



Published in final edited form as:

Clin Geriatr Med. 2023 November ; 39(4): 535–551. doi:10.1016/j.cger.2023.05.006.

Delirium and delirium prevention in the emergency department

Sangil Lee, MD, MS [Associate Professor of Emergency Medicine],

University of Iowa Carver College of Medicine, Department of Emergency Medicine, 200 Hawkins Dr, Iowa City, IA 52242

Matthew A. Howard III, MD [Professor and Chair],

Department of Neurosurgery, University of Iowa, 200 Hawkins Dr, Iowa City, IA 52242

Jin H. Han, MD, MSc [Associate Professor of Emergency Medicine]

Vanderbilt University Medical Center, Department of Emergency Medicine, Geriatric Research, Education, and Clinical Center, 312 Oxford House, Nashville, TN 37232-4700

Keywords

Altered mental status; delirium; encephalopathy; subtype; prevention; treatment

Introduction

Delirium is a common and dangerous form of acute brain dysfunction among older emergency department (ED) patients.¹ Delirium is associated with higher mortality, accelerated cognitive and functional decline, and increased hospital length of stay.^{2,3} Unfortunately, ED providers miss delirium in the majority of cases because they do not routinely screen for this diagnosis.⁴ Using a delirium assessment can improve recognition; several brief and easy-to-use delirium assessments are feasible to use for the ED. Once delirium is detected, the emergency physician's primary goal is to find and treat the underlying etiology. A significant proportion of older ED patients without delirium will develop delirium during hospitalization.⁵ Because preventing delirium is by far the most effective way in maximizing older patient outcomes, EDs should consider implementing non-pharmacologic, multi-component, delirium prevention protocols, especially for those at moderate to high-risk for developing delirium.

The ED plays a critical role in the evaluation and management of older patients with delirium. The ED is often the initial point of entry for geriatric hospitalizations⁶ and serves the role of rapidly identifying those who are critically ill while efficiently identifying the underlying etiology and promptly initiating life-saving therapies. In the United States alone, the ED sees approximately 18 million patients who are 65 years and older each year.⁷ Due to the projected exponential growth of the US aging population over the next several decades, the number of elder ED patient visits will also grow at a similar pace.⁸ Thus, the emergency physician must be adept in evaluating and managing delirium in the ED. This

review will discuss the epidemiology, assessment, treatment, and prevention of delirium in the ED setting.

Delirium definition and epidemiology in the ED

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR), delirium is defined as a disturbance in attention and awareness that is accompanied by an acute (hours to days) loss in cognition that cannot be better accounted for by a preexisting or evolving neurocognitive disorder such as dementia.⁹ Delirium occurs in 6% to 36% of patients of older emergency department (ED) patients^{2–4,10–18} and is associated with increased in-hospital and long-term death,^{2,15,18,19} accelerated functional and cognitive decline,²⁰ longer hospital length of stays,^{19,21} unanticipated intensive care unit (ICU) admissions,¹⁹ discharge to a skilled nursing facility,¹⁹ and increased 30-day rehospitalizations.¹⁹

Delirium's Heterogeneity

Delirium is a heterogeneous syndrome that can vary by psychomotor activity and may have prognostic implications.^{22,23} Subtyping delirium by psychomotor activity is generally the most widely studied nomenclature.²⁴ Psychomotor subtyping is based on the patient's motor activity, speech, and level of arousal.²⁵ The four psychomotor subtypes of delirium are hypoactive, hyperactive, mixed²⁶ and no subtype,^{27–30} and it is hypothesized that each psychomotor subtype has its own distinct underlying pathophysiology and etiologies.^{26,31,32} Hypoactive delirium is described as 'quiet' delirium; patients with this subtype appear drowsy, somnolent, or lethargic. Because its clinical presentation can be subtle, hypoactive delirium is frequently missed by healthcare providers³³ and may be misinterpreted as depression or fatigue.^{34,35} On the other hand, patients with hyperactive delirium have increased psychomotor activity; these patients may seem restless, anxious, agitated, or combative. Hyperactive delirium is more easily recognized by healthcare providers, yet this is the least common subtype of delirium in older ED patients.³ Mixed-type delirium exhibits fluctuating levels of psychomotor activity; the patient can exhibit hypoactive symptomatology at one moment and hyperactive symptomatology several hours or even seconds later. Hypoactive delirium tends to portend the worst prognosis and is associated with higher mortality rates.^{30,36–38}

Delirium and dementia

Delirium is often confused with dementia, but they are two distinct syndromes with different characteristics and prognosis Table 1 shows the key differences between these two conditions.

Classically, delirium is considered reversible and precipitated by an underlying medical or surgical illness. There is a proportion of patients, however, who develop long-term cognitive impairment after delirium.^{39,40} Dementia is traditionally characterized as chronic, irreversible, and not secondary to an underlying medical illness. Delirium usually has neurocognitive (inattention, disorganized thinking, and perceptual disturbances) and non-neurocognitive (impaired arousal and sleep-wake disturbance) impairments that are not typically observed in dementia.

Distinguishing delirium from advanced dementia can be challenging because the clinical features can overlap. Patients with advanced dementia can be inattentive and have impaired arousal, disorganized thinking, sleep-wake cycle disturbances, and perceptual disturbances in the absence of delirium.⁴¹ When patients with advanced dementia develop delirium, an acute change in mental status is still observed, and any pre-existing cognitive and non-cognitive abnormalities can worsen.

Risk factors for delirium

When considering the if an older ED patient is delirious or is at risk for developing delirium, the emergency physician must consider vulnerability and precipitating factors of delirium (Table 2). Dementia is the most consistently reported and powerful vulnerability factor for delirium across multiple clinical settings.^{3,19,42–49} Infection is the most common precipitating factor for delirium,^{43,46,47,50–53} but is important to note that the majority of patients with delirium will have more than one etiology.^{51,54} The development of delirium involves complex interplay between patient vulnerability and precipitating factors. For example, patients with high vulnerability to developing delirium, such as a 90-year-old with Alzheimer's dementia who requires complete assistance to perform activities of daily living, require a relatively lower intensity insult like an uncomplicated urinary tract infection to develop delirium. Patients with little vulnerability to developing delirium, such as a fully functional 70-year-old who still works as an engineer, will require a more noxious insult, such as severe sepsis, to trigger delirium. In patients with little or no vulnerability to developing delirium, emergency physicians should look for an precipitating life-threatening illness.

