (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 (American Psychiatric Association, 2013)

Another foundational reference, the International Classification of Diseases-10, or ICD-10, describes delirium not due to alcohol or other psychoactive substances as an

> etiologically nonspecific organic cerebral syndrome characterized by concurrent disturbances of consciousness and attention, perception, thinking, memory, psychomotor behavior, emotion, and the sleep-wake schedule. The duration is variable and the degree of severity ranges from mild to very severe. (World Health Organization, 2010)

Adding to its complexity, delirium can also manifest itself with three different levels of consciousness: hyperactive, hypoactive, or mixed. Patients with hyperactive delirium can appear agitated, hypervigilant, irritable, with lack of concentration and **perseveration** (the uncontrollable repetition of a word, phrase, or gesture). Hypoactive delirium can present with diminished alertness, absence of or slowed speech, hypokinesia, and lethargy. Mixed delirium, as the name implies, includes manifestations of both hyperactive and hypoactive delirium (Cavallazzi et al., 2012).

Delirium Symptoms

> I know you might find this hard to believe, but I'm a writer. I know this may sound crazy, but I created this whole town!
> Jack Gable, *Delirious* (1991)

As we said in the previous section, delirium can present itself in myriad ways. Let's take a closer look at some of the more specific symptoms. The constellation of delirium symptoms can fall into three categories: cognitive, behavioral, and physiologic.

Common cognitive symptoms include:

- Disorientation
- Inability to sustain attention
- Impaired short-term memory
- Impaired visual and/or spatial ability
- Reduced level of consciousness, especially at night
- Perseveration (uncontrolled repetition, such as a word or gesture) (Cavallazzi et al., 2012; Medline Plus, 2014a)

Common behavioral symptoms include:

- Sleep-wake cycle disturbance
- Irritability
- Hallucinations
- Delusions (Cavallazzi et al., 2012)

Some common physiologic symptoms include:

- Incontinence
- Tremor
- Tachycardia
- Hypertension (Cavallazzi et al., 2012; MedLine Plus, 2014a)

Tremors, elevated heart rate, and elevated blood pressure are seen especially in those experiencing alcohol withdrawal syndrome (Cavallazzi et al., 2012).

Understanding Delirium (video 5:55)

Causes of Delirium

> That's the key to success—a healthy colon.
> > Eddie Murphy, 1983
> > *Delirious: An HBO Special*

One of the difficulties in adequately recognizing delirium is that so many conditions can cause it. Some of the major causes leading to delirium include neurologic issues, medications, infection, dehydration, metabolic changes, fecal impaction, and urinary retention (Maneeton & Maneeton, 2013; Cavallazzi et al., 2012).

Physical Causes

Urinary retention and fecal impaction are commonly cited causes delirium (Gower et al., 2012). Although the connection is not quite clear, cases of cystocerebral syndrome have been referenced in literature since the term was first coined in 1990 by Timothy Blackburn and Marvin Dunn to describe acute urinary retention presenting as delirium (Blackburn et al., 1990; Ble et al., 2001).

Neurologic Causes

Issues with the central nervous system (CNS) can cause delirium. This might seem obvious because delirium is, in fact, a CNS manifestation. While head trauma or even stroke may first come to mind as causes, other conditions such as hypertensive encephalopathy, intracranial neoplasm, and epilepsy can also cause delirium (Maneeton & Maneeton, 2013). Deficits in cholinergic function and the synthesis of acetylcholine, a type of neurotransmitter, are also thought to cause delirium and cognitive decline (Sonneville et al., 2013; Cavallazzi et al., 2012).

Medications

A wide variety of medications can trigger delirium, and can include everything from antibiotics, antidepressants, antipsychotics, lithium, to sedatives and many more. Studies have shown that taking three or more medications can be a risk factor, putting elders—who often take more than one prescription—at particular risk (Maneeton & Maneeton, 2013). Other prescribed medications can cause delirium, especially in older patients. These can include anticholinergic agents, benzodiazepines, and opiates (Cavallazzi et al., 2012).

Commonly prescribed drugs and over-the-counter (OTC) medications have also been implicated in causing delirium. These can include digoxin, diphenhydramine (Benedryl), beta blockers, antibiotics (primarily penicillins, cephalosporins, and quinolones), heartburn controllers like histamine receptor blockers (also called H2 receptor antagonists, eg, Pepcid, Zantac), corticosteroids, and lidocaine (von Moltke et al., 2001; Fujii et al., 2012).

Many illegal drugs can cause delirium. Methamphetamines, cocaine, hallucinogens, inhalants, opioids, and so-called bath salts (synthetic cathinones related to amphetamines) are noted culprits (Maneeton & Maneeton, 2013; National Institute on Drug Abuse, 2012).

Infection

Infections, especially widespread illness like sepsis, can cause delirium (Sonneville et al., 2013). In fact, infection is a leading cause of delirium in pediatric patients (Maneeton & Maneeton, 2013). Other infections such as urinary tract infections, meningitis, encephalitis, and pneumonia can also make patients susceptible to delirium (Maneeton & Maneeton, 2013; NIH, MedLine Plus, 2014a; Grover et al., 2009).

