Practice Points: Postoperative Delirium

National Association of Orthopaedic Nurses
Advancing the Art and Science of Orthopaedic Care

Delirium is an acute decline in attention and cognition.[6] It is a common but often undiagnosed complication in postoperative elderly patients with an incidence of up to 51%, according to the American Psychiatric Association (APA).[1] Generally reversible, delirium is associated with increased mortality, length of stay, and hospital costs, long-term cognitive or functional impairment, and the need for extended care placement as maintained by the Hartford Institute (HI) for Geriatric Nursing.[5] Both the HI and the APA have developed practice protocols for the patient in delirium. Additional researchers have identified evidence-based practice for assessment and treatment interventions of the patient with delirium.

Delirium as defined by the HI is a disturbance of consciousness with impaired attention and disorganized thinking or perceptual disturbance that develops acutely, has a fluctuating course, and an underlying physiologic or medical cause. Delirium may be confused with dementia which has an insidious onset and progressive course with clear consciousness until the end stages. Dementia is the number one cause of delirium.[6] In simple terms delirium relates to awareness, dementia to memory, and depression to mood.

Table 1: Features of Delirium and Dementia[2]

Feature	Delirium	Dementia
Onset/course	Acute, abrupt onset; course fluctuates, worse at night	Slow, progressive onset; course stable
Duration	Short, variable; resolves with treatment	Chronic, ongoing, progressive
Consciousness	Clouded, decreased	Alert
Orientation	Often impaired especially with place, time, and events	Often impaired
Attention	Reduced or vigilant	Usually normal
Thinking	Disorganized, fragmented	Abstraction and judgment impaired
Speech	Incoherent, slow or rapid	Word-finding difficulty
Sleep-wake	Disturbed, cycle reversed	Fragmented
Delusions	Common, often paranoid	Sometimes
Hallucinations	Visual and auditory common, tactile and olfactory possible	Uncommon

Risk Factors for Delirium

Risk factors for delirium are multifactorial including predisposing and precipitating. Predisposing risk factors are those of vulnerability present at the time of admission, while precipitating risk factors are hospital-related.[11] Medications are one of the most common, yet reversible causes of delirium, making pharmacological evaluation a high priority.

Table 2: Delirium Risk Factors[3,5,11]

Predisposing Risk Factors (Preoperative)	Precipitating Risk Factors (Intraoperative or Postoperative)
Advance age (> 70 years)	Trauma of surgery
Male	Prolonged anesthesia
Cognitive impairment/dementia	Intraoperative hypothermia
Medical illness	Postoperative hematocrit <30
Polypharmacy	Use of meperidine, anticholinergics, benzodiazepines, high-dose opioids
Alcohol abuse	Dehydration
Poor functional status	Hypoxia
Sensory impairment	Hypoglycemia
Depression	Use of urinary catheters
Pain	Undertreated pain
Abnormal serum Na+, K+, glucose, BUN/Cr	Immobilization (including physical restraints)
Fracture on hospital admission	Sleep deprivation
Infection	

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Features of Delirium

Suspect delirium when the patient develops any of the key features of delirium over a short period of time or if the patient was oriented and alert preoperatively and isn't postoperatively.

- Alertness will fluctuate from stuporous to hypervigilant.
- Attention will be easily distractible, with inability to switch from one focus to another and keep track of the topic.
- Orientation will be limited to self; disoriented to time and place.
- Memory of hospitalization and instructions is lacking, and the patient is forgetful of names and current events.
- Thinking is disorganized and rambling with an illogical flow, difficult expression of needs, and garbled speech.
- Perceptual disturbances include illusions and hallucinations.
- Psychomotor activity can be hypo or hyperactive including picking, hitting and biting. Emotional extremes of fear, anger, anxiety, and apathy will be seen.
- Sleep-wake cycle may be reversed.

Delirium may resolve in several hours to days or persist for months, typically resolving in 10-12 days.[1]

What is best practice in assessing and managing postoperative delirium?

Recommended for Practice

Delirium Assessment

The diagnosis of delirium is primarily clinical, requiring a systematic assessment to identify key features and contributing factors. Assessment for prevention and management of delirium for the hospitalized patient includes:

- monitoring cognitive function
- identifying chronic or acute change in mental status
- addressing risk factors, providing supportive care, and managing symptoms for acute changes.[6]

The acronym 'DELIRIUM' can be used to easily identify the multifactorial key assessment criteria.[8]

- **D**ementia
- **E**lectrolytes
- **L**ungs, liver, heart, kidney, brain
- **R**x
- **I**njury, pain, stress
- **M**etabolic

Polypharmacy in the elderly is a key predisposing factor of delirium. The 2002 Beers Criteria[10] is an assessment instrument to identify potentially inappropriate medication use in older adults. Nurses can use the Beers criteria to identify medication risks in older adults with chronic illnesses and multiple medications. However, this tool requires clinical judgment to weigh patient risk and benefit of a medication. The Beers I and Beers II criteria can be found at **http://consultgerirn.org/uploads/File/trythis/issue16_2.pdf**.