Medication risk factors for delirium

It is important to note that delirium can be precipitated by medication side effects or withdrawals. Thus, it is imperative to obtain medication history, including non-prescription medications, recent changes or altered compliance with medications, and missed medications. Medication lists obtained from the electronic medical record (EMR) may not be accurate and should be clarified. High-risk medications include sedatives, corticosteroids, antihistamines, anticholinergics, tricyclic antidepressants, and muscle relaxants are notorious for precipitating delirium.⁵⁴ Opioids have the potential to precipitate delirium, though clinicians need to consider treating pain first.^{55,56}

Under recognition of delirium in the ED

Despite the high morbidity and mortality associated with delirium, emergency healthcare providers fail to detect delirium in 57% to 83% of cases,^{3,4,10,16,35,57,58} because it is not actively screened for using a validated delirium assessment.⁵⁹ The evidence suggests that delirium remains underrecognized in the ED.^{4,10,12,13,16} When delirium is unrecognized in the ED, the inpatient providers will also miss delirium in 95% of cases.³ Missing delirium has several negative implications for clinical care.⁵⁷ Because delirium is frequently misdiagnosed as dementia or psychiatric illnesses, such as depression³⁵ some may be inappropriately admitted to a psychiatric ward or discharged, thus delaying the diagnosis of delirium and their underlying medical condition.⁵⁸ Studies suggest that 25% of delirious older ED patients are actually discharged and sent home^{10,21} and may not be able to

fully comprehend their ED diagnosis or discharge instructions⁶⁰ leading to noncompliance, return ED visits, and other adverse outcomes.⁶¹

Assessment of delirium in the ED

Using a validated delirium assessment is vital to improving recognition (Table 2). There are three types of delirium assessments: patient-based, proxy-based, and observational. Patient-based delirium assessments require the rater to interact with the patient and usually incorporates bedside cognitive testing to assess the features of delirium. The advantage of this approach is that it has a potentially high ceiling for diagnostic accuracy (>95% sensitive and >95% specific). The disadvantages to this approach, however, is that to achieve high diagnostic accuracy, it may require significant training and a lengthier delirium assessment.⁶² It also requires raters to conduct additional cognitive testing on the patient, which may be difficult in a setting with significant time constraints such as the ED.

The most widely used patient-based delirium assessment is the Confusion Assessment Method (CAM) algorithm and their derivatives. The short-form CAM algorithm consists of four features: (1) altered mental status or fluctuating course, (2) inattention, (3) disorganized thinking, and (4) altered level of consciousness.⁶³ A patient is considered to meet the criteria for delirium if both features 1 and 2 and either 3 or 4 are present. The CAM's features are evaluated by subjective impression after performing a brief global cognitive assessment. For this reason, the CAM may require substantial training, and its diagnostic accuracy may be dependent on an operator's level of training and experience. To reduce operator dependence, increase ease-of-use, and reduce training-burden, several delirium assessments have incorporated brief, objective assessments into the CAM algorithm. Examples of these CAM-based assessments are the Brief Confusion Assessment Method (bCAM), Confusion Assessment Method for the Intensive Care Unit (CAM-ICU), and 3D-CAM. The bCAM, the one of the most commonly used delirium screening tools besides CAM, was specifically tailored for the ED and takes less than 2 minutes to perform with high inter-rater reliability.^{62,64}

The 4AT is another widely used patient-based delirium assessment and has four components: (1) alertness, (2) orientation, (3) attention, and (4) acute change or fluctuating course. The 4AT also takes 2- minutes to perform with excellent diagnostic accuracy.⁶⁷ Ultra-brief delirium patient-based assessments exist, such as the Month of the Year backwards task, but diagnostic accuracy is often sacrificed for brevity. Alternatively, a two-step approach to delirium assessment have been proposed for the ED to increase screening efficiency. A highly sensitive delirium assessment such as the Delirium Triage Screen (DTS) or 2-Item Ultra-Brief (UB-2) delirium assessment can be performed to rapidly rule out delirium. Because DTS or UB-2 have moderate specificity, a positive test requires a confirmatory delirium assessment with a higher specificity such as the bCAM, 3D-CAM, or 4AT.⁶²

Proxy-based delirium assessments asks a family-member about the presence of delirium features. An example of a proxy-based delirium assessment is Single Question in Delirium (SQiD)^{73,74} where the clinical asks proxy if the patient has been more confused lately. While this approach has moderately good diagnostic accuracy, a proxy is often unavailable

in the ED in approximately 25–75% of patients.⁷⁵ Observation-based delirium assessment simply observes the patient for delirium features during routine clinical interaction. Because this requires subjective assessment, extensive training may be needed to maximize diagnostic accuracy. The Richmond Agitation Sedation Scale (RASS) assesses the patients level of arousal and is 82% sensitivity and 85% specific for delirium.⁷² Observing a change in RASS increases the specificity for delirium to 92%.⁷⁶

The Diagnostic Evaluation Once Delirium is Detected in the ED

When delirium is detected, the first and most important priority is to find and treat the underlying etiology. Because older adults with delirium cannot provide an accurate history,⁶⁰ emergency physicians should contact family or their caregivers to obtain collateral information. If from a skilled nursing facility, the facility's staff should be contacted. In addition to obtaining a history of why the patient is in the ED, the emergency physician should elicit patients' baseline mentation and level of functioning from the collateral historian and how quickly the mental status change occurred.⁷³ An abrupt (within seconds) change in mental status may indicate a stroke as the cause for the patient's delirium.

Because adverse drug reactions and withdrawal from medications are common delirium etiologies, obtaining an accurate medication history, including over-the-counter (OTC) medications, is vital. Emergency physicians should ask about recent changes in or non-compliance with medications. High-risk medications that may contribute to delirium include: sedative-hypnotic, steroids, antihistamines, anticholinergics, tricyclic antidepressants, muscle relaxants.⁷⁷ The use of opioids for pain was considered the risk factor for delirium, yet recent studies did not show a significant association.^{55,56} Rather, we emphasize that painful conditions are treated aggressively to minimize the risk of delirium and avoid certain opioids, such as meperidine. Lastly, ask the patient or collateral historian about substance use disorder (alcohol, opioid, sedative-hypnotics, and illicit drug use) should also be inquired.

After history-taking, emergency physicians should conduct a comprehensive physical exam, including vital signs. Point-of-care tests for glucose may identify hypo- or hyperglycemia. A full examination of the patient is necessary to inspect the back, sacrum, genitalia, and feet for possible infections or drug patches which may have contributed to delirium. The detailed neurological exam should be performed. Focal neurological findings may suggest a stroke or intracranial hemorrhage as the cause of delirium. This examination can provide an opportunity to evaluate for trauma: accidental, self-inflicted, or non-accidental.

ED patients with delirium typically require a broad laboratory evaluation including serum electrolytes, glucose, blood urea nitrogen, creatinine, and transaminases, and a urinalysis. Measuring serum drug concentrations of psychoactive medications such as lithium, anticonvulsants, theophylline, digoxin, and aspirin should be considered if the delirious patient is on these medications. Because acute myocardial infarction can precipitate delirium and chest pain may be absent from the history,^{78,79} a 12-lead electrocardiogram should also be considered. Urinalysis is a routine diagnostic test for older adults due to urinary tract infection (UTI). Older adults tend to have a higher proportion of abnormal urinalysis without

active UTI, which leads to a risk of diagnostic anchoring on abnormal urinalysis and missing another potentially more serious cause of delirium.