Metabolic Issues

A number of metabolic conditions can cause delirium. Too little or too much of some electrolytes has been implicated in delirium, specifically sodium, calcium, and magnesium. Liver impairment causing elevated liver enzymes or the more serious hepatic encephalopathy, has been implicated in delirium (Nordstrom et al., 2012). Other metabolic disorders contributing to delirium include metabolic acidosis (decreased blood pH due to metabolic processes), hypoxia (low blood oxygen levels), and uremia (elevated blood urea nitrogen, or BUN) (Maneeton & Maneeton, 2013; Aldemir et al., 2001; Gower et al., 2012).

Vitamin Deficiencies

Vitamin deficiencies have been known to cause delirium. Wernicke's encephalopathy, a severe form of thiamine (Vitamin B1) deficiency often seen in chronic alcohol abuse, is a noted cause of delirium (Oudman et al., 2014). Vitamin B12 and niacin (Vitamin B3) deficiencies are associated with delirium, especially among those with alcoholism (Kibirige & Mwebaze, 2013); Briani et al., 2013; Oldham & Ivkovic, 2012).

Endocrine Disorders

Perhaps one of the most common causes of reversible delirium is abnormal blood sugar. Delirium can occur with hypoglycemia or diabetic ketoacidosis as a result of hyperglycemia (Maneeton & Maneeton, 2013). Although both conditions can be caused by factors other than diabetes, diabetes and/or a side effect of its treatment are the most common causes of blood sugar abnormalities, which can lead to delirium (Sonneville et al., 2013; Sanford & Flaherty, 2014; National Diabetes Information Clearinghouse, 2012; Virtual Labs Media Library, Stanford University, 2005).

A thyroid hormone imbalance can also be the culprit behind the disorder, and is one that is often missed (Medline Plus, 2014a; National Institute of Neurological Disorders & Stroke, 2015).

A more serious form of hypothyroidism, known as myxedema, and a rare condition called Hashimoto's encephalopathy, wherein autoimmune antibodies attack brain tissue, can also present with delirium (Heinrich & Grahm, 2003; Ma & Leung, 2008; Jain et al., 2015).

While hypothyroidism can result in the hypoactive form of delirium, agitated, or hyperactive delirium can be caused by hyperthyroidism (NIH, Medline Plus, 2015).

Withdrawal Syndrome

Delirium tremens is a form of delirium that occurs during withdrawal, most notably of alcohol, but also with some drugs, such as benzodiazepines, barbiturates, other sedatives, and hypnotics (NIH, MedLine Plus, 2015; Maneeton & Maneeton, 2013). In fact, many of the causes for delirium mentioned previously are related to alcoholism and withdrawal. ICD-10 defines **delirium tremens** as

> a short-lived, but occasionally life-threatening, toxic-confusional state with accompanying somatic disturbances. It is usually a consequence of absolute or relative withdrawal of alcohol in severely dependent users with a long history of use. Onset usually occurs after withdrawal of alcohol. (World Health Organization, 2010)

Heavy Metal Toxicity

Heavy metal toxicity is a rare but noted cause of delirium (Maneeton & Maneeton, 2013). Lead poisoning from exposure to leaded gasoline, industrial processes, paint, battery recycling, and other sources can manifest as symptoms of delirium (Flora et al., 2012).

Exposure to high or prolonged levels of mercury—primarily caused by outgassing of mercury from dental amalgam, ingestion of contaminated fish, or occupational exposure—can result in delirium (Bernhoft, 2012).

Symptoms of severe confusion and hallucinations have been reported with bismuth intoxication caused by overdosing on common preparations (eg, Pepto-Bismol) used to treat upset stomach and peptic ulcers (Tripathi & Vibha, 2009).

Other metal toxicities that are known to cause delirium include aluminum, lithium, manganese, and arsenic, which is used in creating chromated copper arsenate for pressure-treated wood to make it more resistant to water damage (Tripathi & Vibha, 2009).

Mnemonics for the Causes of Delirium

> Polonius: Though this be madness, yet there is method in't.
> > William Shakespeare
> > *Hamlet,* Act 2, Scene 2

The list of potential causes of delirium can confuse even the most experienced clinician. Luckily there are several mnemonic devices that can help. While they vary somewhat in their grouping of causes, they can serve as helpful tools in making a differential diagnosis. See tables below.

DELIRIUM: Mnemonic for Reversible Causes of Delirium

Drugs
- Any new additions, increased doses, or interactions
- Consider over-the-counter drugs and alcohol
- Consider esp. high-risk drugs (anticholinergics, tricyclic antidepressants, some opioids

Electrolyte disturbances
- Especially dehydration, sodium imbalance
- Thyroid abnormalities

Lack of drugs
- Withdrawals from chronically used sedatives, including alcohol and sleeping pills
- Poorly controlled pain (lack of analgesia)

Infection
- Especially urinary and respiratory tract infections

Reduced sensory input
- Poor vision
- Poor hearing

Intracranial
- Infection
- Hemorrhage, stroke, tumor

Rare: consider only if new focal neurologic findings, suggestive history, or work-up are otherwise negative

Urinary, fecal
- Urinary retention; "cystocerebral syndrome"
- Fecal impaction

Myocardial, pulmonary
- Myocardial infarction, arrhythmia, exacerbation of heart failure
- Exacerbation of chronic obstructive pulmonary disease
- Hypoxia