Three common assessment scales are used to identify delirium: the Confusion Assessment Method (CAM), the NEECHAM Confusion Assessment Scale, and the Delirium Observation Screening Scale (DOS). All scales have been validated and were developed for use without special training in geriatrics.

The **CAM questionnaire** measures existing confusion and has an ICU version, allowing the same tool to be used throughout a facility. The rating generally takes 5-10 minutes through an interview with the patient and includes a brief cognitive assessment. The CAM tool consists of nine questions regarding: acute onset, inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbances, psychomotor agitation and retardation, and altered sleep-wake cycle. A shortened version worksheet could be used with subsequent assessments. (Confusion Assessment Method [CAM]: Training Manual and Coding Guide, 2003, New Haven: Yale University School of Medicine).

In contrast, the **NEECHAM Confusion Assessment Scale** measures risk of confusion and contains three components of cognitive processing, behavior assessment, and physiologic assessment, and each component has three items to score. The scale can be completed in 10 minutes based on observation and data.[4]

The **DOS** tool was developed based on the DSM-IV (Diagnostic and Statistical Manual) coding criteria and rates thirteen behavioral items on a present or absent basis. The scale can be completed in 5 minutes and is simple to score.[4]

A simple assessment for geriatric rounds may include the following review:

- What was the pre-op or pre-admission baseline cognition?
  Sometimes a frank discussion is needed to elicit an accurate picture from family, who may deny or not recognize the existing dementia.
- What are the current lab results? (especially sodium and Hct) Is dehydration an issue?
- What medications are in use? (especially narcotics, sedatives, any on Beer's list)
- Are glasses on and hearing aids in? (uncorrected sensory impairment)
- What tubes are in that can come out?
- Are restraints in use?
- Is pain controlled?
- Is there impaction of stool?
- Is a delirium assessment screening tool in use?

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Recommended for Practice *(continued)*

Interventions

Prevention of delirium is the best approach to reduce its frequency and complications.[6] Interventions should familiarize patients with their environment, lessen disruption of life style, increase control, independence and mobility, and decrease pain. Early surgical intervention with modified anesthesia, and aggressive treatment of hypoxia and heart failure, show a significant decrease in the incidence of confusion. In addition, care that is focused on adequate oxygenation, fluid and electrolyte balance, elimination of unnecessary medications (especially psychoactive medications), adequate nutrition, and prevention of major complications will significantly reduce the incidence of delirium.[11] An example of this is using nonpharmacological sleep aides such as warm drinks, relaxation tapes, and massage.

Physiologic causes of delirium can be grouped in five areas: neurological, medication, infection, dehydration, and hypoxia.[12]

Table 3: Physiologic Causes of Delirium[5,12]

Neurological	Infection
• Level of consciousness • Recent head injury • Neurologic change: motor deficit, pupil changes • Diagnostic tests as needed • Labs: blood chemistry, thyroid stimulating hormone, B12 levels	• Urinary tract infection or pneumonia • Lab work: urinalysis, blood culture, sputum culture • Temperature

Medication
• Recent medication changes • Drug levels • Benzodiazepines, anticholinergics, antipsychotics, H2 blockers (famotodine), drugs with high toxicity • Meperidine; high dose opiods • Polypharmacy

Dehydration	Hypoxia
• Prolonged fasting time (after a fall or waiting for an operating room, etc…) • Altered intake & output • Inadequate nutrition & hydration • Electrolyte imbalance • Abnormal serum glucose levels	• Altered respiratory rate • Low pulse oximetry/oxygen saturation • Altered arterial blood gases • Abnormal chest x-ray

The IN/OUT Approach can be used to categorize the causes of delirium.[13] Causes fit in 4 categories of: IN the Brain (stroke, traumatic brain injury, meningitis, vascular disorders, increased intracranial pressure); OUT of the Brain (endocrine dysfunction, organ failure, infection, metabolic dysfunction, shock, burns, dehydration, nutritional deficiencies); Drugs IN (opiates, anticholinergics, steroids, psychoactives); Drugs OUT (alcohol, sedative or SSRI withdrawal).

Once delirium has developed, care should focus on recognizing symptoms and treating the cause. Pharmacologic treatment reserved for the last step. Interventions include ruling out physiologic causes, addressing physiologic needs, providing a therapeutic environment, and utilizing a pharmacologic protocol.