Radiographic testing should be guided by the history and physical examination. Because delirious ED patient are older, have decreased visceral and peritoneal pain responses, and have difficulty with communication, a lower threshold to perform radiographic imaging may be needed to fully evaluate patients with relatively mild somatic complaints. A chest x-ray should be considered patients who are tachypneic, have abnormal lung auscultation, or have respiratory complaints. With regard to head CT, there is little evidence-based guidance on when to perform one. In systematic review that included 909 older ED patients with altered mental status or confusion, 15.6% will have abnormal head CT.⁸⁰ However, many of these studies did not use a delirium assessment and the patients included likely had more severe impairments. Inpatient studies have reported that head CTs have low diagnostic yield in older adults with delirium, but these studies have limited generalizability to the ED.^{81,82} A head CT should be strongly considered in delirious patients with impaired level consciousness (e.g. decreased level of arousal or somnolence), likely to only be relevant when there is a recent history of a fall or head trauma, if the patient is on anticoagulation, or a focal neurological deficit is found on clinical examination.^{80–82} Brain magnetic resonance imaging (MRI) should be considered in delirious patients with an abrupt onset of mental status changes or focal neurologic symptoms to rule out a cerebrovascular accident in the setting of a non-diagnostic head CT scan.

Non-pharmacological Management of Delirium

Aside from finding the underlying etiology delirium, there is no universally accepted intervention for delirium after it has occurred, especially for the ED setting.⁸³ A recent systematic review on the delirium prevention and treatment in the ED showed limited evidence on three non-RCTs employed a multi-factorial delirium prevention program; three non-RCTs evaluated regional anesthesia for hip fractures; and one study evaluated the use of Foley catheter, medication exposure, and risk of delirium.⁸⁴ One observational cohort study on the use of ED Foley catheters in the ED increased the duration of delirium (proportional OR 3.1, 95% CI 1.3 to 7.4).⁸⁵

If a patient is found to meet the criteria for delirium in the ED, the goal is to reduce the risk of agitation if the patient has hypoactive delirium or mitigate the worsening agitation if the patient has mixed-type or hyperactive delirium. Delirious patients often have perceptual disturbances (i.e., hallucinations and delusions) and can easily become more agitated in the noisy and over-stimulating ED environment. Because of the acute loss in cognition, they have difficulty understanding what is going on or have difficulty communicating. To achieve this goal, Flaherty et al. recommend the “TADA” approach which stands for “Tolerate, Anticipate, Don’t Agitate”.⁸⁶ This includes, tolerate, anticipate, and do not agitate, as below:

- *Tolerate* – The first step is to tolerate seemingly dangerous behaviors. Tolerating behaviors allows patients to respond naturally to their circumstances and may provide them a sense of control while in their delirious state. Because delirious patients are often unable to adequately communicate, these behaviors may

also indicate that something is bothering them such as needing to urinate or unaddressed pain.

- *Anticipate* – This step requires the health care provider to anticipate what the patient might do and proactively avoids inciting agents that may cause or exacerbate agitation. This includes avoiding unnatural tethers that are not absolutely needed for clinical care, including oxygen, intravenous lines, urinary catheters, and other monitoring devices. Getting out of bed is also anticipated and encouraged by this approach as long as patient's safety can be ensured.
- *Don't Agitate* – This is the final step and considered the golden rule of this approach. Some agitators are obvious. Reorientation can be unpredictable as it can occasionally worsen agitation and should only be attempted if the patient is amenable to it.

Pharmacological management for delirium in the ED

Drug therapy for delirium has been extensively evaluated. Since there are no rigorous mortality or long-term benefits, the goal of pharmacological therapy is to control agitation while avoiding oversedation.⁸⁷ The oral route is usually preferred over injections to minimize the discomfort of the injection, subsequent agitation due to injection, and arrhythmia.⁸⁸ It is imperative to note that many of these agents were tested for agitated patients, and not all were specific to older adults with delirium.

Disposition of Patients with Delirium

Currently, there is a limited evidence-based guidelines to whether an ED patient with delirium requires a hospitalization or can be discharged home. In general, a significant proportion of those with delirium will require hospitalization due to the severity or acuity of the underlying medical illness that precipitated the delirium. Delirious ED patients with severe neurocognitive symptoms, limited home social support, or have poor access to outpatient care will also likely require an admission even for simple clinical conditions that require some form of patient monitoring to continue treatment.

However, there is a potential risk that the symptoms of delirium may worsen during hospitalization because the patient will be in an unfamiliar environment or be exposed to deliriogenic iatrogenesis. As a result, ED discharge should be considered if the delirium symptoms are mild or have resolved, the etiology is unequivocally obvious and can be managed as an outpatient, the patient can be closely monitored at home by a family member or caregiver, and close outpatient follow-up with transportation can be arranged. For patients who reside in a long term care facility, depending on cause of delirium and degree of agitation or somnolence, some individuals with delirium may return to their long term care facility for treatment. If feasible, disposition to skilled nursing facility may also be an option.

Non-pharmacological management (prevention) in the ED

Up to 30% of older ED patients who are non-delirious on hospital admission will develop delirium during a hospital stay leading to significant mortality and morbidity.⁸⁹ Because

there is no intervention that has been shown to effectively reduce negative sequelae associated with delirium after it occurs,⁸³ a greater emphasis has been on placed delirium prevention to improve older patient outcomes.

Non-pharmacologic, multi-component delirium prevention protocols have been shown to be effective in preventing delirium and its resultant outcomes.⁹⁰ Some components of these protocols can be considered in ED, especially as boarding is an persistent issue. The most widely-used and evidence-based delirium prevention program is the Hospital Elder Life Program (HELP).^{91–94} HELP is a multi-component, non-pharmacologic intervention to reduce delirium risk factors. The HELP program includes reorientation, cognitive stimulation activities, reestablishment of sleep-wake cycles, minimized use of psychoactive medications, maximized mobility, optimal hydration and nutrition, and visual and hearing aids for those with sensory impairment. While many of the HELP components may be difficult to implement in the ED, certain components can be adapted and tailored to the ED to decrease the development of delirium in high-risk patients:⁹⁵ Observational Studies showed that ED length of stays greater than 10 to 12 hours might increase the risk of developing delirium^{96,97} especially in patients with pre-existing cognitive impairment.⁹⁶ The clinicians should mobilize the resource to prevent any unnecessary ED stays for those who have an increased risk of delirium. For example, In times of high boarding in the ED, institutions should consider adopting processes that prioritize inpatient bed assignment for persons at high risk of delirium. A recent study showed that higher physical therapy and occupational therapy intensity may be a useful intervention to shorten delirium duration.⁹⁸

ADEPT tool for delirium care

A working group of content experts convened to develop a point-of-care tool to assist emergency physicians in the care of older adults in the ED, and it was designed to present and explain the Assess, Diagnose, Evaluate, Prevent, and Treat (ADEPT). Five core principles were identified by the group that ensure adequate and thorough care for older adults with delirium. The ADEPT tool⁹⁹ developed by ACEP gives collective knowledge from an expert panel on delirium evaluation and management.

