

# Acute Postoperative Delirium: Definitions, Incidence, Recognition, and Interventions

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*Emergence excitement or delirium is a common postanesthesia complication. Often, the emergence excitement resolves quickly, and the patient's continued recovery is uneventful. Although the initial period of excitement may be short lived and resolve without long-term sequela, some patients may experience acute postoperative delirium, a phenomenon that is more difficult to assess and of potentially longer duration. Although patients are spending less time in the hospital after surgical procedures, concern over the potential development of acute postoperative delirium remains. Patients at risk present in ambulatory surgery centers and inpatient perianesthesia settings daily. Identification of at-risk patients is crucial to avoiding the development of delirium in the acute postanesthesia care setting. The purpose of this selective review is to define acute postoperative delirium and its incidence, discuss assessment and recognition, describe interventions, and identify future considerations related to this phenomenon.*

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**DURING THEIR INITIAL** orientation to perianesthesia nursing, nurses review complications that may occur in the postanesthesia care phase. Emergence excitement or delirium is identified as one of these complications. The focus of this initial orientation often is on the identification and management of patients experiencing this phenomenon with the intent to minimize potential further complications. Often, the emergence excitement resolves quickly, and the patient's continued recovery is uneventful. Although the initial period of excitement may be short lived and resolve without

long-term sequela, some patients may experience acute postoperative delirium, a phenomenon that is more difficult to assess and of potentially longer duration. Acute postoperative delirium may not be diagnosed until after the patient has left the postanesthesia care unit. Elderly patients are at the greatest risk for acute postoperative delirium.<sup>1</sup> Whereas patients are spending less time in the hospital after surgical procedures, concern over the potential development of acute postoperative delirium remains. Patients at risk present in ambulatory surgery centers and inpatient perianesthesia settings daily. Identification of these at-risk patients is crucial to the prevention of delirium after patients leave the acute postanesthesia care setting. What is the incidence? Can we identify at-risk patients preoperatively? What interventions can we use to minimize or prevent acute postoperative delirium? The purpose of this selective review is to define acute postoperative

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delirium and its incidence, discuss assessment and recognition, describe interventions, and identify future considerations related to this phenomenon.

### Definition

According to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, DSM-IV,<sup>2</sup> delirium is defined as "a disturbance of consciousness with reduced ability to focus, sustain, or shift attention; a change in cognition (memory deficit, disorientation, language disturbance); or the development of a perceptual disturbance that occurs over a short period of time and tends to fluctuate over the course of the day." The history, physical examination, or laboratory tests supports delirium as a direct physiologic consequence of a general medical condition, substance intoxication or withdrawal, use of a medication, toxin exposure, or a combination of these factors.

Inouye<sup>3</sup> describes delirium, or acute confusional state, as "a common and potentially preventable problem in older hospitalized patients." The Confusion Assessment Method (CAM) criteria, developed by Inouye et al,<sup>4</sup> defines delirium "by the acute onset and fluctuating course of mental status impairment, including inattention and either disorganized thinking or altered level of consciousness."<sup>3</sup>

Dyer et al<sup>5</sup> defined postoperative delirium, for the purposes of a review of 80 primary data-collection studies, as "an acute change in cognitive status characterized by fluctuating consciousness and inattention occurring within 30 days of an operation." By this definition, an acute change in cognitive status could occur long after the patient has left the ambulatory surgery center or hospital facility.

### Incidence

The reported incidence of postoperative delirium in 26 relevant and valid studies reviewed by Dyer et al<sup>5</sup> ranged from 0% to 73.5%. Variations

in definition, comorbid conditions, details related to the surgery, diagnosticians, diagnostic tools used, and sample size are factors influencing incidence reported.<sup>5,6</sup> In one study<sup>7</sup> overall incidence of acute postoperative delirium was 41% in patients undergoing bilateral knee replacement surgery. No differences were found between types of postoperative analgesia (epidural *v* patient controlled analgesia). Edlund et al<sup>8</sup> studied delirium before and after operations for femoral neck fractures. In their study, 29.7% of the patients were delirious before surgery, and 18.8% had delirium postoperatively. Patients who had delirium after surgery had perioperative falls in blood pressure and had more postoperative complications such as infections. Weed et al<sup>9</sup> reported an incidence of 17% postoperative delirium in patients undergoing major head and neck surgery in a study examining preoperative identification of patients at risk for delirium. An estimated 14% to 80% of all elderly patients hospitalized for the treatment of acute physical illness(es) experience an episode of delirium.<sup>10,11</sup>