Physical Needs

Addressing physical needs can eliminate or minimize precipitating risk factors. Safety can be achieved through the use of sensory aids (glasses, hearing devices), reorientation, fall protocol, removal of invasive devices as soon as possible, and early mobilization. Pain control should include comfort measures, providing adequate pain control, avoidance of meperidine and propoxyphene/acetaminophen, and potential around-the-clock use of acetaminophen.[12] Elimination should be managed with removal of a urinary catheter as quickly as possible, frequent toileting, and maintaining bowel function. Sleep should be facilitated utilizing comfort and relaxation measures, allowing for uninterrupted sleep, and avoidance of sedative-hypnotics.

Therapeutic Environment

The therapeutic environment should foster orientation, familiarity, and a calm sensory setting.[5]

- Reassure and reorient
- Use environmental aids such as a clock, calendar, and adequate lighting
- Explain all activities and communicate clearly
- Provide appropriate sensory level such as noise reduction, one task at a time
- Foster familiarity with family and consistent caregivers
- Reassure and educate family, engage them whenever possible

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Recommended for Practice *(continued)*

Pharmacological Management

Pharmacological treatment includes four key concepts: use the fewest medications possible, the lowest possible dose, titrate slowly, and review all medications at least daily. Haloperidol is the drug of choice because it has few anticholinergic side effects, few active metabolites, small likelihood of sedation and hypotension, and can be given by multiple routes. Quetiapine is used for Parkinson's patients.

Table 4: Pharmacologic Treatment[6]

Class and Drug	Dose	Comments
Antipsychotic-Haloperidol	0.5-1.0 mg orally, twice daily; added doses every 4 hours as needed (peak effect 4-6 hours) 0.5-1.0 mg IM; observe after 30-60 min and repeat if need (peak effect 20-40 min)	• Usually agent of choice • Avoid IV use because of short duration of action • Avoid in patients with withdrawal syndrome, hepatic insufficiency, neuroleptic malignant syndrome
Atypical antipsychotic Risperidone Olanzapine Quetiapine	 0.5 mg orally, twice daily 2.5-5.0 mg orally, once daily 2.5-5.0 mg orally, once daily	• Olanzapine and Quetiapine have been trialed with favorable results • Associated with increased mortality in older patients with dementia
Benzodiazapine-Lorazepam	0.5-1.0 mg orally, add doses as needed every 4 hours	• Second-line agent • Use with patients in sedative and alcohol withdrawal, those with neuroleptic malignant syndrome, and possibly Parkinson's disease

Nursing and Physician Standard Orders

Standard nursing orders and physician orders have been developed for care of the patient with delirium.[11]

Standard nursing orders should include:

- Outcome goals
- Standard baseline assessment of predisposing risk factors
- Standard assessment of precipitating risk factors
- Designated ongoing delirium assessment with chosen tool
- Standard specific nursing interventions

Standard physician orders should include:

- Notify MD of potential alcohol withdrawal that requires use of process specific protocol
- Notify MD of physician of acute medication related dystonias
- Drug specific choices: haloperidol IV and PO, lorazepam IV and PO
- Nicotine withdrawal medication orders
- Consult for integrative therapy

ADVISE Approach for Delirium Management

Table 5: ADVISE[13]

Advocacy	Act to optimize prevention and management
Diligence	Recognize and investigate mental status changes
Vigilance	Delirium patients remain vulnerable
Integration	Use multiple interventions and biopsychosocial approach
Support	Include psychotherapeutic interventions, family and staff
Education	Educate patients, family and staff on risks and implications

Likely to be Effective

APA care recommendations fall into three categories based on the level of evidence that supports the practice. Level III represents practices that may be recommended on the basis of individual circumstances, but not supported by higher evidence.[1]

- Benzodiazepines as monotherapy are generally reserved for delirium with alcohol or sedative-hypnotic withdrawal. Those patients who can only tolerate low doses of antipsychotics may benefit from a combination.
- Paralysis, sedation, and mechanical ventilation may be used for agitated delirium patients with hypercatabolc conditions.
- Opiates may benefit patients with delirium and pain as an aggravating factor.

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Effectiveness Not Established

The use of antipsychotics such as risperidone, olanzapine, and quetiapine are based on clinical evidence and do not have supporting evidence of control group studies.

The use of radiologic diagnostics to identify delirium has limited use. Electroencephalography has a limited role in diagnosis of delirium related to the percentage of false positive and false negative results. In addition, neuroimaging studies have a low clinical yield of diagnosis.

Not Recommended for Practice

Restraints can cause increased agitation and risk of injury for the delirious patient. Means other than restraints should be used to prevent harm unless other measures are not effective.

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