Falls in the General Hospital: Association With Delirium, Advanced Age, and Specific Surgical Procedures

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Background: *Falls and delirium in general-hospital inpatients are related to increases in morbidity, mortality, and healthcare costs. Patients fall despite safeguards and programs to reduce falling.* **Objective:** *The authors sought to determine the prevalence of diagnosed and undiagnosed delirium in patients who fell during their hospital stay.* **Method:** *The authors performed a retrospective electronic chart review of 252 patients who fell during their hospital stay. Falls were categorized by their severity (i.e., minor, moderate, and major). Demographic information, patient outcomes, and diagnostic criteria for delirium (per DSM–IV) were collected on the day of admission, the day of the fall, and the 2 days preceding the patient's fall.* **Results:** *Falls in the general hospital were associated with delirium (both diagnosed and undiagnosed), advanced age, and specific surgical procedures.* **Conclusion:** *Improving the recognition of undiagnosed delirium may lead to sustainable and successful fall prevention programs. Detection of impairments in mental status can assist staff to create individualized patient care plans. Knowledge about which patients are at risk for injury from delirium and falls can lead to improvements in patient safety, functioning, and quality of life.* (Psychosomatics 2009; 50:218–226)

Patients frequently fall, despite vigorous efforts by hospital staff to identify those at risk for falling and to initiate falls-prevention programs. In 1985, falls led to more than 2 million injuries, 369,000 hospital admissions, and nearly 9,000 deaths.[1] By the year 2000, falls by patients over the age of 65 years accounted for 1.8 million emergency department visits annually, 433,000 admissions, and 15,800 deaths. The number of fall-related deaths for elderly patients has also risen significantly.[2] In addition to the impact of falls on morbidity and mortality, falls have an economic impact; the average cost of hospitalization for the consequences of a fall is $17,500,[3] and total direct costs for elderly adults have who have fallen exceeds $19 billion.[2]

Among those at highest risk for falling are patients in tertiary-care medical centers (because of acute illness, an unfamiliar environment, and medication changes, among other factors).[1] Falls occur in 1 of every 3 adults age 65 years or older; of these, 20%–30% sustain moderate-to-severe injuries.[2,4,5] Furthermore, falls account for the most frequent cause of nonfatal injuries, and falling is the lead-

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ing cause of death from injury in older adults.[6] Although most falls in elderly persons are neither fatal nor result in significant physical injury, the psychological impact of a fall (or a near-miss) often results in a fear of falling and a self-imposed restriction of activities.[7]

Recently, Mahoney and colleagues[8] reviewed the temporal relationship between hospitalization and rate of falls after discharge. They found that falls pose a serious threat to the health and functioning of older adults and also increase healthcare costs. Since a new diagnosis of delirium (or of persistent delirium) after hospitalization places a patient at a sixfold higher risk for falling,[8] understanding why a patient falls and how a fall can be prevented is very important.

In acute-care settings, falls-prevention programs typically involve multidisciplinary teams to evaluate the risk of falling, to monitor the safety of hospitalized patients, and to implement interventions. However, despite the institution of safeguards, the application of new products, and the creation of fall-prevention programs, falls continue to plague acute-care hospitals and the patients they care for. The national benchmark, set in 1990 by the University Hospital Study, is 3 falls per 1,000 patient-days.[9] Although the fall-rate for patients at the Massachusetts General Hospital (MGH), a large, tertiary medical center, was below the external benchmark and well within the targeted range, we aimed to further reduce falls at our institution. We hypothesized that delirium contributes to patient falls on inpatient units in general hospitals, and, therefore, we sought to determine the prevalence of delirium among inpatients who fell and to establish the frequency of undiagnosed delirium in this population. Table 1 provides definitions.[10–13]

METHOD

Study Design

After review and approval by the institution's Human Research Committee (HRC), we performed a retrospective review of the hospital charts for the 252 adult inpatients who fell between April 2003 and June 2003; a total of 237 records were available for review to establish whether there was evidence of delirium (ED; established when the diagnosis was made by a treating clinician or when the diagnostic criteria were described in the medical record).

Data Collection

Data were extracted from the medical record by nine raters (four psychiatric clinical nurse-specialists, one medical clinical nurse-specialist, one adult nurse-practitioner, and three staff nurses) trained by the principal investigator (PI) to identify delirium and its descriptors. Each rater reviewed five of the same charts, using a collection tool to establish and ensure interrater reliability at the beginning of the chart review. The PI subsequently reviewed 10 records of each rater at the beginning and end of the chart review to ensure interrater reliability. Each rater reviewed 25–30 records (including discharge summaries, laboratory data, medication orders, and the incident reports regarding the patients falls).