The occurrence of postoperative delirium is costly. Higher pharmacy and medical professional costs and increased length of stay for patients with delirium contribute to rising health care costs.<sup>12</sup> However, the high cost is not only monetary, but also in mortality. Hospital mortality rates among patients who are delirious are higher, ranging from 10% to 65%, than for patients not experiencing acute delirium.<sup>11</sup>

Given the costs both monetarily and in patient mortality, recognition of patients at risk is necessary. Every at-risk patient entering the hospital with an acute medical illness or undergoing major elective surgery needs to be carefully evaluated. Foreman<sup>13</sup> stated "... careful and systematic assessment of the patient's physical and mental status at the time of admission is warranted. Such an assessment should also be routine throughout hospitalization for the timely detection of any cognitive problem, for

without detection, there can be no intervention." Detection of cognitive problems, specifically delirium, continues to be challenging for the clinician. The challenge begins with the identification of risk factors and causes of postoperative delirium.

### Risk Factors

In 1995, Dyer et al<sup>5</sup> stated there is "a need for accurate incidence data with further definition of risk factors and studies that address the diagnosis and treatment of this common postoperative problem." More recently, Edlund et al<sup>8</sup> also stressed the importance of identifying risk factors for delirium and the mechanisms involved in the development of delirium.

Inouye<sup>3</sup> describes delirium as typically resulting from a combined action of predisposing and precipitating factors. An inter-relationship exists between patient vulnerability to delirium at the time of admission into the hospital (predisposing factors) and the occurrence of noxious insults during hospitalization (precipitating factors). Predisposing factors include vision impairment, severe illness, cognitive impairment, and dehydration.<sup>3</sup> Increasing numbers of predisposing factors lead to increasing risk of delirium development. Precipitating factors include the use of physical restraints, malnutrition, the addition of more than 3 new medications on the previous day, use of an indwelling bladder catheter, and any iatrogenic event (including complications of diagnostic or therapeutic procedures, transfusion reactions or adverse drug reactions).<sup>3</sup> Again, multiple precipitating factors lead to increasing risk. Targeting preventive strategies toward these risk factors can reduce the development of delirium in hospitalized older patients by 40%.<sup>3</sup>

Various investigators cite differing conditions associated with the onset of delirium. The most prevalent conditions associated with the pathogenesis of delirium include pharmacologic agents, dehydration, hypoxia, infection (especially upper respiratory and urinary tract), met-

abolic disturbances, and nutritional deficiencies.<sup>14</sup> Dyer et al<sup>5</sup> found that age, preoperative cognitive impairment, and the use of anticholinergic drugs were significantly associated with delirium, whereas gender, type and route of anesthesia, and sleep deprivation were not. Older patients are at higher risk than younger patients.

Preexisting cognitive impairment is a risk factor. Higher rates of postoperative delirium are seen in patients with preexisting central nervous system disorders, such as dementia and Parkinson's disease.<sup>6</sup> Depression is significantly associated with postoperative delirium. Disorientation can occur quickly in the unfamiliar hospital surroundings and with the various auditory and visual stimuli leading to sensory overload in busy PACUs and ICUs.<sup>6</sup>

### Clinical Predictors

Mercantonio et al<sup>1</sup> identified clinical predictors for the development of postoperative delirium. They are age 70 years or older; alcohol abuse; preoperative Telephone Interview for Cognitive Status (TICS) score of 30 or less (TICS, a modification of the Mini-Mental Status Exam [MMSE], does not require written responses and is comparable to the MMSE in validity and reliability. Scores below 30 indicate impaired cognition); Specific Activity Scale (SAS) class IV (class IV represents severe physical impairment); markedly abnormal preoperative serum sodium, potassium, or glucose level; aortic aneurysm surgery; and noncardiac thoracic surgery. Patients with no risk factors (0 points) had a rate of less than 1% postoperative delirium; those with one point, a rate of 8%; patients with 2 points, a rate of 19%; and patients with 3 or more points, a rate of 45% (Table 1).

