Delirium in the Intensive Care Unit

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Delirium in the intensive care unit (ICU) is a complex, common, and problematic condition that interferes with healing and recovery. It leads to higher morbidity and mortality and extended hospital stays. The aging population older than 65 and more likely to develop delirium, is the fastest growing population in the United States and is increasingly seen in the ICU. Delirium is often unrecognized and misdiagnosed, which leads to mistreatment or lack of appropriate treatment. This article discusses the definition of delirium, pathogenesis, clinical practice guidelines, newer assessment tools for ICU, and nursing interventions directed toward prevention and early identification of delirium. **Key words:** assessment tools, critical care patient, delirium, nursing interventions, pathogenesis, prevention, risk factors

While all patients in the intensive care unit (ICU) have very serious and life-threatening conditions, those with advanced age bring with them additional challenges as they experience physiological changes related to growing older. Older patients in the ICU environment, having special procedures, following anesthesia and surgical interventions, all have a risk for delirium, which results in a poorer prognosis and an extended hospital stay as well as an increased financial burden.

This article defines delirium and will address its pathogenesis, types of delirium and behavior manifested related to the type of delirium, prodromal symptoms, risk factors, preventive measures, nursing interventions, and assessment tools.

**DEFINITION OF DELIRIUM**

Delirium in the ICU is a common and problematic condition that leads to higher morbidity and mortality and extended hospital stays. Delirium is a condition that can be either unrecognized or misdiagnosed. Eli and colleagues report that 66% to 84% of delirium in elderly hospitalized patients is unrecognized by clinicians, and that 94% of patients demonstrated the hypoactive type. Delirium has been described as a sundown syndrome, ICU psychosis, acute confusion, ICU syndrome, encephalopathies, and cognitive impairment. Thirty percent of patients in surgical ICUs and 40% to 50% of patients after hip surgery manifest delirium. Three months after a patient is diagnosed with delirium, a mortality rate between 23% and 33% is documented. In a 1-year follow-up, there was up to 50% mortality rate of patients diagnosed with delirium. Up to 60% of older hospitalized patients develop delirium as a complication during their hospital course. Delirium is listed as a target for quality of care improvement for the elderly population. As the population ages, more ICU beds are filled by elderly patients requiring risk assessment and early intervention.
Delirium can manifest in 2 varieties, hyperactive and hypoactive. Advanced age has been identified as a risk factor. Those who have a better premorbid cognitive and physical condition recover or have a more favorable outcome. Delirium is seen as an abrupt cognitive decline from a previous level of functioning due to a medical condition and/or a substance. "A delirium is characterized by a disturbance of consciousness and a change in cognition over a short period of time." Although the same symptom presentation is seen, delirium is diagnosed based on etiology: Delirium due to a general medical condition, substance-induced delirium, delirium due to multiple etiologies, and delirium not otherwise specified (NOS) when the etiology is undetermined. The disturbance of consciousness and cognition must not be associated with a developing dementia.10

SYMPTOMS OF DELIRIUM

Delirium is indicative of cerebral dysfunction. The beginning stages of this process are seen in the prodromal symptoms. These symptoms include anxiety, restlessness, insomnia, and disturbing dreams and these usually start at night. The 2 types of delirium are hypoactive and hyperactive. Patients can have a mixture of both types, which means that at one point they can appear hypoactive, and then at another point appear to be hyperactive. Hypoactive delirium includes slowed speech, slowed movements, sluggishness, apathy, depression, and lethargy. Hyperactive delirium includes excessive activity, rapid pressured speech, rage, fear, rapid movements, and increased reaction to any stimuli.1 The hypoactive type may not be recognized as they appear to not present the physical danger of injury that the hyperactive type does.

The symptoms start abruptly with changes in level of consciousness and awareness fluctuating, including impaired attention, with distractibility. Cognition changes include memory problems, disorientation, and rambling or incoherent speech, while perceptual difficulties are manifested in hallucinations, particularly visual ones. Other disturbances include sleep-wake cycles, rapid shifts in emotions, fear, anger, irritability, and depression. When the underlying medical condition is not treated, death can result. Medically ill patients who develop delirium are more at risk for medical complications and significant morbidity.11 A number of reasons why delirium is misdiagnosed in the ICU have been identified by Armstrong.1 These include the following: (1) it is an expected event in the ICU and so it is not identified, (2) it is seen as secondary to other issues in the ICU and therefore may be overlooked, (3) women are identified as depressed when seen (probably delirium, hypoactive type) and men are given "no diagnosis" as it is easier to label women than men in this setting. Trzepacz12 reports that the nonpsychiatric literature is less specific about criteria and have included dementia as part of the delirium category.