I WATCH DEATH: Mnemonic for Differential Diagnosis of Delirium

Infection | HIV, sepsis, pneumonia

Withdrawal | Alcohol, barbiturate, sedative-hypnotic

Acute metabolic | Acidosis, alkalosis, electrolyte disturbance, hepatic failure, renal failure

Trauma | Closed-head injury, heat stroke, postoperative, severe burns

CNS pathology | Abscess, hemorrhage, hydrocephalus, subdural hematoma, infection, seizures, stroke, tumors, metastases, vasculitis, encephalitis, meningitis, syphilis

Hypoxia | Anemia, carbon monoxide poisoning, hypotension, pulmonary or cardiac failure

Deficiencies | Vitamin B12, folate, niacin, thiamine

Endocrinopathies | Hyper/hypoadrenocorticism, hyper/hypoglycemia, myxedema, hyperparathyroidism

Acute vascular | Hypertensive encephalopathy, stroke, arrhythmia, shock

Toxins or drugs | Prescription drugs, illicit drugs, pesticides, solvents

Heavy Metals | Lead, manganese, mercury

Dr. DRE: Mnemonic for Conditions to Consider When Delirium is Present

D | Diseases (Sepsis, COPD, CHF)

DR | Drug removal (SATs and stopping benzodiazepines/narcotics)

E | Environment (Immobilization, sleep and day/night, hearing aids, glasses)

THINK: Mnemonic for What to "Think" About When Delirium Is Present

T   Toxic situations:
- CHF, shock, dehydration
- Deliriogenic meds (tight titration)
- New organ failure (eg, liver, kidney)

H   Hypoxemia

I   Infection/sepsis (nosocomial); Immobilization

N   Nonpharmacologic Interventions:
- Hearing aids
- Glasses
- Reorient
- Sleep protocols
- Music
- Noise control
- Ambulation

K   K+ (potassium) or electrolyte problems

DELIRIOUS: Mnemonic of Delirium Causes
D   Drugs (continuous drips, Na+, Ca+, BUN/Cr, NH3+)
E   Environmental factors (hearing aids, eye glasses, sleep/wake cycle)
L   Labs (including Na+, K+, Ca+, BUN/Cr, NH3+)
I   Infection
R   Respiratory status (ABGs-PaO2 and PCO2)
I   Immobility
O   Organ failure (renal failure, liver failure, heart failure)
U   Unrecognized dementia
S   Shock (sepsis, cardiogenic)/steroid

Source: ICU Delirium & Cognitive Impairment Study Group, Vanderbilt University, 2013. Permission pending.

Risk Factors for Delirium

Gavin Elster: She'll be talking to me about something. Suddenly the words fade into silence. A cloud comes into her eyes and they go blank. She's somewhere else, away from me, someone I don't know. I call her, she doesn't even hear me. Then, with a long sigh, she's back. Looks at me brightly, doesn't even know she's been away, can't tell me where or when.

Scottie: How often does this happen?

Gavin Elster: More and more in the past few weeks.

> *Vertigo* (1958)

Common Risk Factors

Just as delirium has myriad causes, it also has many risk factors and predisposing conditions. As we'll see later in the course, reducing or preventing many of these factors can have a very beneficial effect.

According to Maneeton and Maneeton (2013):

Individuals are differently susceptible to delirium. Despite the exposing to the same causative factor, individuals are not equally prone to develop delirium. Predisposing and risk factors appear to play a role in the susceptibility to delirium. There have been numerous studies on predisposing and risk factors of delirium. For instance, Inouye and Charpentier (1996) demonstrated the five independent precipitating factors for delirium, including use of physical restraints, malnutrition, more than three medications taken, use of bladder catheter, and any iatrogenic event. Recently, risk factors for delirium have been established in four domains, including patient characteristics, chronic pathology, acute illness, and environmental factors (Van Rompaey et al., 2009). Another study in elderly patients receiving hip surgery found that early symptoms of memory impairment, incoherence, disorientation, and underlying somatic illness were predictors of delirium (De Jonghe et al., 2007).

Some of the most commonly cited risk factors are:

- Age > 60 years
- ICU
- Postoperative
- Acute brain condition (eg, stroke)
- Chronic brain condition (eg, Alzheimer-type dementia)
- Diabetes
- HIV infection (Maneeton & Maneeton, 2013

Others also include:

- Vision impairment
- Dehydration
- Physical restraint use
- Bladder catheter use
- Adding more than three drugs
- Sudden withdrawal of regular medications or alcohol use
- Hip fractures (Inouye, 2000; Ahmed, et al., 2014)

Gender, however, does not appear to be a strong risk factor for delirium, according to several studies (Van Rompaey et al., 2009; Dyer et al., 1995; Korevaar et al., 2005; Ahmed et al., 2014).

Risk Factors in the ICU

Because the prevalence of delirium is so high in the ICU—as much as 80%—several studies focused on this population of patients (van Rompaey et al., 2009, Brummel et al., 2013; Ely et al., 2001).

An in-depth study by Van Rompaey and colleagues grouped delirium risk factors for ICU patients into four domains depending on their ability to be mitigated: patient characteristics, chronic pathology, environment, and acute illness (van Rompaey et al., 2009).

Patient characteristics included age, gender, and daily smoking or chronic alcohol habits. Chronic pathology indicated primarily a pre-existing cognitive impairment. Environmental characteristics included whether visible daylight could be observed by the patient, a private or shared room, the presence of a clock, the use of restraints, and whether relatives visited the patient. Acute illness factors were those relating to the patient's "current diagnosis or treatment," and included such factors as temperature, nutrition, and the use of tubes, drains, and catheters (van Rompaey et al., 2009).