Postoperative delirium also is associated with other adverse outcomes.<sup>1</sup> These outcomes may include cardiac arrest, ventricular tachycardia or fibrillation, myocardial infarction, pulmonary edema, pulmonary embolus, bacterial pneumonia, respiratory failure requiring intubation, re-

Table 1. Summary of the Clinical Prediction Rule for Postoperative Delirium

Risk Factor	Points
Age $\geq$ 70 yr	1
Alcohol abuse	1
TICS score $<$ 30*	1
SAS class IV†	1
Markedly abnormal preoperative sodium, potassium, or glucose level‡	1
Aortic aneurysm surgery	2
Noncardiac thoracic surgery	1
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Total Points	Risk of Delirium (%)§
0	2
1 or 2	11
$\geq$ 3	50

\*TICS indicates Telephone Interview for Cognitive Status (scores less than 30 suggest cognitive impairment).

†SAS indicates Specific Activity Scale (class IV represents severe physical impairment).

‡Markedly abnormal levels were defined as follows: sodium, less than 130 or greater than 150 mmol/L; potassium, less than 3.0 or greater than 6.0 mmol/L; or glucose, less than 3.3 or greater than 16.7 mmol/L ( $<$ 60 or  $>$ 300 mg/dL).

§Estimates of risk were based on the true incidence of delirium in the validation population.

Reprinted with permission from Mercantonio et al.<sup>1</sup>

nal failure requiring dialysis, and stroke. Mercantonio et al<sup>1</sup> found that in patients in whom delirium developed, the rate of major complications was 15% compared with a 2% rate among patients who did not have delirium. Mortality rate in patients with postoperative delirium was 4% compared with 0.3% mortality rate in patients who did not have delirium. Mean length of stay for patients with postoperative delirium was 15 days compared with 7 in patients without delirium. Rate of discharge to new long-term care or rehabilitation facilities was 36% for patients with postoperative delirium, whereas patients without delirium went to new facilities 11% of the time.

### Biochemical Derangements

Metabolic alterations can also precipitate the onset of delirium. These alterations include dehydration, hyponatremia, hyperglycemia, hypoglycemia, acid-base disorders, hypercalcemia, hyperphosphatemia, and hepatic, renal, and endocrine disease.<sup>6</sup>

### Drugs, Anesthetics, and Intraoperative Risks

Cholinergic pathways appear to play a significant role in the pathogenesis of delirium.<sup>6</sup> Serotonin, norepinephrine, and other neurotransmitters have been implicated in the development of delirium. Medications associated with delirium include anticholinergic drugs, anesthetics, opioids, antihistamines, antiasthmatic agents, benzodiazepines, antiparkinsonian agents, histamine<sub>2</sub>-receptor antagonists, antihypertensive and cardiovascular agents, antimicrobials, corticosteroids, immunosuppressive agents, anticonvulsants, antiinflammatory agents, muscle relaxants, and oral hypoglycemics.<sup>2,6</sup> Mercantonio et al<sup>15</sup> found that meperidine and benzodiazepines (long-acting and higher doses more significant) were significantly associated with delirium that occurred in postoperative patients and recommended the use of alternative therapies whenever possible. Ketamine, in use for many years, is well known for its potential to precipitate emergence delirium in patients. The product insert states “emergence reactions have occurred in approximately 12% of patients.” The incidence of these reactions is least among the young (under 15 years old) and the elderly (over 65 years of age).<sup>16</sup>

Mercantonio et al<sup>17</sup> identified occurrence of postoperative delirium associated with greater intraoperative blood loss, more postoperative blood transfusions, and postoperative hematocrit level less than 30%. Route of anesthesia and intraoperative hemodynamic complications such as hypotension were not associated with postoperative delirium.

### Postoperative Factors

#### Hypoxemia

In acute emergence delirium in the postanesthesia care unit, hypoxemia is always considered the primary cause until proven otherwise.<sup>18</sup> Pulse oximetry is essential in the monitoring of the postoperative patient. Hypox-

emia also is a factor in the development of acute postoperative delirium occurring after the patient has left the postanesthesia care unit. Aak-erlund et al<sup>19</sup> identified hypoxemia as a risk factor in postoperative brain dysfunction leading to delirium in patients who suffered from inadequate oxygenation. Patients with delirium had significantly lower oxygen saturation levels than patients who did not have delirium. Treatment with supplemental oxygen was successful (postoperative delirium resolved) for all affected patients in this study.