Future directions

It has been nearly 15 years since recommendations from the American Geriatrics Society and Society for Academic Emergency Medicine to prioritize delirium care, yet emergency medicine still has consensus-based recommendations and tools to formulate delirium treatment protocols.⁸⁴ Since 2012, a total of seven Cochrane reviews have synthesized delirium interventions across a variety of patient populations and clinical settings, but none included studies from the ED. The Geriatric Emergency Care Applied Research (GEAR) Network reviewed a similar question and still did not identify any ED-based research upon which to base interventions.⁹⁶ We encourage EDs to start implementing processes to minimize delirium risk associated with emergency care.^{100,101}

Conclusion

Delirium has been an elusive condition that did not have an effective screening process in the ED until recently. When identified, emergency clinicians must identify the underlying cause, as this is the primary goal of treatment. Further research is needed into processes to improve identification of individuals at risk of delirium and ED processes to prevent and mitigate the adverse effects of delirium.

Disclosure:

Dr. Lee and Dr. Howard have no disclosure. Dr. Han receives funding from the National Institute on Aging under award number NIA R01 AG065249 and the Geriatric Research, Education, and Clinical Center.

REFERENCES

1. Han JH, Suyama J. Delirium and Dementia. *Clin Geriatr Med*. 2018;34(3):327–354. doi:10.1016/j.cger.2018.05.001 [PubMed: 30031420]
2. Han JH, Shintani A, Eden S, et al. Delirium in the emergency department: an independent predictor of death within 6 months. *Ann Emerg Med*. 2010;56(3):244–252.e1. doi:10.1016/j.annemergmed.2010.03.003 [PubMed: 20363527]
3. Han JH, Zimmerman EE, Cutler N, et al. Delirium in older emergency department patients: recognition, risk factors, and psychomotor subtypes. *Acad Emerg Med*. 2009;16(3):193–200. doi:10.1111/j.1553-2712.2008.00339.x [PubMed: 19154565]
4. Lewis LM, Miller DK, Morley JE, Nork MJ, Lasater LC. Unrecognized delirium in ED geriatric patients. *Am J Emerg Med*. 1995;13(2):142–145. doi:10.1016/0735-6757(95)90080-2 [PubMed: 7893295]
5. Lee S, Harland K, Mohr NM, et al. Evaluation of emergency department derived delirium prediction models using a hospital-wide cohort. *J Psychosom Res*. 2019;127:109850. doi:10.1016/j.jpsychores.2019.109850 [PubMed: 31678811]
6. Schuur JD, Venkatesh AK. The growing role of emergency departments in hospital admissions. *N Engl J Med*. 2012;367(5):391–393. doi:10.1056/NEJMp1204431 [PubMed: 22784039]
7. Niska R, Bhuiya F, Xu J. National Hospital Ambulatory Medical Care Survey: 2007 emergency department summary. *Natl Health Stat Report*. 2010;(26):1–31.
8. He W, Sengupta M, Velkoff V, DeBarro K. 65+ in the United States: 2005. Current Population Reports, P23–209, US Government Printing Office; 2005. Published online December 2005. Accessed December 22, 2022. <https://www.census.gov/content/dam/Census/library/publications/2005/demo/p23-209.pdf>
9. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th Ed., Text Revision (DSM-5-TR). American Psychiatric Association Publishing; 2022. doi:10.1176/appi.books.9780890425787
10. Hustey FM, Meldon SW, Smith MD, Lex CK. The effect of mental status screening on the care of elderly emergency department patients. *Ann Emerg Med*. 2003;41(5):678–684. doi:10.1067/mem.2003.152 [PubMed: 12712035]
11. Naughton BJ, Moran MB, Kadah H, Heman-Ackah Y, Longano J. Delirium and other cognitive impairment in older adults in an emergency department. *Ann Emerg Med*. 1995;25(6):751–755. doi:10.1016/s0196-0644(95)70202-4 [PubMed: 7755195]
12. Elie M, Rousseau F, Cole M, Primeau F, McCusker J, Bellavance F. Prevalence and detection of delirium in elderly emergency department patients. *CMAJ*. 2000;163(8):977–981. [PubMed: 11068569]
13. Hustey FM, Meldon SW. The prevalence and documentation of impaired mental status in elderly emergency department patients. *Ann Emerg Med*. 2002;39(3):248–253. doi:10.1067/mem.2002.122057 [PubMed: 11867976]