The domains were scored to see if "an intervention on relevant factors could influence the incidence of delirium in the intensive care unit. To prevent delirium, precipitating factors are more modifiable than predisposing factors" (van Rompaey et al., 2009).

Results in the van Rompaey study revealed that patient characteristics of smoking and alcohol use were significant risk factors for developing delirium in the ICU. In the chronic pathology domain, only an established diagnosis of dementia appeared to be a risk factor. In the acute illness domain, the longer a patient stayed in the ICU, the greater the risk of developing delirium.

Patients admitted because of a medical diagnosis as opposed to a surgical diagnosis also seemed to have a greater risk of developing delirium. The use of multiple psychoactive medications, tubes, bladder catheters, multiple infusions, and those who could not have a regular meal were also factors in the acute illness domain that were correlated with a higher risk of the onset of delirium. Environmental factors such as no visible daylight, no visits from relatives, and a transfer from another ward were significant risk factors (van Rompaey et al., 2009).

Screening Tools for Delirium

The dream police, they live inside of my head

The dream police, they come to me in my bed

The dream police, they're coming to arrest me, oh no!

Lab tests, medication chart reviews, and bedside screening tests all have their place in assessing a patient for delirium. Let's see how these lead to an accurate delirium diagnosis.

Laboratory Tests

The long list of potential causes we discussed earlier can be narrowed down with routine lab work such as a general chemistry panel, toxicology screen, thyroid hormone levels, and head scans to reveal the underlying cause for a patient's delirium (Registered Nurses' Association of Ontario, 2010; Maneeton & Maneeton, 2013). In fact, Maneeton and Maneeton call lab tests "essential" to identify delirium causes. They also suggest pulse oximetry, urinalysis, electrocardiogram (ECG), CSF study, radiologic studies, and an EEG (electroencephalogram) if warranted (Maneeton & Maneeton, 2013).

Chart Review

A review of the patient's chart can reveal pertinent medication history, medical and mental illnesses, and substance abuse (Maneeton & Maneeton, 2013). Unfortunately, while documentation is critical in recognizing and managing delirium, it is often recorded haphazardly or not at all. Several studies call for improved charting (Voyer et al., 2008; Hope et at., 2014).

Confusion Assessment Method (CAM)

[Training in the use of Confusion Assessment Method (CAM) tool is beyond the scope of this course. The CAM tool below is presented for general review to create a basic awareness of the instrument. Please visit www.hospitalelderlifeprogram.org for more information.]

Bedside assessment and screening tools can be easily and quickly performed by trained nursing staff and other healthcare professionals, making them ideal instruments to help identify and decrease, or eliminate, the potential for delirium. The Confusion Assessment Method (CAM) was created in 1988 by Sharon Inouye as an assessment tool for clinicians without psychiatric training to identify and recognize delirium. Today it is the most widely used delirium detection tool in the world (Inouye & vanDyke, 1990).

A study of eleven delirium detection instruments by Wong and colleagues found the CAM "has the best available supportive data as a bedside delirium instrument" because of "the instrument's ease of use, test performance, and clinical importance of the heterogeneity in the confidence intervals" (Wong & Holroyd-Leduc, 2010).

The Confusion Assessment Method Instrument

1. *[Acute Onset]* Is there evidence of an acute change in mental status from the patient's baseline?

2A. *[Inattention]* Did the patient have difficulty focusing attention, for example, being easily distractible, or having difficulty keeping track of what was being said?

2B. *[If present or abnormal]* Did this behavior fluctuate during the interview, that is, tend to come and go or increase and decrease in severity?

3. *[Disorganized thinking]*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?

4. *[Altered level of consciousness]* Overall, how would you rate this patient's level of consciousness? (Alert [normal]; Vigilant [hyperalert, overly sensitive to environmental stimuli, startled very easily], Lethargic [drowsy, easily aroused]; Stupor [difficult to arouse]; Coma; [unarousable]; Uncertain)

5. *[Disorientation]*Was the patient disoriented at any time during the interview, such as thinking that he or she was somewhere other than the hospital, using the wrong bed, or misjudging the time of day?

6. *[Memory impairment]*Did the patient demonstrate any memory problems during the interview, such as inability to remember events in the hospital or difficulty remembering instructions?

7. *[Perceptual disturbances]*Did the patient have any evidence of perceptual disturbances, for example, hallucinations, illusions or misinterpretations (such as thinking something was moving when it was not)?

8A. *[Psychomotor agitation]* At any time during the interview did the patient have an unusually increased level of motor activity such as restlessness, picking at bedclothes, tapping fingers or making frequent sudden changes of position?

8B. *[Psychomotor retardation]* At any time during the interview did the patient have an unusually decreased level of motor activity such as sluggishness, staring into space, staying in one position for a long time or moving very slowly?

9. *[Altered sleep-wake cycle]* Did the patient have evidence of disturbance of the sleep-wake cycle, such as excessive daytime sleepiness with insomnia at night?

The Confusion Assessment Method (CAM) Diagnostic Algorithm

Feature 1: *Acute Onset or Fluctuating Course* This feature is usually 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? (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.