The database was developed and pretested by investigators, based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM–IV) criteria for delirium.[13] The collection instrument collated demo-

TABLE 1. Definition of Terms Used in the Study

A fall	An unplanned descent to the floor with or without injury to the patient.[10] Operational definition: Documentation of the event through an incident report filed with the office of Quality and Safety and categorized as having an injury or no injury.
An injury	Minor: Small bruise or abrasion that does not require medical treatment. Moderate: Injury requiring medical treatment that is not considered major, such as a cut requiring sutures. Major: A serious injury, including a fracture, head injury, or wound that required major suturing.[11,12]
Delirium	A syndrome manifested by:[13] • Disturbance of consciousness (i.e., reduced clarity of awareness of the environment) with a reduced ability to focus, sustain, or shift attention. • Change in cognition (e.g., memory deficit, disorientation, or language disturbance) or the development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia. • Rapid onset and fluctuations during the course of the day • Evidence from the history, physical examination, or laboratory tests that the disturbance is caused by the direct physiological consequences of a general-medical condition
Categorization	• Diagnosis of delirium (DD): diagnosis of delirium in medical record. • Evidence of delirium (ED): evidence of delirium via data collection but no delirium diagnosis on record. • ND: no identified delirium on record diagnosis or in data collection.

graphic data (e.g., age and gender), date and location of the fall, discharge disposition, diagnosis of delirium, use of a synonym for delirium per ICD–9 coding, and the criteria for delirium (i.e., a disturbance of consciousness, a change in cognition, fluctuations through the day, and evidence of a physiological derangement [e.g., of serum electrolytes, serum chemistries, arterial blood gases, liver-function tests, tests of hematological function, microbiology data, and radiological tests]; Table 2). The list of the operative procedures performed on patients who sustained falls was provided by the operating room scheduler and recorded in the database (Table 3). Data were derived from 4 hospital days (i.e., the day of admission [Day 1], the day of the fall [Day 2], and the 2 days preceding the fall [Pre-Fall Day 1, Pre-Fall Day 2]).

Data from 252 safety reports were abstracted and coded for privacy. Records of 15 patients were excluded because they were not admitted to the hospital or were admitted to the Pediatrics Service or to Obstetrics. Twenty patients had more than one fall; 18 of the patients had two falls, one patient had three falls, and one patient suffered four falls during the hospital stay. Because the electronic record system was unable to differentiate between medications ordered and medications administered, our reviewers did not tabulate information on medications.

Data Analysis

Data were entered into a Statistical Package for Social Sciences (SPSS, Version 14.0). Descriptive statistics were computed on all variables.

Secondary Review Each rater was instructed to transcribe any descriptive terms found in the electronic record that did not match the criteria or the signs and symptoms as listed on the collection tool, but which could describe a symptom of delirium. The variables consistent with the signs and symptoms of delirium were sorted into two categories: as "possibly relevant to delirium" and as "items from the data collection tool." The research group confirmed the principal investigator's categorization.

Three categories were established to determine whether a patient may have had delirium at the time of the fall: 1) a group where there was evidence of delirium (ED); 2) a group who had a diagnosis of delirium (DD) written in the medical record per ICD–9 coding; and 3) a group where there was no delirium (ND; i.e., no evidence of a delirium diagnosis, or of symptoms of delirium).

TABLE 2. Demographics of Patients Who Fell in the Hospital

Demographics	Service at Time of Fall	Discharge Location
Age	Medicine	Home
Gender	Surgery	Skilled nursing facility
Date of admission	Neurology	Rehabilitation facility
Date of discharge	Neurosurgery	Other facility
Date of fall	Orthopedics	Death
	Cardiology	
	Psychiatry	
	Other	

RESULTS

Data were analyzed on patient demographics, clinical service, and patient outcomes.

Patient Demographics

Patients who fell were slightly more likely to be male (52%). Half of all falls occurred in patients age 70 or over. All of the patients who sustained a major injury were over 70 years old; 87.5% of falls in the older adult were associated with a moderate injury. Twenty-two percent of patients who fell sustained an injury; in 74%, it was minor; in 21%, it was moderate; and in 5%, it was major. Repeated falls occurred in 18% of the patients (see Figure 1).