Confusion

Confusion is a group of behaviors, including inattention and memory difficulties: disruptive behaviors such as aggressiveness, combative, and delusions, with an inability to perform activities of daily living. It is a nonspecific term.13 Confusion and disorientation are 2 different cognitive components. Disorientation refers to place, person, and time. Confusion includes alterations in memory, judgment, decision making, and problem solving.13 In the elderly, confusion can be seen as symptomatic of delirium or depression. Confusion may also be seen in major depression and psychoses. Treating the underlying physical disorder can reverse or eliminate the delirium whether it is related to a urinary tract infection or perhaps an adverse drug reaction.14

Agitation and anxiety

From a medical standpoint, agitation appears to be viewed in a different light than from a psychiatric perspective. Agitation is
seen as important because in the critical care area it very often leads to posttraumatic stress disorder, delirium, and post-ICU depression. Agitation is now receiving more attention as an important area in ICUs. Agitation is seen as both increased violent movement and strong emotion. It is characterized by restlessness, fidgeting, attempts at removing dressings, catheters and other tubes, disorientation, inattention, and inability to follow commands. This agitation produces abnormal vital signs, with blood pressure, respirations, and pulses rising to dangerous levels.

Multiple causes are seen as producing agitation, including anxiety, delirium, pain, confusion, and withdrawal. Agitation is seen as a result of hypoxia, drugs, inadequate pain management, hypotension, brain injury, anxiety, and the ICU environment with its accompanying noise, bright lights, and other continuous stimuli. Delirium is seen from a medical standpoint as uncontrolled agitation. Delirium found in the ICU is in 15% to 40% of ICU patients and results in a poorer prognosis and a significant mortality rate of 10% to 33%. Agitated behavior as seen in delirium is problematic as these patients self-extubate and remove catheters, leading to increased morbidity, mortality, and length of stay.

**PATHOGENESIS**

Delirium is considered as a dysfunction in multiple brain regions. As yet, underlying pathogenesis is still unclear. Trzepacz states that since a variety of etiologic factors can give rise to delirium, it is a syndrome rather than a disease. Trzepacz identifies some of the subtypes as hyperactive vs hypoactive, cortical vs subcortical, anterior vs posterior cortical, right vs left hemispheric, psychotic vs nonpsychotic, and acute vs chronic. Certain drug withdrawals such as alcohol or barbiturates and those that can induce anticholinergic toxicity produce a hyperactive type of delirium. Certain metabolic dysfunctions such as hepatic insufficiency produce a hypoactive delirium. Brain metabolism may be primary to this process of delirium and altered neurotransmitters may be secondary or results from interference in brain metabolism. Multiple hypotheses have been suggested as causative for delirium. Engel and Romano concluded a reduction in cerebral oxidative metabolism as causative for cognitive impairment. Any disease or toxic agent capable of reducing the supply or utilization of substrates for brain metabolic activity could produce delirium. Blass and Plum took that hypothesis a step further and stated that a reduced rate of cerebral oxidative metabolism reduces acetylcholine synthesis resulting in cholinergic deficiency and thus leads to delirium. Itil and Fink postulate that reduced cerebral oxidative metabolism and reduction in specific neurotransmitters, namely acetylcholine, is pathogenic to this process. Kral’s view states that acute confusional states in the elderly are a reaction to stress with elevated levels of cortisol and deleterious effects on anatomical substrates of attention and information processing. Last, Geschwind’s hypothesis is that confusional states are global disorders of attention and the result of acute lesions in the anatomical substrates of attention.

On a continuum, the first behavior observed is anxiety. Anxiety is a subjective emotional experience noted by apprehension and observed by objective symptoms of autonomic system arousal. This manifests in restlessness. This then escalates to confusion and agitation. If not addressed early, it becomes a full-blown case of delirium. For some patients, subclinical delirium or prodromal symptoms may be observed for 1 to 3 days before full criteria are met for delirium. These symptoms are restlessness, anxiety, irritability, distractibility, and sleep disturbances. The night nurse may be the first person to notice a change in mental status and sleep pattern because of a disturbance in the wake-sleep cycle and sundowning phenomena. Sundowning is observed when a patient may be alert and oriented during the day, but as the sun goes down, the patient becomes confused and disoriented. There are many roads to decompensation for an impaired brain. The earlier the identification and intervention into changes in dysfunctional behavior, a more favorable outcome can be accomplished.
CAUSATIVE AND RISK FACTORS FOR DELIRIUM