Source: Adapted by Waszynski C. (2012); Inouye S. (1990). CAM permission pending.

Confusion Assessment Method-ICU (CAM-ICU)

[Training in the use of Confusion Assessment Method for the ICU (CAM-ICU) tool is beyond the scope of this course. The CAM-ICU tool below is presented for general review to create a basic understanding of the instrument. Please visit www.hospitalelderlifeprogram.org for more information.]

The CAM-ICU instrument was adapted for use with ICU patients in 2001 by Wesley Ely, at Vanderbilt University with Dr. Inouye. It differs from the CAM or other tools in that it can be used with patients unable to speak because of ventilation or other issues (Ely et al., 2001a; Tate, 2012).

Features and Descriptions	absent	present

I. Acute onset or fluctuating course*

    A.   Is there evidence of an acute change in mental status from the baseline?

    B.   Or, did the (abnormal) behavior fluctuate during the past 24 hours, that is, tend to come and go or increase and decrease in severity as evidenced by fluctuations on the Richmond Agitation Sedation Scale (RASS) or the Glasgow Coma Scale?

II. Inattention†

Did the patient have difficulty focusing attention as evidenced by a score of less than 8 correct answers on either the visual or auditory components of the Attention Screening Examination (ASE)?

III. Disorganized thinking

Is there evidence of disorganized or incoherent thinking as evidenced by incorrect answers to three or more of the 4 questions and inability to follow the commands?

Questions
    1.   Will a stone float on water?
    2.   Are there fish in the sea?
    3.   Does 1 pound weigh more than 2 pounds?
    4.   Can you use a hammer to pound a nail?

Commands
    1.   Are you having unclear thinking?
    2.   Hold up this many fingers. (Examiner holds 2 fingers in front of the patient.)
    3.   Now do the same thing with the other hand (without holding the 2 fingers in front of the patient).

(If the patient is already extubated from the ventilator, determine whether the patient's thinking is disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject.)

IV. Altered level of consciousness

Features and Descriptions	absent	present

Is the patient's level of consciousness anything other than alert, such as being vigilant or lethargic or in a stupor or coma?

ALERT:

    spontaneously fully aware of environment and interacts appropriately

VIGILANT:

    hyperalert

LETHARGIC:

    drowsy but easily aroused, unaware of some elements in the environment or not spontaneously interacting with the interviewer; becomes fully aware and appropriately interactive when prodded minimally

STUPOR:

    difficult to arouse, unaware of some or all elements in the environment or not spontaneously interacting with the interviewer; becomes incompletely aware when prodded strongly; can be aroused only by vigorous and repeated stimuli and as soon as the stimulus ceases, stuporous subject lapses back into unresponsive state

COMA:

    unarousable, unaware of all elements in the environment with no spontaneous interaction or awareness of the interviewer so that the interview is impossible even with maximal prodding

Features and Descriptions	absent	present

Overall CAM-ICU Assessment (Features 1 and 2 and either Feature 3 or 4):

Yes _____   No _____

* The scores included in the 10-point RASS range from a high of 4 (combative) to a low of −5 (deeply comatose and unresponsive). Under the RASS system, patients who were spontaneously alert, calm, and not agitated were scored at 0 (neutral zone). Anxious or agitated patients received a range of scores depending on their level of anxiety: 1 for anxious, 2 for agitated (fighting ventilator), 3 for very agitated (pulling on or removing catheters), or 4 for combative (violent and a danger to staff). The scores −1 to −5 were assigned for patients with varying degrees of sedation based on their ability to maintain eye contact: -1 for more than 10 seconds, -2 for less than 10 seconds, and −3 for eye opening but no eye contact. If physical stimulation was required, then the patients were scores as either −4 for eye opening or movement with physical or painful stimulation or −5 for no response to physical or painful stimulation. The RASS has excellent interrater reliability and intraclass correlation coefficients of 0.95 and 0.97, respectively, and has been validated against visual analog scale and geropsychiatric diagnoses in 2 ICU studies.

† In completing the visual ASE, the patients were shown 5 simple pictures (previously published) at 3-second intervals and asked to remember them. They were then immediately shown 10 subsequent pictures and asked to nod "yes" or "no" to indicate whether they had or had not just seen each of the pictures. Since 5 pictures had been shown to them already, for which the correct response was to nod "yes," and 5 others were new, for which the correct response was to nod "no," patients scored perfectly if they achieved 10 correct responses. Scoring accounted for either errors of omission (indicating "no" for a previously shown picture) or for errors of commission (indicating "yes" for a picture not previously shown). In completing the auditory ASE, patients were asked to squeeze the rater's hand whenever they heard the letter A during the recitation of a series of 10 letters. The rater then read 10 letters from the following list in a normal tone at a rate of 1 letter per second: S, A, H, E, V, A, A, R, A, T. A scoring method similar to that of the visual ASE was used for the auditory ASE testing.

Source: Ely et al., 2001a,b. CAM-ICU permission pending.

Confusion Assessment Method (video 8:30)

Confusion Assessment Method (CAM)

Source: U.S. Department of Veterans Affairs (2008). https://www.youtube.com/watch?v=M4wsPTtGeIc

Differential Diagnosis for Delirium

I'm not insane; my mother had me tested.