Clinical Service

Forty-two percent of falls occurred while patients were on the medical service, as compared with more than 50% of the falls that occurred on the surgical service; the falls-per-day were lower on Medicine and higher on Surgery (see Figure 2, Figure 3).

Discharge Outcomes

Sixty-percent of patients who fell were unable to be discharged to their homes; 7% died, 49% went to skilled nursing facilities (SNF)/rehabilitation hospitals, and 4% were transferred to another acute-care hospital. Only 40% of those who fell returned home directly after hospital discharge (Figure 4).

Delirium Analysis

Ninety-six percent of patients who fell showed evidence of delirium. Of those, 18.7% either had a discharge diagnosis of delirium or a descriptor of symptoms for delirium in the electronic record (used by the physician at

discharge [ICD–9 coding]). None of the patients' charts included the actual words that define the condition: 1) disturbance of consciousness; 2) change in cognition; 3) fluctuations during the day and night; and 4) evidence of direct physiological consequences of a general-medical condition. (See Table 4.) This raises questions about the consistency of diagnoses of delirium across specialties.[14]

Evidence of delirium involved identification of the signs and symptoms of a disturbance of consciousness, a change in cognition, or a fluctuating course (see Table 5). The physiological changes were numerous and evident on the day of admission, on the day of the fall, and 2 days before the fall.

Words suggestive of a diagnosis of delirium were frequently used; these terms included the following: a change in cognition (33%), encephalopathy (25%), an acute confusion syndrome (14%), hepatic encephalopathy (11%), delirium tremens (6%), a toxic metabolic state (5%), and agitation (2%). A variety of terms in the electronic record (e.g., confused, a change in mental status, an unsteady gait, disorientation, mental status improved, required restraints, a memory deficit, dizziness, sundowning, decreased responsiveness, somnolent, and syncope) were used by staff to describe the patient who fell and manifested cognitive impairment. Nearly three-fourths of hospital records (72%) included at least one of the following terms: confused, change in mental status, unsteady gait, disorientation, mental status improved, required restraints, memory deficit, dizziness, sundowning, decreased responsiveness, somnolent, and syncope (Table 4). Although these terms are not synonyms for delirium, they suggest a disturbance of affect, behavior, or cognition.

When a physiological etiology was identified, 80% of patients had at least one abnormal laboratory finding (related to results for: hematocrit, hemoglobin, blood-urea nitrogen, white blood-cell count, creatinine, potassium, albumin, magnesium, AST/SGOT, and alkaline phosphate); calcium levels were inadvertently omitted from the collection tool.

Several ambulatory and gastrointestinal (GI) procedures were most often associated with falls (e.g., placement of an automatic implantable cardioverter defibrillator [AICD], bronchoscopy, cardiac catheterization, colonoscopy, endoscopy, endoscopic retrograde cannulation of the pancreas [ERCP], and resection of the colorectal segment).

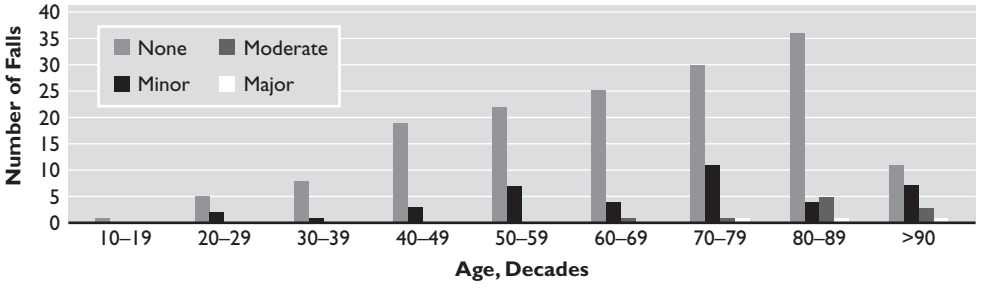
Length of Stay

The mean length of stay (LOS) for patients who fell was 15.0 days (median: 10 days), whereas the LOS for all patients at Massachusetts General Hospital (MGH) was 5.83 days. For patients who fell and had a diagnosis of delirium (DD), the mean LOS was 17.5 days (median: 14