14. Hustey FM, Meldon S, Palmer R. Prevalence and documentation of impaired mental status in elderly emergency department patients. *Acad Emerg Med*. 2000;7(10):1166.
15. Kakuma R, du Fort GG, Arsenault L, et al. Delirium in older emergency department patients discharged home: effect on survival. *J Am Geriatr Soc*. 2003;51(4):443–450. doi:10.1046/j.1532-5415.2003.51151.x [PubMed: 12657062]
16. Suffoletto B, Miller T, Frisch A, Callaway C. Emergency physician recognition of delirium. *Postgrad Med J*. 2013;89(1057):621–625. doi:10.1136/postgradmedj-2012-131608 [PubMed: 23788663]
17. Hare M, Arendts G, Wynaden D, Leslie G. Nurse screening for delirium in older patients attending the emergency department. *Psychosomatics*. 2014;55(3):235–242. doi:10.1016/j.psych.2013.08.007 [PubMed: 24314593]
18. Hsieh SJ, Madahar P, Hope AA, Zapata J, Gong MN. Clinical deterioration in older adults with delirium during early hospitalisation: a prospective cohort study. *BMJ Open*. 2015;5(9):e007496. doi:10.1136/bmjopen-2014-007496
19. Kennedy M, Enander RA, Tadiri SP, Wolfe RE, Shapiro NI, Marcantonio ER. Delirium risk prediction, healthcare use and mortality of elderly adults in the emergency department. *J Am Geriatr Soc*. 2014;62(3):462–469. doi:10.1111/jgs.12692 [PubMed: 24512171]
20. Han JH, Vasilevskis EE, Chandrasekhar R, et al. Delirium in the Emergency Department and Its Extension into Hospitalization (DELINEATE) Study: Effect on 6-month Function and Cognition. *J Am Geriatr Soc*. 2017;65(6):1333–1338. doi:10.1111/jgs.14824 [PubMed: 28263444]
21. Han JH, Eden S, Shintani A, et al. Delirium in older emergency department patients is an independent predictor of hospital length of stay. *Acad Emerg Med*. 2011;18(5):451–457. doi:10.1111/j.1553-2712.2011.01065.x [PubMed: 21521405]
22. Girard TD, Thompson JL, Pandharipande PP, et al. Clinical phenotypes of delirium during critical illness and severity of subsequent long-term cognitive impairment: a prospective cohort study. *Lancet Respir Med*. 2018;6(3):213–222. doi:10.1016/S2213-2600(18)30062-6 [PubMed: 29508705]
23. Yang FM, Marcantonio ER, Inouye SK, et al. Phenomenological subtypes of delirium in older persons: patterns, prevalence, and prognosis. *Psychosomatics*. 2009;50(3):248–254. doi:10.1176/appi.psy.50.3.248 [PubMed: 19567764]
24. de Rooij SE, Schuurmans MJ, van der Mast RC, Levi M. Clinical subtypes of delirium and their relevance for daily clinical practice: a systematic review. *Int J Geriatr Psychiatry*. 2005;20(7):609–615. doi:10.1002/gps.1343 [PubMed: 16021665]
25. Meagher DJ, Moran M, Raju B, et al. Motor symptoms in 100 patients with delirium versus control subjects: comparison of subtyping methods. *Psychosomatics*. 2008;49(4):300–308. doi:10.1176/appi.psy.49.4.300 [PubMed: 18621935]
26. Meagher DJ, Trzepacz PT. Motoric subtypes of delirium. *Semin Clin Neuropsychiatry*. 2000;5(2):75–85. doi:10.153/SCNP00500075 [PubMed: 10837096]
27. Godfrey A, Leonard M, Donnelly S, Conroy M, O'laighin G, Meagher D. Validating a new clinical subtyping scheme for delirium with electronic motion analysis. *Psychiatry Res*. 2010;178(1):186–190. doi:10.1016/j.psychres.2009.04.010 [PubMed: 20452050]
28. Meagher D, Adamis D, Leonard M, et al. Development of an abbreviated version of the delirium motor subtyping scale (DMSS-4). *Int Psychogeriatr*. 2014;26(4):693–702. doi:10.1017/S1041610213002585 [PubMed: 24429062]
29. Meagher DJ, Leonard M, Donnelly S, Conroy M, Adamis D, Trzepacz PT. A longitudinal study of motor subtypes in delirium: frequency and stability during episodes. *J Psychosom Res*. 2012;72(3):236–241. doi:10.1016/j.jpsychores.2011.11.013 [PubMed: 22325705]
30. Meagher DJ, Leonard M, Donnelly S, Conroy M, Adamis D, Trzepacz PT. A longitudinal study of motor subtypes in delirium: relationship with other phenomenology, etiology, medication exposure and prognosis. *J Psychosom Res*. 2011;71(6):395–403. doi:10.1016/j.jpsychores.2011.06.001 [PubMed: 22118382]
31. Ross CA. CNS arousal systems: possible role in delirium. *Int Psychogeriatr*. 1991;3(2):353–371. doi:10.1017/s1041610291000819 [PubMed: 1687443]

32. Ross CA, Peyser CE, Shapiro I, Folstein MF. Delirium: phenomenologic and etiologic subtypes. *Int Psychogeriatr*. 1991;3(2):135–147. doi:10.1017/s1041610291000613 [PubMed: 1811769]
33. Inouye SK, Foreman MD, Mion LC, Katz KH, Cooney LM. Nurses' recognition of delirium and its symptoms: comparison of nurse and researcher ratings. *Arch Intern Med*. 2001;161(20):2467–2473. doi:10.1001/archinte.161.20.2467 [PubMed: 11700159]
34. Nicholas LM, Lindsey BA. Delirium presenting with symptoms of depression. *Psychosomatics*. 1995;36(5):471–479. doi:10.1016/S0033-3182(95)71628-0 [PubMed: 7568655]
35. Farrell KR, Ganzini L. Misdiagnosing delirium as depression in medically ill elderly patients. *Arch Intern Med*. 1995;155(22):2459–2464. [PubMed: 7503605]
36. Kiely DK, Jones RN, Bergmann MA, Marcantonio ER. Association between psychomotor activity delirium subtypes and mortality among newly admitted post-acute facility patients. *J Gerontol A Biol Sci Med Sci*. 2007;62(2):174–179. doi:10.1093/gerona/62.2.174 [PubMed: 17339642]
37. Kim S-Y, Kim S-W, Kim J-M, et al. Differential associations between delirium and mortality according to delirium subtype and age: A prospective cohort study. *Psychosom Med*. 2015;77(8):903–910. doi:10.1097/PSY.0000000000000239 [PubMed: 26397939]
38. Jackson TA, Wilson D, Richardson S, Lord JM. Predicting outcome in older hospital patients with delirium: a systematic literature review. *Int J Geriatr Psychiatry*. 2016;31(4):392–399. doi:10.1002/gps.4344 [PubMed: 26302258]
39. Marcantonio ER, Simon SE, Bergmann MA, Jones RN, Murphy KM, Morris JN. Delirium symptoms in post-acute care: prevalent, persistent, and associated with poor functional recovery. *J Am Geriatr Soc*. 2003;51(1):4–9. doi:10.1034/j.1601-5215.2002.51002.x [PubMed: 12534838]
40. Levkoff SE, Evans DA, Liptzin B, et al. Delirium. The occurrence and persistence of symptoms among elderly hospitalized patients. *Arch Intern Med*. 1992;152(2):334–340. doi:10.1001/archinte.152.2.334 [PubMed: 1739363]
41. Boller F, Verny M, Hugonot-Diener L, Saxton J. Clinical features and assessment of severe dementia. A review. *Eur J Neurol*. 2002;9(2):125–136. doi:10.1046/j.1468-1331.2002.00356.x [PubMed: 11882053]
42. Inouye SK, Viscoli CM, Horwitz RI, Hurst LD, Tinetti ME. A predictive model for delirium in hospitalized elderly medical patients based on admission characteristics. *Ann Intern Med*. 1993;119(6):474–481. doi:10.7326/0003-4819-119-6-199309150-00005 [PubMed: 8357112]
43. Schor JD, Levkoff SE, Lipsitz LA, et al. Risk factors for delirium in hospitalized elderly. *JAMA*. 1992;267(6):827–831. [PubMed: 1732655]
44. Marcantonio ER, Goldman L, Mangione CM, et al. A clinical prediction rule for delirium after elective noncardiac surgery. *JAMA*. 1994;271(2):134–139. [PubMed: 8264068]
45. Gustafson Y, Berggren D, Brännström B, et al. Acute confusional states in elderly patients treated for femoral neck fracture. *J Am Geriatr Soc*. 1988;36(6):525–530. doi:10.1111/j.1532-5415.1988.tb04023.x [PubMed: 2897391]
46. Jitapunkul S, Pillay I, Ebrahim S. Delirium in newly admitted elderly patients: a prospective study. *Q J Med*. 1992;83(300):307–314. [PubMed: 1631262]
47. Kolbeinson H, Jónsson A. Delirium and dementia in acute medical admissions of elderly patients in Iceland. *Acta Psychiatr Scand*. 1993;87(2):123–127. doi:10.1111/j.1600-0447.1993.tb03342.x [PubMed: 8447239]
48. Pompei P, Foreman M, Rudberg MA, Inouye SK, Braund V, Cassel CK. Delirium in hospitalized older persons: outcomes and predictors. *J Am Geriatr Soc*. 1994;42(8):809–815. doi:10.1111/j.1532-5415.1994.tb06551.x [PubMed: 8046190]
49. Margiotta A, Bianchetti A, Ranieri P, Trabucchi M. Clinical characteristics and risk factors of delirium in demented and not demented elderly medical inpatients. *J Nutr Health Aging*. 2006;10(6):535–539. [PubMed: 17183425]
50. Rockwood K. Acute confusion in elderly medical patients. *J Am Geriatr Soc*. 1989;37(2):150–154. doi:10.1111/j.1532-5415.1989.tb05874.x [PubMed: 2910973]
51. Cirbus J, MacLulich AMJ, Noel C, Ely EW, Chandrasekhar R, Han JH. Delirium etiology subtypes and their effect on six-month function and cognition in older emergency department patients. *Int Psychogeriatr*. 2019;31(2):267–276. doi:10.1017/S1041610218000777 [PubMed: 30021661]