Sheldon Cooper, "The Griffin Equivalency"
The Big Bang Theory (2008)

Delirium vs. Dementia

Delirium can be difficult to differentiate from other conditions like dementia or depression because many of the symptoms are similar. Those suffering with delirium can also have dementia at the same time, further hampering an accurate diagnosis (American Delirium Society, 2013; Rosenstein, 2011). Let's look more closely at the differences, and similarities, between delirium and dementia.

The hallmark difference between delirium and other conditions is its rapid onset, its fluctuating course, and the patient's inability to hold attention. Causes are usually reversible and often involve an underlying medical condition. Dementia, however, is a slowly progressive disease causing brain damage that can take years to develop.

In delirium, the level of consciousness can fluctuate, whereas it is steady in dementia.

Delirious patients have impaired orientation and are acutely confused; in those with mild dementia, orientation might be normal but will slowly progress to disorientation. Thinking, attention abilities, and awareness is often disorganized in delirious patients, while the attention capabilities of patients with dementia are usually intact and patients may even be alert during the day. Sleep/wake cycles are disturbed in those experiencing delirium, but patients with dementia may begin with normal cycles that slowly degrade as the disease progresses (Maneeton & Maneeton, 2013; NIH, Medline Plus, 2014a; Robertson, 2015 [pending]).

Delirium vs. Depression

Dying is just one thing to be sad about. Living unhappily, that's another matter.
Morrie Schwartz
Tuesdays with Morrie (1992)

Depression, like delirium, can have a rapid onset, or it can be slow. While delirium has a myriad of possible causes, most are physiologic. The causes of depression are often a combination of factors including the environment (eg, stress, loss of a loved one, social isolation), genetics, biology (ie, neurotransmitters), and psychological issues. Depression can last for months and can become chronic, although, like delirium, it can be resolved. As with delirium, a depressed person's sleeping patterns can be disrupted, experiencing everything from insomnia to excessive sleeping. Two important distinctions in depression are the loss of interest in previously enjoyed activities and a pessimistic attitude (Maneeton & Maneeton, 2013; National Institute of Mental Health, 2011).

Comparing Delirium, Depression, and Dementia

	Delirium	Depression	Dementia
Onset	Rapid, hours to days	Rapid or slow	Progressive, develops overs several years
Cause	Medications, infection, dehydration, metabolic changes, fecal impaction, urinary retention, hypo- and hyperglycemia	Alteration in neurotransmitter function	Progressive brain damage
Duration	Usually less than one month but can last up to a year	Months, can be chronic	Years to decades
Course	Reversible, cause can usually be identified	Usually recover within months; can be relapsing	Not reversible, ultimately fatal
Level of consciousness	Usually changed, can be agitated, normal, or dull, hypo or hyperactive	Normal or slowed	Normal
Orientation	Impaired short-term memory, acutely confused	Usually intact	Correct in mild cases; first loses orientation to time, then place and person
Thinking	Disorganized, incoherent, rambling	Distorted, pessimistic	Impaired, impoverished
Attention	Usually disturbed, hard to direct or sustain	Difficulty concentrating	Usually intact
Awareness	Can be reduced, tends to fluctuate	Diminished	Alert during the day; may be hyperalert

Comparing Delirium, Depression, and Dementia			
	Delirium	Depression	Dementia
Sleep/waking	Usually disrupted	Hyper or hypo somnolence	Normal for age; cycle disrupted as the disease progresses

Source: Adapted from Eliopoulos, 2010.

Differences Between Dementia, Delirium, and Depression (video 28:53)

Source: Patrice Sobecki, BSN, Mercy College (2013).

Strategies for Addressing Delirium

Dr. Eric Foreman: What if his behavior isn't a side effect of the ondansetron? What if it's a symptom?

Dr. Robert Chase: Thank you.

Dr. Eric Foreman: What causes delirium and nausea?

Dr. Chris Taub: He's been stuck here in the hospital a few days. Nobody else is sick, so it can't be environmental...

Dr. Richardson: Not exactly stuck. I snuck out. Freedom is my birthright.

House M.D. (2010), "Now What?"

Although delirium is common, it is a serious condition with many causes, which, left untreated, can have devastating outcomes. The good news is delirium is treatable and can mitigated or prevented altogether.

Preventing or reducing the impact of delirium begins with finding the associated cause or, more correctly, causes. Maneeton and Maneeton (2013) report:

> Frequently, delirium is associated with multi-factorial etiology, all possible causes, therefore, should be investigated and corrected. Because behavioral and other psychiatric disturbances are also common, psychopharmacological and psychosocial interventions are also needed in most patients. Those include the control of behavioral disturbances, preventing complications (eg, accidents, falling) and supporting functional needs.

Pharmacologic Strategies

A number of medications can ease the effects of delirium. Haloperidol, a dopamine antagonist, is the gold standard because it has a variety of administration routes and has fewer negative side effects than other medications (Maneeton & Maneeton, 2013). Chlorpromazine has also been used to treat delirium successfully (Cavallazzi et al., 2012). Researchers are also studying other antipsychotics, such as risperidone, and finding favorable results (Yoon et al., 2013).

Cholinesterase inhibitors present an intriguing area of study because anticholinergic medications are correlated to drug-induced delirium and cholinergic medications can reduce symptoms of delirium in dementia. Unfortunately, results have been mixed, with some studies showing an increase in adverse effects (Marcantonio et al., 2011). Researchers are calling for further study on the use of cholinesterase inhibitors in patients with delirium (Maneeton & Maneeton, 2013). Studies have shown benzodiazepine to be less useful in controlling non-alcohol-related delirium. That said, it is considered the medication of choice to treat alcoholic withdrawal delirium (Maneeton & Maneeton, 2013).