TABLE 3. Common Tests/Procedures Performed on Patients in the Hospital

Abdominal aortic aneurysmectomy	Coronary artery bypass graft	Endoscopic ultrasonography	Mitral valve replacement
Automatic implantable cardioverter defibrillator	Cardiac cauterization	G-tube placement	Pacemaker placement
Appendectomy	Cholecystectomy	Hernia repair	Sigmoidoscopy
Arthroscopy	Colonoscopy	Hip replacement	Thyroidectomy
Arthroplasty	Colorectal resection	Laminectomy	Urinary endoscopy
Aortic valve replacement	Esophago-gastro-duodenostomy	Liver biopsy	Video capsule
Breast biopsy	Endoscopy	Lumpectomy	
Bronchoscopy	Endoscopic retrograde cannulation of the pancreas	Manometry	

FIGURE 1. Falls by Age and Severity



days), whereas for those with evidence of delirium (ED), the mean LOS was 14.6 days (median: 10 days), and for those who fell but had no diagnosis of delirium (ND), the mean LOS was 11 days (median: 9 days).

About half of the patients admitted to our acute-care hospital and who fell returned home directly after their discharge from the hospital; 7% of the patients who fell died after their fall. Half of the falls during the study period occurred in those over 70 years old; patients in this age-group accounted for all of the hospital-acquired major injuries and half of the moderate injuries. Ninety-six percent of patients who fell had symptoms of delirium; however, it went undiagnosed or treated 75% of the time.

DISCUSSION

Our data suggest that one of the most important risk factors for falling may be delirium, which involves a sudden change in a patient's mental state associated with an altered level of functioning. It is a potentially preventable and reversible organic mental disorder frequently with an acute medical etiology. Delirium is manifested by a variety of behaviors and symptoms (such as restlessness, anxiety, an altered level of consciousness, irritability, hypersensitivity to environmental stimuli, and changes in cognition and orientation) that fluctuate over the course of a day; however alternative labels (i.e., intensive care unit [ICU] psychosis, toxic psychosis, an acute confusional state, acute brain failure, postoperative encephalopathy, and organic brain syndrome) have been used to describe it.[13,15–19]

Delirium has protean manifestations. In hyperactive delirium, agitation, a poor attention span, and difficulty following directions are seen and lead to its being mistaken for dementia, whereas, in hypoactive delirium, withdrawal, somnolence, difficult arousing, inability to perform activities of daily living (ADLs), and poor nutritional oral intake of food and fluid are often mistaken for depression.[17,21,22]

Agitation is often managed by use of restraints and presence of observers (to minimize the risk for falls or other injuries); these can contribute to increased anxiety for the patient and result in staff promoting bed-rest during a time when early mobilization is indicated. Nurses and physicians often prescribe "sitters" (which are costly and do little to treat the patient who is acutely ill) for a patient at risk for injuries without identifying the underlying etiology of the behavioral disturbance. Moreover, in one study, the use of sitters was associated with an increase in