### *Pain*

Uncontrolled or undertreated pain is associated with the development of postoperative delirium, particularly in older patients. Lynch et al<sup>20</sup> studied patients older than 50 years of age undergoing major elective noncardiac operations. They found that after controlling for known preoperative risk factors for delirium, higher pain scores at rest were associated with an increased risk of delirium over the first 3 postoperative days. They suggest that better control of postoperative pain may reduce the serious complication of postoperative delirium. Table 2 summarizes the etiologic factors associated with postoperative delirium.

### **Recognition and Assessment**

Baseline data of patients undergoing operative procedures are needed to evaluate the patients' postoperative response to the operative procedure and plan of care. These data are even more critically important when a patient at risk is anticipating surgery. Patients at risk for the development of postoperative delirium should have, as part of their preoperative evaluation, a formal cognitive assessment to establish a baseline for postoperative comparison.<sup>6</sup>

Recognizing delirium can be challenging even for the experienced clinician. Interestingly, in 2 recent studies, the researchers chose to delay assessment of patients until after the immediate postanesthesia period, in one case for 8 hours, and in the other, until the next day.<sup>8,17</sup> Both

**Table 2. Etiologic Factors**

#### **Preoperative**

1. Brain affectation caused by
  - a. Physiologic causes—aging
  - b. Pathologic causes—congenital, traumatic, neoplastic, vascular, idiopathic
2. Drugs
  - a. Drug polypharmacy
  - b. Drug intoxication or withdrawal
3. Endocrine and metabolic
  - a. Hyper/hypothyroidism
  - b. Hyponatremia
  - c. Hypoglycemia
4. Mental status
  - a. Depression
  - b. Dementia
  - c. Anxiety
5. Gender

#### **Intraoperative**

1. Type of surgery
  - a. Orthopedic
  - b. Ophthalmic
  - c. Cardiac
2. Duration of surgery
3. Anesthetic drugs used
4. Type of anesthesia used—general versus regional
5. Complications during surgery
  - a. Hypotension
  - b. Hyperventilation
  - c. Embolism
  - d. Hypoxemia

#### **Postoperative**

1. Hypoxia
  - a. Respiratory causes
  - b. Perioperative hypoxia
  - c. Residual anesthetics
2. Hypocarbia
3. Pain
4. Sepsis
5. Sensory deprivation or overload
6. Electrolyte or metabolic problem

Modified from Parikh and Chung,<sup>29</sup> with permission.

cited the difficulty of differentiating delirium from the residual effects of premedication and anesthesia. Perianesthesia nurses might be interested in assessing patients in the immediate postanesthesia period, particularly when they cared for the patients preoperatively and know the patients' baselines.

What clinical features is the nurse assessing in the postoperative patient? Foreman and Grabowski<sup>21</sup> defined the clinical features of delirium to assist the nurse in identifying patients

with delirium. Clinical features include the following:

1. Onset is acute, abrupt and overt; it can be timed and dated.
2. The course is fluctuating and the duration brief, lasting hours to days.
3. Attention deficits are the hallmark of an acute delirium state. The patient, who is acutely confused, will be unable to sustain or shift attention to various stimuli.
4. Orientation: Nurses rely almost exclusively on the presence of disorientation as a means of identifying cognitive impairment.<sup>21</sup> Disorientation has been shown to be nonspecific for identifying acutely confused elders.<sup>22</sup> The focus should be on aspects of concentration and attention rather than on orientation and psychomotor behavior of the patients with postoperative delirium.
5. Impairment of memory will affect immediate and recent memory and impact new learning.
6. Thinking will be disorganized; the patient will be incoherent, illogical, undirected, and unconnected.
7. Hallucinations and illusions or perceptual disturbances may lead the patient to mistake the unfamiliar for the familiar.
8. Psychomotor behavior may be hypokinetic or hyperkinetic or a mixed variant.

Delirium remains underdiagnosed and undertreated by physicians and nurses. It often is misattributed to an exacerbation of an underlying dementia.<sup>14</sup> Table 3 lists the differences between delirium, depression, and dementia.