A number of organic causative factors for delirium have been determined: primary cerebral diseases, which include infections, stroke, and trauma, systemic disease that affect the brain, which are metabolic diseases, infections, and cardiovascular disease, intoxication with exogenous substances, such as drugs, and withdrawal from substances of abuse, alcohol, and sedative-hypnotic drugs. Delirium is a common mental disorder encountered in general hospital practice with the elderly as the elderly are more at risk for delirium. In those patients older than 70, 30% to 50% show signs of delirium while hospitalized. In the elderly, delirium can be the presenting symptom of acute physical illness, and if not recognized, can lead to death. The elderly are more prone to this disorder because of the effects of aging, disease of the brain, reduced neurotransmitters, particularly acetylcholine, reduced vision and hearing, chronic diseases, sleep deprivation, stress, and failure to adapt to residing in unfamiliar environments.

In the elderly, there can be multiple factors that play a role in the development of delirium. Because those older than 65 years usually have other medical conditions, they are usually on at least 6 to 8 medications before coming into the hospital. These drugs may include agents such as digoxin, antiparkinsonian, antipsychotics, antidepressants, diuretics, and sedative-hypnotics. Polypharmacy and drug interactions can induce delirium. Physical conditions that induce delirium include congestive heart failure, pneumonia, urinary tract infections, cancer, uremia, dehydration, sodium depletion, and cerebral infarction.

CLINICAL PRACTICE GUIDELINES

Several groups describe clinical practice guidelines in the critical care area to ensure best practice. Clinical practice guidelines are usually created by a multidisciplinary group of clinicians using scientific literature for guiding decision making. The Institute of Medicine, Society of Critical Care Medicine (SCCM), American College of Critical Care Medicine (ACCM), and the American Psychiatric Association (APA) all have guidelines. For instance, pain is a serious issue with critically ill patients. Patients experiencing pain may manifest restlessness, agitation, and confusion. Guidelines for pain management address sedation, analgesia, and neuromuscular blockade in the ICU. Assessment of pain is very important and needs to be done on a regular basis. "The restlessness associated with critical illness must nearly always, by necessity, be quelled with sedation and analgesia." Maintaining comfort and safety for the critically ill patient, particularly those on mechanical ventilation, is a central goal.

Practice guidelines for the treatment of patients with delirium are also published by APA. These guidelines provide (1) immediate interventions for urgent medical conditions, (2) identification and treatment of delirium, (3) means to ensure safety, and (4) suggestions to improve the patient's functioning. These include environmental and supportive interventions. Somatic interventions include making recommendations for medication, using haloperidol as the most frequently used, but other antipsychotic drugs may also be recommended. Under the guidelines for monitoring and ensuring safety, the patient must be evaluated for suicidal and violent potential in order to protect the patient and others. Restraints are not recommended as they can increase agitation and injury to the patient and they must only be used as a last resort for patient safety in a limited fashion. These patients require close observation by caregivers. The nurse needs to assess risk for falls and self-harm. Since symptoms in patients with delirium fluctuate, frequent monitoring is needed to assess for agitation, aggressive behavior, sleep disturbances, delusions, and hallucinations. Treatment is determined by the manifest behaviors of the patient. Mental status assessments are done frequently (at least once a shift) to assess fluctuations, or to see if symptoms are abating, resolving, or getting worse.
ASSESSMENT TOOLS

Formal assessment tools used in the ICU for delirium include Hart’s Cognitive Test for Delirium, the Abbreviated Cognitive Test for Delirium, Dr. Inouye’s Confusion Assessment Method (CAM), and the updated version specifically for ventilator-dependent patients, Dr. Ely’s CAM-ICU. The importance of a nonpsychiatric clinician (nurses) able to administer the CAM and CAM-ICU in under 5 minutes is a plus. The CAM is used for patients who can respond verbally. The CAM-ICU involves showing pictures instead of conversation, which is necessary for patients on mechanical ventilators. The 4 areas covered are acute onset or fluctuating course, inattention, disorganized thinking, and altered levels of consciousness. Another test using nonverbal measures that reflects impaired cognition is the behavioral rating scale called the Clinical Assessment of Confusion-A (CAC-A). All tools test for orientation, observing if there is a change in behavior or alertness, lethargy, or agitation, and observing if the patient is attentive and can follow commands are the other categories tested. Disorganized thinking is assessed by observing if the patient speaks incoherently, is rambling, or indulges in irrelevant conversation.