FIGURE 2. Falls by Clinical Service

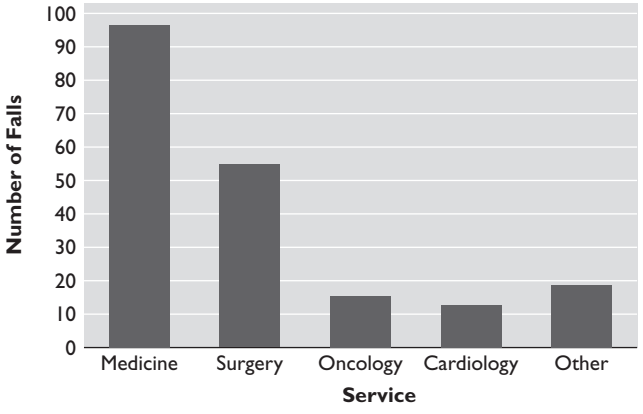


FIGURE 3. Falls by Injury Severity and Service

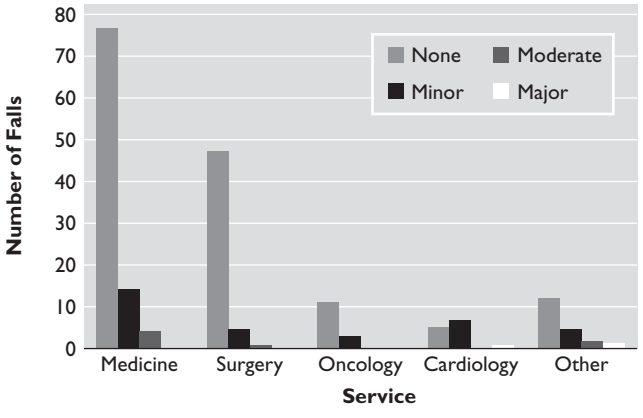
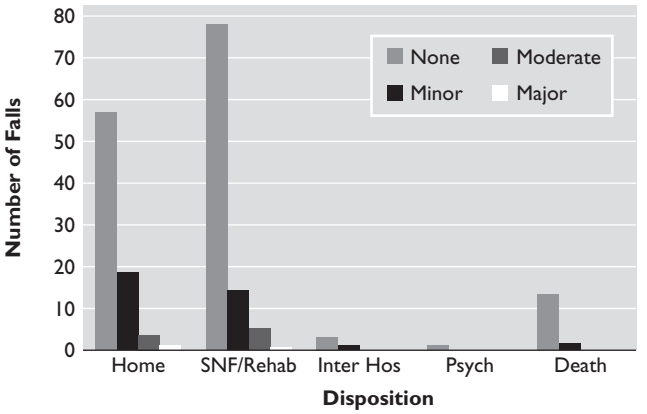


FIGURE 4. Discharge Disposition and Severity of Injury Sustained in Fall



SNF: skilled nursing facility; InterHos: inter-hospital transfer; Psych: psychiatry unit

falls and costs.[22] The strategy of focusing on containment of behaviors, rather than on treatment of illness, prevents customization of care that is based upon an underlying etiology and the pathophysiology that contributes to a behavioral change.

Delirium

The rate of delirium among inpatients over 70 years of age has been estimated at 80%,[22] and it may affect more than half of patients admitted for medical care,[24] half of postoperative patients,[25] 80% of terminally ill patients,[26] and one-third of patients after coronary bypass graft.[27]

Those who develop delirium also are at risk of dying. One-fourth of older adults with delirium die within 1 month of its onset,[28] and one-half of those who develop delirium die in the next 5 years.[29] The mortality rates for inpatients with delirium are 10%–65% and are comparable to those who develop sepsis and acute myocardial infarction.[18] Moreover, patients with delirium have a longer LOS and more medical complications and injuries.[30]

Unfortunately, delirium remains poorly recognized by healthcare professionals, who often overlook and misdiagnosis the syndrome.[22,31,32] For example, hypoactive de-

TABLE 4. Terms Frequently Used to Describe Delirium

Disturbance of Consciousness	Change in Cognition	Fluctuation
Change in level of consciousness	Change in mental status	Altered behavior
Decreased responsiveness	Confusion	Altered sleep–wake cycle
Dizziness	Decreased short-term memory	Change in functioning
Hallucinations	Disorientation	Decline in functioning
Incoherence	Lack of capacity	Easily redirected
Intensive-care-unit psychosis	Language disturbance	Not at baseline
Lethargy	Mental status cleared	No longer needs sitter
Non-responsiveness	Mental status improved	Required restraints
Organic brain syndrome	Memory deficit	Sundowning
Perceptual disturbances	Reduced ability to shift attention	Unable to complete ADLs
Pulling lines, catheters, and tubes	Unable to follow directions	Unsteady gait
Reduced clarity		Waxing and waning
Seizure		
Sensory problems		
Slow to rouse		
Somnolent		
Stuporous		
Syncope		
Visual disturbances		

TABLE 5. Evidence of Medical Cause for Delirium

Routine Blood Tests				
Electrolytes	**General Chemistry**	**Blood Gas Oximetry**	**Liver Function Tests**	**Hematology**
Na <125 or >155	Mg <1.4 or >2.0	PO_2 <80	ALT/SGPT >55	WBC >11.0
K <3.4 or >4.8	Alb <3.0	PCO_2 >42	AST/SGOT >40	HCT <33
BUN >25	Amylase >100		ALK Phos >115	Hgb <11
Cr >1.5	Lipase >6		T Bili >1.0	
Glu <80 or >250	Ca <8.8 or >10.5		D Bili >0.4	
			NH_3 >48	