In a 3-year study of hospitalized older adults, Trzepacz<sup>23</sup> found that nursing notes alone contained sufficient information to diagnose delirium 85% of the time, yet the information was rarely used to make the diagnosis of delirium. When documented, key words used in medical documentation to describe acute delirium include agitated, confused, disoriented, and delirious.<sup>1</sup>

Table 3. Features of Depression, Delirium, and Dementia

Features	Depression	Delirium	Dementia
Onset	Weeks to months (rapid)	Hours to days (acute)	Months to years (slow, indefinite)
Duration	Short	Variable	Long/lifetime
Mood	Consistent	Labile	Fluctuation
Disabilities	Recognizes	New disabilities appear (acute)	May conceal deficits
Answers	“Don’t know”	May be incoherent (acute)	Offers response but not correct, but may be close to correct
MMSE*	Performance fluctuates	Acute fluctuations	Fairly stable with downward trajectory over time
Progression	Resolves with treatment	Resolves with treatment	Ongoing

\*Mini-mental status exam ([www.nemc.org/psych/mmse.asp](http://www.nemc.org/psych/mmse.asp)). Reprinted with permission from Insel & Badger.<sup>32</sup>

Winawer<sup>6</sup> identified 2 challenges facing the clinician attempting to diagnose delirium: recognizing the disorder is present and evaluating the patient for suspected medical conditions that may have precipitated the episode. Applying the DSM-IV criteria at the bedside will help the clinician make a more accurate diagnosis.<sup>6</sup> Among the instruments that can be used in identifying delirium are the Mini-Mental Status Exam,<sup>24</sup> the Confusion Assessment Method (CAM),<sup>4</sup> NEECHAM confusion scale,<sup>25</sup> Clinical Assessment of Confusion A,<sup>26</sup> and Confusion Rating Scale.<sup>27</sup> Schuurmans et al<sup>28</sup> discussed screening instruments in their review on early recognition of delirium. They described the instruments and identified advantages and disadvantages of each instrument to help guide the clinician in use of the instruments. No tool currently exists that is specific to acute postoperative delirium assessment and recognition.

Inouye<sup>3</sup> states “delirium should always be handled as a warning sign of potentially life-threatening disease in the elderly, warranting careful and detailed medical evaluation.” Patients may have an underlying, treatable physical disorder

that is causing the acute delirium. Prompt recognition and treatment is crucial. The APA<sup>4</sup> asserts that delirium may lead to stupor, coma, seizures, or death, particularly if the underlying cause is untreated. It goes on to say, that in the postoperative patient,

delirium is a harbinger of limited recovery and poor long-term outcome and is often associated with increased risk for postoperative complications, longer postoperative recuperation periods, longer hospital stays, and increased long-term disability.<sup>4</sup>

Parikh and Chung<sup>29</sup> stress the importance of nursing care in detecting the earliest signs of delirium. Patients and families need reassurance when delirium sets in. Educating nurses to recognize central nervous system changes is an effective and inexpensive way to deal with this common postoperative problem.<sup>5</sup> With the risk of prolonged recovery, longer hospital stays, and increased disability, it is imperative for peri-anesthesia nurses to enhance their skills in recognizing and evaluating patients at risk for and suffering from postoperative delirium. Peri-anesthesia nurses then need to identify potential interventions for use in the PACU and ambulatory surgery settings.

### Interventions

The next step in the care of the patient at risk for or experiencing postoperative delirium is intervention. Table 4 addresses prevention of postoperative delirium, outlining the key assessment and intervention points.

Mercantonio et al<sup>1</sup> suggests using a clinical prediction rule for identifying patients at risk for postoperative delirium. Intervention strategies to prevent or reduce the impact of delirium include the close monitoring and correction of perioperative hypoxemia, hypotension, fluid and electrolyte imbalance, and severe anemia. The use of nonopioid agents for postoperative analgesia, prudent use of short-acting opioid agents, and avoidance of anticholinergic agents (eg, meperidine) also are suggested. Preoperative assessment of patients at risk using vali-

Table 4. Prevention of Postoperative Delirium

<b>Preoperative assessment</b>
Detailed history of drugs
Medical problem evaluation
Detection of sensory or perceptual deficits
Mental preparation before surgery
Neuropsychiatric testing
Use of geriatric-anesthesiologic program
<b>Intraoperative precautions</b>
Adequate oxygenation and perfusion
Correct the electrolyte imbalance
Adjust drug dose
Minimize the variety of drugs
Avoid atropine, flurazepam, scopolamine
<b>Postoperative care</b>
Environmental support
Well-lit cheerful room
Quiet surroundings
Keep patient oriented
Visit by friend or family
Treat pain
Identify risk-associated drugs
Anticholinergics
Depressants
H <sub>2</sub> antagonists
Digoxin, lidocaine
Meperidine
Benzodiazepines
Reassure patient and family