52. Rahkonen T, Mäkelä H, Paanila S, Halonen P, Sivenius J, Sulkava R. Delirium in elderly people without severe predisposing disorders: etiology and 1-year prognosis after discharge. *Int Psychogeriatr*. 2000;12(4):473–481. doi:10.1017/s1041610200006591 [PubMed: 11263714]
53. George J, Bleasdale S, Singleton SJ. Causes and prognosis of delirium in elderly patients admitted to a district general hospital. *Age Ageing*. 1997;26(6):423–427. doi:10.1093/ageing/26.6.423 [PubMed: 9466291]
54. Hanlon JT, Semla TP, Schmadre KE. Alternative Medications for Medications in the Use of High-Risk Medications in the Elderly and Potentially Harmful Drug-Disease Interactions in the Elderly Quality Measures. *J Am Geriatr Soc*. 2015;63(12):e8–e18. doi:10.1111/jgs.13807 [PubMed: 26447889]
55. Lee S, Okoro UE, Swanson MB, Mohr N, Faine B, Carnahan R. Opioid and benzodiazepine use in the emergency department and the recognition of delirium within the first 24 hours of hospitalization. *J Psychosom Res*. 2022;153:110704. doi:10.1016/j.jpsychores.2021.110704 [PubMed: 34959040]
56. Daoust R, Paquet J, Boucher V, Pelletier M, Gouin É, Émond M. Relationship between pain, opioid treatment, and delirium in older emergency department patients. *Acad Emerg Med*. 2020;27(8):708–716. doi:10.1111/acem.14033 [PubMed: 32441414]
57. Sanders AB. Missed delirium in older emergency department patients: a quality-of-care problem. *Ann Emerg Med*. 2002;39(3):338–341. [PubMed: 11867994]
58. Reeves RR, Parker JD, Burke RS, Hart RH. Inappropriate psychiatric admission of elderly patients with unrecognized delirium. *South Med J*. 2010;103(2):111–115. doi:10.1097/SMJ.0b013e3181c99423 [PubMed: 20065900]
59. Press Y, Margulin T, Grinshpun Y, et al. The diagnosis of delirium among elderly patients presenting to the emergency department of an acute hospital. *Arch Gerontol Geriatr*. 2009;48(2):201–204. doi:10.1016/j.archger.2008.01.008 [PubMed: 18313774]
60. Han JH, Bryce SN, Ely EW, et al. The effect of cognitive impairment on the accuracy of the presenting complaint and discharge instruction comprehension in older emergency department patients. *Ann Emerg Med*. 2011;57(6):662–671.e2. doi:10.1016/j.annemergmed.2010.12.002 [PubMed: 21272958]
61. Clarke C, Friedman SM, Shi K, Arenovich T, Monzon J, Culligan C. Emergency department discharge instructions comprehension and compliance study. *CJEM*. 2005;7(1):5–11. doi:10.1017/s1481803500012860 [PubMed: 17355647]
62. Han JH, Wilson A, Vasilevskis EE, et al. Diagnosing delirium in older emergency department patients: validity and reliability of the delirium triage screen and the brief confusion assessment method. *Ann Emerg Med*. 2013;62(5):457–465. doi:10.1016/j.annemergmed.2013.05.003 [PubMed: 23916018]
63. Inouye SK, van Dyck CH, Alessi CA, Balkin S, Siegel AP, Horwitz RI. Clarifying confusion: the confusion assessment method. A new method for detection of delirium. *Ann Intern Med*. 1990;113(12):941–948. [PubMed: 2240918]
64. Santangelo I, Ahmad S, Liu S, et al. Examination of geriatric care processes implemented in level 1 and level 2 geriatric emergency departments. *JGME*. 2023;3(4).
65. Wong CL, Holroyd-Leduc J, Simel DL, Straus SE. Does this patient have delirium?: value of bedside instruments. *JAMA*. 2010;304(7):779–786. doi:10.1001/jama.2010.1182 [PubMed: 20716741]
66. Ely EW, Inouye SK, Bernard GR, et al. Delirium in mechanically ventilated patients: validity and reliability of the confusion assessment method for the intensive care unit (CAM-ICU). *JAMA*. 2001;286(21):2703–2710. doi:10.1001/jama.286.21.2703 [PubMed: 11730446]
67. Bellelli G, Morandi A, Davis DHJ, et al. Validation of the 4AT, a new instrument for rapid delirium screening: a study in 234 hospitalised older people. *Age Ageing*. 2014;43(4):496–502. doi:10.1093/ageing/afu021 [PubMed: 24590568]
68. Fick DM, Inouye SK, Guess J, et al. Preliminary development of an ultrabrief two-item bedside test for delirium. *J Hosp Med*. 2015;10(10):645–650. doi:10.1002/jhm.2418 [PubMed: 26369992]