Simple Interventions

> Bernadette: "What happens to our neuroreceptors when we don't get enough REM sleep?"
>
> Sheldon: "They lose their sensitivity to serotonin and norepinephrine."
>
> Bernadette: "Which leads to . . ."
>
> Sheldon: "Impaired cognitive function."
>
> > *The Big Bang Theory* (2010), "The Einstein Approximation"

Delirium, despite its serious nature, can be reduced or eliminated through many relatively simple interventions. Several large, comprehensive studies as well as a number of websites list a variety of interventions that may mitigate or eliminate delirium (Registered Nurses' Association of Ontario, 2010; Canadian Coalition for Seniors' Mental Health, 2006; Inouye et al., 1999; American Delirium Society, 2013; Hospital Elder Life Program, 2015; National Cancer Institute, 2015.

Let's take a closer look at the most commonly cited interventions, which we've grouped into five categories.

Physiologic Supports

As we've seen from the list of causes, there are many physiologic factors that can precipitate delirium. Establishing or maintaining vital signs, elimination habits, hydration and meal times to ensure adequate nutrition and fluid intake, and managing pain or discomfort are key to managing this condition. Areas to consider managing include:

- Temperature
- Blood pressure
- Fluids/electrolytes
- Blood Glucose
- Oxygenation
- Nutrition
- Elimination
- Pain management (Registered Nurses' Association of Ontario, 2010; Canadian Coalition for Seniors' Mental Health, 2006; Maneeton & Maneeton, 2013; van Rompaey et al., 2009)

Environment

Managing the patient's environment can have an enormous impact on preventing or reducing the severity of delirium. This category is one frequently mentioned as a primary non-pharmacological intervention for those experiencing delirium. Environmental factors to consider are:

- **Light**. Make sure light is adequate to see well, but not harsh.
- **Sound.** Reduce noise. TV or music may be promote relaxation and orientation, but monitor the patient as sound can also be a stimulant.

- **Familiar objects from home**. Encourage family members to bring familiar objects from home such as pictures, books, or religious accessories. (Registered Nurses' Association of Ontario, 2010; Canadian Coalition for Seniors' Mental Health, 2006; Cavallazzi et al., 2012; American Delirium Society, 2013; Hospital Elder Life Program, 2015)

Physical Supports

Interacting directly with the patient (or, in some cases, not interacting) can mitigate delirious episodes. Items to consider are:

- **Avoiding restraints**. Almost all studies reviewed for this course stated that restraints should be avoided if at all possible.
- **Avoiding catheters**. Like restraints, several studies called for the avoidance of urinary catheters or reduce their use.
- **Establishing mobility.** Several studies and resources cite the importance of establishing mobility after surgery, even if the patient is still on a ventilator, to reduce or prevent delirium
- **Sleep/wake habits.** Access to daylight during the day and reduced at night to maintain sleep/wake patterns was an important protocol cited in several studies, especially for those in the ICU. Other studies suggested scheduling medication administration to different times to reduce disruption of sleep.
- **Glasses, hearing aids, dentures.** Having the patient's eyeglasses, hearing aids, and/or dentures were key interventions reported in several studies as these simple aids helped to keep patients oriented to their surroundings. (Registered Nurses' Association of Ontario, 2010; Canadian Coalition for Seniors' Mental Health, 2006; Cavallazzi et al., 2012; van Rompaey et al., 2009)

Social Supports

The frequent presence of family members and a familiar team of care staff are correlated with positive outcomes:

- **Family members.** Family members are encouraged to visit as often as possible. Having loved ones sit with the patient around the clock, if possible, has proven beneficial.
- **Care team.** Maintain a consistent care team to minimize confusion. (Registered Nurses' Association of Ontario, 2010; Canadian Coalition for Seniors' Mental Health, 2006; Van Rompaey et al., 2009)

Orientation/Communication Techniques

Gentle reassurances and repetition of orienting facts by nursing staff and others can decrease agitation in delirious patients:

- **Orientation.** Along with environmental cues, placing a clock and calendar where the patient can see them helps with maintaining orientation. Repeat reminders about the date, time, and location if it seems to calm the patient.

- **Simple instructions.** Keep instructions simple and clear. Repeat instructions as necessary, but allow enough time to respond.

- **Reassurance.** Provide reassurance to the patient to reduce agitation. (Registered Nurses' Association of Ontario, 2010; Canadian Coalition for Seniors' Mental Health, 2006; Cavallazzi et al., 2012)

Conclusion

The goal of this course is to provide healthcare practitioners with an in-depth review of delirium. Delirium is a medical emergency, with many symptoms and many more causes. Delirium often results in distressing outcomes and a poor prognosis if not treated early in its course. Despite its prevalence in the community and within our healthcare system, its diagnosis and treatment needs often go unmet. Learning what delirium is; its causes and the risk factors that can precipitate or predispose a patient to the condition; a general understanding of the Confusion Assessment Method screening tool; how to tell the difference between delirium, dementia, and depression; and strategies to reduce the severity of or prevent delirium will improve outcomes and save lives.