When a patient is admitted to the ICU, nursing assessment includes taking a history of medical and psychiatric conditions. For instance, does the patient, if older than 65 years, have the beginning stages of dementia, which puts him or her at increased risk for delirium? What medications have they been taking, including a history of herbal and over-the-counter medications? Herbal medicines have the potential for polypharmacy and drug interactions that can cause morbidity and mortality during the perioperative period. Often overlooked is a history of alcohol abuse and when was the last drink. Alcohol is the most common substance abused by the elderly, along with prescription drugs of a sedative-hypnotic and anxiolytic type. Polypharmacy puts patients at risk for drug interactions and confusion. Assess the patient’s baseline mental status. In the ICU, delirium usually develops over 2 to 3 days, and so observing and documenting baseline behavior that reflects cognitive status is important. What are the changes in their life and what are the recent adjustments or adaptations they have had to make?

NURSING INTERVENTIONS

Nursing management first starts with looking for and recognizing symptoms of delirium, particularly those at risk. Preventive measures can be implemented by the nurse, observing and assessing patients frequently for changes in mental status or behavior and checking to see if the patient is oriented to person, time, and place.

Patients coming into the ICU are often frightened, confused, in pain, and fearful. It is important for the nurse to be with the patient, identify oneself, and explain to the patient and family about each procedure and what to expect. The nurse must educate the family that when delirium occurs it is a temporary condition and that it will improve after treatment. The nurse must give frequent reassurance. Identifying and being aware of the patient’s level of anxiety (which should be monitored for increasing levels) is important. It is known that when anxiety gets high enough, it can progress to delirium. As much as possible, decrease all noise levels so as to help the patient get proper sleep; rest is particularly needed. This may mean keeping TVs off, staff speaking softly, and turning lights down. Prevention will also include tracking laboratory and physical parameters (along with monitoring nutritional intake), and as well as ensuring adequate hydration, safety, and pain management. There are a number of guidelines that make recommendations for treatment of delirium. Once delirium is identified, an immediate search must begin to identify contributing physical factors and correct them.

When a patient becomes agitated, the plan of care is adjusted to accommodate the change. Delirium complicates the medical
picture to give care, especially if the patient is agitated, uncooperative, hallucinating, and disoriented. Patients, at this time, may be unable to participate appropriately in their own care. Delirium is more visible and problematic at night because of the wake-sleep cycle disturbance.\textsuperscript{30} When nonpharmacologic measures and reassurance are not adequate, then administering medication would be the next step. Haloperidol or another antipsychotic is usually ordered by the clinician and the nurse administers the medication and documents the response. Medications of this type are considered a form of chemical restraint to prevent the patient from self-injury or other unsafe behaviors, such as pulling out tubes or catheters. One on one observation is needed at this time to keep the patient safe. Avoid using physical restraints except as a last resort. Restraints increase the patient’s anxiety and the patient may sustain injuries from restraint devices.\textsuperscript{17}

**SUMMARY**

Delirium is a complex condition as it is multifaceted and can present in different ways. Misdiagnosis or missed diagnosis can complicate treatment and recovery. Delirium in the ICU is an increasingly problematic condition that can lead to increased morbidity and mortality and extended hospital stays. More attention needs to be directed at prevention and early detection. This can only be accomplished by preplanning. Critical care nurses are in an excellent position to assess and identify behaviors that are prodromal. Understanding risk factors for delirium such as advanced age, extracerebral diseases including systemic infections, hypoxia, postoperative states, substance withdrawal, and electrolyte imbalances are important. The underlying physical condition that is causing the delirium must be addressed first. Cognitive examinations can be accomplished with the mini-mental status exam (MMSE), the Cognitive Test for Delirium (CTD), or in the case of ventilator-dependent patients, the CAM-ICU. Abrupt changes in behavior such as clouding of consciousness and inattention, restlessness, or lethargy, and changes in the sleep-wake cycle may be the first signs of a developing delirium.\textsuperscript{30} Interventions by ICU nurses include ongoing thorough assessment, monitoring of laboratory results, identification of changes in mental status, modifying environmental contributing factors, and providing gentle assurance to the patient and family.

**REFERENCES**

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