Modified from Parikh and Chung,<sup>29</sup> with permission.

dated instruments should be included on all patients undergoing major elective surgery.<sup>1</sup>

A recent case report published in *Anesthesia & Analgesia* describes the use of melatonin, an over-the-counter substance for treatment and prevention of postoperative delirium.<sup>30</sup> The authors suggest "it may be worthwhile to use this fairly benign drug to treat postoperative delirium or even prophylactically in patients with a history of confusion after surgery."<sup>30</sup>

Inouye et al<sup>31</sup> identified a multicomponent intervention consisting of 6 standardized protocols for managing specific risk factors for delirium: cognitive impairment, sleep deprivation, immobility, visual impairment, hearing impairment, and dehydration. These interventions are effective in reducing the number and duration of episodes of delirium in hospitalized older patients, but have no significant effect on the severity of delirium or on reoccurrence rates.

However, these results are from using standardized protocols and, unfortunately, are not specific to postoperative delirium.

According to the APA,<sup>4</sup> “if the underlying etiological factor is promptly corrected or is self-limited, recovery is more likely to be complete and more rapid.” This supports improved assessment and recognition of delirium to minimize adverse outcomes.

Nonpharmacologic approaches to care are aimed at limiting the etiologic sources of delirium, including bladder catheters, poor nutritional intake, improving orientation, decreasing sensory overload or deprivation, and providing reassurance.<sup>32</sup> Patient safety is important because patients with delirium are at risk for injury from their behavior. Physical restraints should be avoided to reduce the risk of patient injury and increased agitation by aggravating the patient.<sup>29,33</sup>

Maintaining sensory aids (eyeglasses, hearing aids, and dental appliances) or returning them promptly after the surgical procedure is completed, early ambulation, and avoidance of indwelling bladder catheters and physical restraints may be appropriate in the postanesthesia period. Discharging older patients home after minimal hospital or facility stays may help minimize lifestyle disruptions and cognitive impairment. Reorientation strategies, simple instructions and explanations, and frequent eye contact help maintain communication with the elderly patient.<sup>3</sup> Involving patients and families in decision making may help maintain cognitive function. A holistic nursing approach to care will help preserve the integrity of the individual patient and their families.<sup>13</sup>

### Future Considerations

The recognition and identification of appropriate interventions for patients with acute postoperative delirium continues to challenge peri-anesthesia nurses, anesthesia care providers, and other health care providers. Optimizing

patients preoperatively to minimize clinical predictors and known risk factors is the goal. Research is needed in the area of acute postoperative delirium to better define the phenomenon, its incidence, risk factors and causes; enhance recognition; and develop additional interventions. Unfortunately, much of the literature on postoperative delirium is over 10 years old. Some basic work defining acute delirium needs to be accomplished before new studies are undertaken on specific acute postoperative delirium.

Schuurmans et al<sup>28</sup> recommend that to change clinical practice and improve early recognition the following should occur:

1. The word *confusion* should be dropped; it causes misunderstanding in the process of observation and diagnosis. Replacing *confusion* with exact behavioral descriptions would help nurses describe delirium more accurately.
2. Emphasis should be given to nurses' views and knowledge related to health in older patients. Basic nursing curricula should include knowledge of delirium, its causes, and risk factors.
3. Instruments for systematic screening of symptoms need further study related to reliability, validity, and ease of use in the clinical practice setting.

Foreman<sup>10</sup> suggests consensus in nomenclature to facilitate communication. Study designs must incorporate fundamental characteristics of acute delirium and phenomenologic approaches be undertaken to gain insight into the human experience of delirium. Also, Foreman<sup>10</sup> suggests that instrumentation be improved. Instruments are needed that are practical, sensitive and specific, and discriminating. Franco et al<sup>12</sup> believe that substantially reduced health care costs may be one of the outcomes of future interventions designed to improve clinical outcomes and lower complication rates.

Perianesthesia, acute care, and critical care nurses can begin making a difference in at-risk

patients now. Learning to recognize those patients at risk for the development of acute postoperative delirium and intervening when appropriate will begin the process to improve the safety and well-being of this vulnerable surgical population.

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