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Post Test

Use the answer sheet following the test to record your answers.

1. According to the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), *delirium* is a medical condition characterized by:

    a. A reduced ability to focus and a change in cognition.

    b. Emotional lability.

    c. Manic expressions of joy.

    d. Feelings of depression and lethargy.

2. Which of the following is **not** a symptom of delirium:

    a. Bradycardia.

    b. Disorientation.

    c. Impaired short-term memory.

    d. Perseveration.

3. Which one of the following can cause delirium:

    a. Over-exertion.

    b. A high-lipid diet.

    c. Drinking water to excess.

    d. Urinary tract infection.

4. In the DELIRIUM mnemonic for the reversible causes of delirium, the "M" stands for:

    a. Mental.

    b. Myocardial.

    c. Metabolic.

    d. Muscle.

5. Which of the following is a risk factor for delirium:

    a. Hip fracture.

    b. Age <60 years.

    c. Male gender.

    d. History of hepatitis.

6. Name the most commonly used delirium assessment instrument:

     a. Confusion Awareness Method.

     b. Cerebral Assessment Method.

     c. Confusion Assessment Method.

     d. Delirium Assessment Method.

7. The hallmark difference between delirium and other conditions is its:

     a. Irreversibility.

     b. Attentional stability.

     c. Steady course.

     d. Rapid onset.

8. Patients with delirium are acutely confused; patients with depression are typically oriented.:

     a. True

     b. False

9. Which of these medications is the gold standard in treating delirium:

     a. Lithium.

     b. Haloperidol.

     c. Diphenhydramine.

     d. Histamine receptor blockers.

10. Which one of the environmental factors below is **not** beneficial for those with delirium:

     a. Familiar objects from home.

     b. Quiet music.

     c. Gentle restraints.

     d. Softly lit room.

Answer Sheet

Delirium: First, Rule It Out

Name (Please print your name): _____

Date: _____

Passing score is 80%

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Course Evaluation

Please use this scale for your course evaluation. Items with asterisks * are required.

- 5 = Strongly agree
- 4 = Agree
- 3 = Neutral
- 2 = Disagree
- 1 = Strongly disagree

*Upon completion of the course, I was able to:

a. Define *delirium* and list at least 4 common symptoms.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

b. Identify at least 5 causes of delirium.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

c. Discuss the risk factors for delirium in the ICU.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

d. Name the most commonly used delirium assessment tool.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

e. Compare and contrast delirium and dementia.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

f. Distinguish between delirium and depression.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

g. Identify the medications used in the treatment of delirium.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

h. Discuss 4 simple interventions when addressing delirium in your patient.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

* The author(s) are knowledgeable about the subject matter.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

* The author(s) cited evidence that supported the material presented.

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

* This course contained no discriminatory or prejudicial language.

○ Yes ○ No

* The course was free of commercial bias and product promotion.

○ Yes ○ No

* As a result of what you have learned, do you intend to make any changes in your practice?

○ Yes ○ No

If you answered Yes above, what changes do you intend to make? If you answered No, please explain why.

* Do you intend to return to ATrain for your ongoing CE needs?

○ Yes, within the next 30 days.

○ Yes, during my next renewal cycle.

○ Maybe, not sure.

○ No, I only needed this one course.

* Would you recommend ATrain Education to a friend, co-worker, or colleague?

○ Yes, definitely.

○ Possibly.

○ No, not at this time.

* What is your overall satsfaction with this learning activity?

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

* Navigating the ATrain Education website was:

- ○ Easy.
- ○ Somewhat easy.
- ○ Not at all easy.

* How long did it take you to complete this course, posttest, and course evaluation?

- ○ 60 minutes (or more) per contact hour
- ○ 50-59 minutes per contact hour
- ○ 40-49 minutes per contact hour
- ○ 30-39 minutes per contact hour
- ○ Less than 30 minutes per contact hour

I heard about ATrain Education from:

- ○ Government or Department of Health website.
- ○ State board or professional association.
- ○ Searching the Internet.
- ○ A friend.
- ○ An advertisement.
- ○ I am a returning customer.
- ○ My employer.
- ○ Other
- ○ Social Media (FB, Twitter, LinkedIn, etc)

Please let us know your age group to help us meet your professional needs.

○ 18 to 30

○ 31 to 45

○ 46+

I completed this course on:

○ My own or a friend's computer.

○ A computer at work.

○ A library computer.

○ A tablet.

○ A cellphone.

○ A paper copy of the course.

Please enter your comments or suggestions here: _____

_____

_____

_____

Registration Form

Please print and answer all of the following questions (***** required).

* Name: _____

* Email: _____

* Address: _____

* City: _____ ***** State: _____ ***** Zip:

_____

* Country: _____

* Phone: _____

* Professional Credentials/Designations:

_____

Your name and credentials/designations will appear on your certificate.

* License Number and State: _____

* Please email my certificate:

○ Yes   ○ No

(If you request an email certificate we will not send a copy of the certificate by US Mail.)

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You may pay by credit card or by check.
Fill out this section only if you are **paying by credit card.**
2 contact hours: $10

Credit card information

* Name: _____

Address (if different from above): _____

* City: _____ ***** State: _____ ***** Zip:

_____

* Card type:

○ Visa   ○ Master Card   ○ American Express   ○ Discover

* Card number: _____

* CVS#: _____

* Expiration date: _____