69. Gaudreau J-D, Gagnon P, Harel F, Tremblay A, Roy M-A. Fast, systematic, and continuous delirium assessment in hospitalized patients: the nursing delirium screening scale. *J Pain Symptom Manage*. 2005;29(4):368–375. doi:10.1016/j.jpainsymman.2004.07.009 [PubMed: 15857740]
70. Gavinski K, Carnahan R, Weckmann M. Validation of the delirium observation screening scale in a hospitalized older population. *J Hosp Med*. 2016;11(7):494–497. doi:10.1002/jhm.2580 [PubMed: 26970312]
71. Marra A, Jackson JC, Ely EW, et al. Focusing on inattention: the diagnostic accuracy of brief measures of inattention for detecting delirium. *J Hosp Med*. 2018;13(8):551–557. doi:10.12788/jhm.2943 [PubMed: 29578552]
72. Han JH, Vasilevskis EE, Schnelle JF, et al. The diagnostic performance of the richmond agitation sedation scale for detecting delirium in older emergency department patients. *Acad Emerg Med*. 2015;22(7):878–882. doi:10.1111/acem.12706 [PubMed: 26113020]
73. Sands MB, Dantoc BP, Hartshorn A, Ryan CJ, Lujic S. Single Question in Delirium (SQiD): testing its efficacy against psychiatrist interview, the Confusion Assessment Method and the Memorial Delirium Assessment Scale. *Palliat Med*. 2010;24(6):561–565. doi:10.1177/0269216310371556 [PubMed: 20837733]
74. Han JH, Wilson A, Schnelle JF, Dittus RS, Ely EW. An evaluation of single question delirium screening tools in older emergency department patients. *Am J Emerg Med*. 2018;36(7):1249–1252. doi:10.1016/j.ajem.2018.03.060 [PubMed: 29699898]
75. Wright DW, Lancaster RT, Ratcliff JJ, Lowery DW, Wald MM. Proxy identification: a time-dependent analysis. *Acad Emerg Med*. 2004;11(2):204–207. [PubMed: 14759968]
76. Chester JG, Beth Harrington M, Rudolph JL, VA Delirium Working Group. Serial administration of a modified Richmond Agitation and Sedation Scale for delirium screening. *J Hosp Med*. 2012;7(5):450–453. doi:10.1002/jhm.1003 [PubMed: 22173963]
77. Steinman MA, Beizer JL, DuBeau CE, Laird RD, Lundebjerg NE, Mulhausen P. How to Use the American Geriatrics Society 2015 Beers Criteria-A Guide for Patients, Clinicians, Health Systems, and Payors. *J Am Geriatr Soc*. 2015;63(12):e1–e7. doi:10.1111/jgs.13701 [PubMed: 26446776]
78. Bayer AJ, Chadha JS, Farag RR, Pathy MS. Changing presentation of myocardial infarction with increasing old age. *J Am Geriatr Soc*. 1986;34(4):263–266. doi:10.1111/j.1532-5415.1986.tb04221.x [PubMed: 3950299]
79. Uguz F, Kayrak M, Çiçek E, Kayhan F, Ari H, Altunbas G. Delirium following acute myocardial infarction: incidence, clinical profiles, and predictors. *Perspect Psychiatr Care*. 2010;46(2):135–142. doi:10.1111/j.1744-6163.2010.00249.x [PubMed: 20377801]
80. Liu SW, Lee S, Hayes JM, et al. Head computed tomography findings in geriatric emergency department patients with delirium, altered mental status, and confusion: A systematic review. *Acad Emerg Med*. Published online November 4, 2022. doi:10.1111/acem.14622
81. Naughton BJ, Moran M, Ghaly Y, Michalakes C. Computed tomography scanning and delirium in elder patients. *Acad Emerg Med*. 1997;4(12):1107–1110. doi:10.1111/j.1553-2712.1997.tb03690.x [PubMed: 9408423]
82. Hirano LA, Bogardus ST, Saluja S, Leo-Summers L, Inouye SK. Clinical yield of computed tomography brain scans in older general medical patients. *J Am Geriatr Soc*. 2006;54(4):587–592. doi:10.1111/j.1532-5415.2006.00692.x [PubMed: 16686867]
83. Abraha I, Trotta F, Rimland JM, et al. Efficacy of Non-Pharmacological Interventions to Prevent and Treat Delirium in Older Patients: A Systematic Overview. The SENATOR project ONTOP Series. *PLoS ONE*. 2015;10(6):e0123090. doi:10.1371/journal.pone.0123090 [PubMed: 26062023]
84. Lee S, Chen H, Hibino S, et al. Can we improve delirium prevention and treatment in the emergency department? A systematic review. *J Am Geriatr Soc*. 2022;70(6):1838–1849. doi:10.1111/jgs.17740 [PubMed: 35274738]
85. Noel CB, Cirbus JR, Han JH. Emergency department interventions and their effect on delirium's natural course: the folly may be in the foley. *J Emerg Trauma Shock*. 2019;12(4):280–285. doi:10.4103/JETS.JETS_137_17 [PubMed: 31798243]
86. Flaherty JH, Little MO. Matching the environment to patients with delirium: lessons learned from the delirium room, a restraint-free environment for older hospitalized adults with delirium.

- J Am Geriatr Soc. 2011;59 Suppl 2:S295–00. doi:10.1111/j.1532-5415.2011.03678.x [PubMed: 22091576]
87. Zun L, Wilson MP, Nordstrom K. Treatment goal for agitation: sedation or calming. *Ann Emerg Med.* 2017;70(5):751–752. doi:10.1016/j.annemergmed.2017.06.017 [PubMed: 29056214]
 88. Gault TI, Gray SM, Vilke GM, Wilson MP. Are oral medications effective in the management of acute agitation? *J Emerg Med.* 2012;43(5):854–859. doi:10.1016/j.jemermed.2012.01.028 [PubMed: 22541877]
 89. Siddiqi N, House AO, Holmes JD. Occurrence and outcome of delirium in medical in-patients: a systematic literature review. *Age Ageing.* 2006;35(4):350–364. doi:10.1093/ageing/af1005 [PubMed: 16648149]
 90. Hsieh TT, Yue J, Oh E, et al. Effectiveness of multicomponent nonpharmacological delirium interventions: a meta-analysis. *JAMA Intern Med.* 2015;175(4):512–520. doi:10.1001/jamainternmed.2014.7779 [PubMed: 25643002]
 91. Inouye SK, Bogardus ST, Charpentier PA, et al. A multicomponent intervention to prevent delirium in hospitalized older patients. *N Engl J Med.* 1999;340(9):669–676. doi:10.1056/NEJM199903043400901 [PubMed: 10053175]
 92. Inouye SK, Bogardus ST, Baker DI, Leo-Summers L, Cooney LM. The Hospital Elder Life Program: a model of care to prevent cognitive and functional decline in older hospitalized patients. *Hospital Elder Life Program. J Am Geriatr Soc.* 2000;48(12):1697–1706. doi:10.1111/j.1532-5415.2000.tb03885.x [PubMed: 11129764]
 93. Inouye SK, Baker DI, Fugal P, Bradley EH, HELP Dissemination Project. Dissemination of the hospital elder life program: implementation, adaptation, and successes. *J Am Geriatr Soc.* 2006;54(10):1492–1499. doi:10.1111/j.1532-5415.2006.00869.x [PubMed: 17038065]
 94. Inouye SK. Prevention of delirium in hospitalized older patients: risk factors and targeted intervention strategies. *Ann Med.* 2000;32(4):257–263. doi:10.3109/07853890009011770 [PubMed: 10852142]
 95. Inouye SK, Westendorp RGJ, Saczynski JS. Delirium in elderly people. *Lancet.* 2014;383(9920):911–922. doi:10.1016/S0140-6736(13)60688-1 [PubMed: 23992774]
 96. Bo M, Bonetto M, Bottignole G, et al. Length of stay in the emergency department and occurrence of delirium in older medical patients. *J Am Geriatr Soc.* 2016;64(5):1114–1119. doi:10.1111/jgs.14103 [PubMed: 27160482]
 97. Émond M, Grenier D, Morin J, et al. Emergency department stay associated delirium in older patients. *Can Geriatr J.* 2017;20(1):10–14. doi:10.5770/cgj.20.246 [PubMed: 28396704]
 98. Jordano JO, Vasilevskis EE, Duggan MC, et al. Effect of physical and occupational therapy on delirium duration in older emergency department patients who are hospitalized. *Journal of the American College of Emergency Physicians Open.* 2023;4(1):e12857. doi:10.1002/emp2.12857 [PubMed: 36776211]
 99. Shenvi C, Kennedy M, Austin CA, Wilson MP, Gerardi M, Schneider S. Managing delirium and agitation in the older emergency department patient: the ADEPT tool. *Ann Emerg Med.* 2020;75(2):136–145. doi:10.1016/j.annemergmed.2019.07.023 [PubMed: 31563402]
 100. Lo AX, Kennedy M. It's time to mobilize: Moving mobility interventions for delirium from inpatient units to the emergency department. *Journal of the American College of Emergency Physicians Open.* 2023;4(1):e12900. doi:10.1002/emp2.12900 [PubMed: 36776215]
 101. Kennedy M, Hwang U, Han JH. Delirium in the Emergency Department: Moving From Tool-Based Research to System-Wide Change. *J Am Geriatr Soc.* 2020;68(5):956–958. doi:10.1111/jgs.16437 [PubMed: 32274813]

Synopsis

This review covers the epidemiology of delirium and the overlapping condition of altered mental status and encephalopathy that is relevant to those who practice in the emergency department.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Key points

1. Delirium is a common and serious brain dysfunction that every emergency medicine clinician should be aware of.
2. Accurate delirium assessment and outcome measurement facilitates the further evaluation of the underlying etiology.
3. The prevention and treatment of delirium are still based on expert opinions except for the application of evidence-proven prevention from the hospital and intensive care unit.

Table 1.

Key Differences between delirium and dementia.

Characteristic	Delirium	Dementia
Onset	Acute onset over a period of hours or days	Gradual onset over months or years
Course	Fluctuating	Stable
Inattention	Present	Absent
Impairment of arousal	Usually present	Typically absent
Disorganized thinking	May be present	Typically absent
Disturbed sleep-wake cycle	Present	Typically absent
Perceptual disturbances and hallucinations	May be present	Typically absent
Is cognitive decline reversible?	Usually reversible	Often not reversible
Precipitated by a medical or surgical illness?	Usually	Rarely
Life threatening?	Potentially	Rarely

Table 2.

Vulnerability and precipitous factors

Vulnerability factors	Precipitating factors
Demographics Advanced age, educational level, male	Systemic Illness Infection, inadequate pain control, trauma, surgery
Medications and Drugs Polypharmacy, psychoactive medications, alcohol and substance use disorder	Medications and Drugs Medication changes, alcohol and recreation drug use or withdrawal
Comorbidities Dementia, comorbidity burden, chronic kidney disease, chronic liver disease, terminal illness, frailty	Metabolic Vitamin (i.e., thiamine) deficiencies, electrolyte disturbances, hypo- or hyperglycemia, thyroid dysfunction
Sensory Impairment Hearing impairment, visual impairment	Organ dysfunction Acute kidney injury, acute liver failure, acute heart failure, acute respiratory failure, shock
Decreased oral intake Malnutrition (chronic)	Decreased oral intake Dehydration, malnutrition (acute)
Functional status Functional impairment, Immobility	Central Nervous System Cerebrovascular accident, intraparenchymal hemorrhage, subdural/epidural hematoma, seizures, meningitis, encephalitis
Psychiatric Depression	Iatrogenic Physical restraints, indwelling catheter use, prolonged emergency department length of stay

Table 3.

Selected examples of delirium screening tools

Instrument	Synopsis	Sensitivity	Specificity	Time
Confusion Assessment Method (CAM) ⁶⁵	A bedside cognitive test is used to determine 1) altered mental status or fluctuating course, 2) inattention, 3) disorganized thinking, and 4) altered level of consciousness using clinical impression	86%	93%	5–10 min
Confusion Assessment Method- ICU (CAM-ICU) ⁶⁶	CAM modified to include cognitive assessments and test of attention that can be used for ventilated patients in ICU.	95 to 100%	89 to 93%	2–3 min
Brief Confusion Assessment Method (bCAM) ⁶²	Uses the CAM algorithm but uses the months of the year backwards task from December to July to evaluate inattention and 4 Yes/No questions and simple command to evaluate disorganized thinking.	84% (95%CI 72–92)	96% (95%CI 93%–97%)	< 2 min
4AT ⁶⁷	Evaluates alertness, orientation, attention, and fluctuation	89.7%	64.9%	< 2 min
Delirium Triage Screen (DTS) ⁶²	Evaluates inattention using object testing and level of consciousness using (DTS) followed by more specific test to confirm	98% (95%CI 90–100%)	55% (95%CI 50–60%)	< 30 Sec
Ultra-Brief 2-item Screener ⁶⁸ (UB-2)	Two questions, “Tell me the day of the week” and “please tell me the months of the year backwards”	93% (95% CI 81–99%)	64% (95%CI 56–70%)	<1min
Nursing Delirium Screening Scale (Nu-DESC) ⁶⁹	5 items- disorientation, inappropriate behavior	86% (95%CI 65–95%)	87% (95%CI 73–94%)	1–2min based on 8 hours of observation
Delirium Observation Screening Scale (DOSS) ⁷⁰	Seven areas (consciousness, attention, thought process, orientation, psychomotor, mood, perception)	90%	91%	5 min based on 8 hours of observation
Month of the year backwards – 12 months (MOTYB-12) ⁷¹	Asks the patient to recite the months of the year backwards from December to July.	80.0% (95% CI 60.9%-91.1%)	57.1% (95% CI, 50.4%- 63.7%)	<1 min
Richmond Agitation Sedation Scale ⁷²	A structured evaluation of level of consciousness based on your observation of the patient during routine clinical evaluation	84.0% (95% CI 73.8% to 94.2%)	87.6% (95% CI 84.2% to 91.1%)	<10 sec
Single Question in Delirium (SQiD) ^{73,74}	One question ‘Do you think [name of patient] has been more confused lately?’	80% (95%CI 28.3–99.5%)	71%(95%CI 41.9–91.6%)	<10 sec