Other Tests		
Toxicology	**Microbiology**	**Radiology Chest X-Ray**
Blood toxic drug levels	Positive blood cultures	Infiltrate
Blood alcohol level	Urine >100,000 microorganisms	Opacity
Urine toxic screen	Urine abundant microorganisms	Consolidation
		Pleural effusion
		Pulmonary edema

lirium is more often ignored, or erroneously attributed to aging.[33] Timely and accurate diagnosis of delirium should reap rewards for hospitalized patients.[34] Diagnosis can be facilitated by use of standardized screening examination (e.g., the Folstein Mini-Mental State Exam [MMSE] and the Confusion Assessment Method [CAM]).[25,35–38] These tests can be a routine part of multidisciplinary team assessments. Such assessments can identify alterations from a patient's baseline cognitive status and detect deviations during the hospitalization.[15]

Falls and Delirium

It is apparent that healthcare costs for patients with delirium have increased. On average, patients with delirium have a longer LOS in acute-care settings and require more care before their return to the community and independent functioning.[17,39,40]

Patients at risk for falling pose management problems; they are often restrained (a strategy that frequently leads to patient and family distress) and have complications from such immobility.[41] Patients predisposed to falls tend to be confused and to have greater underlying medical and psychiatric comorbidity.[42] A patient with delirium or one who experiences a fall can lose independence and become fearful and restrict ADLs.

Clinicians typically receive little formal training in the diagnosis and treatment of delirium. Helping clinicians learn to diagnosis delirium and develop the skills necessary to reduce falls should lead to safer care.[43–45] Recognition of confusion and recognition of risk factors for falls (with use of a systematic approach to assessment) and timely intervention are effective strategies to prevent falls.[46] Individualized clinical assessments are important to identify symptoms of delirium that may impede a patient's ability to follow a fall-prevention program.[47] Several studies have attempted to establish prevalence of delirium among inpatients in tertiary-care hospitals; however, data are limited on the subset of patients who fell.[40,41,48,49,52]

A recent metaanalysis of four decades of falls-prevention strategies found that some interventions worked in the short-term to reduce falls, but none demonstrated a sustained effect in acute-care settings.[53,54] The national patient safety goals of The Joint Commission include the reduction of risks and complications that result from falls.

Recommendations

Fall-prevention programs appear to temporarily decrease falls in the general hospital; improving the recognition of undiagnosed delirium may lead to sustainable and successful interventions. Patients with impaired cognition, short-term memory, and attention would have a difficult time retaining any information provided to them (making many fall-prevention programs/interventions unhelpful in this acute period). At the MGH, patients are screened with the Morse Fall Scale. When a patient is deemed at risk for falling, standard "fall precautions" are instituted (e.g., posting a sign that identifies the patient as a fall risk, frequent safety checks, moving the patient to a room close to nursing station, informing all staff to increase their awareness of the patient's status, assessing the medication list, reorienting the patient, placing the bed in its lowest position, removing clutter, placing signs on the wall reminding the patient not to get out of bed without assistance, ensuring that the bed alarm is turned on, decreasing noise, placing assistive devices from home at the bedside, using nonslip footwear, and other least-restrictive devices for safety, such as wedge cushions, roll belts, and floor pads, scheduling toileting, consulting physical therapists, and informing the family of the care plan in the care plan).

Once the patient has been identified as having delirium, the above standard fall-precautions are instituted along with other specific interventions. These include performing mental-status assessments regularly using communication techniques (e.g., reorientation to person, place, time; speaking in a slow, clear manner; using simple, one-step directions), using sensory aids (e.g., glasses, hearing aids, and dentures), being mindful of sleep hygiene (e.g., opening the blinds, turning on the lights during the day and darkening the room at night), monitoring nutrition (e.g., calling a consult, monitoring intake and output, feeding the patient), providing comfort measures (e.g., monitoring pain, mobilizing out of bed, ambulating), monitoring physiological care (e.g., reviewing, resolving or evolving etiologies), and providing a consistent daily routine and schedule. These interventions provide an optimal environment that assists patients with delirium to return to their baseline level of functioning. Standardized cognitive assessments, multidisciplinary training, and an increased awareness of early symptoms should also contribute to improved patient outcomes. Understanding the language currently utilized by the system to identify delirium will assist multidisciplinary teams in developing

and providing education and allow for standardization of the diagnosis and treatment. Developing standardized cognitive assessments, multidisciplinary training, and an increased awareness of early symptoms should also contribute to improved patient outcomes. Mental status has been referred to as the sixth vital sign. Knowledge of mental status impairment and cognitive issues can assist staff in applying individualized plans of care. Understanding when family members need to be involved and how to connect care with outpatient providers should help to increase safe care.

As older adults suffer severe falls and are more apt to develop delirium in acute-care settings, the quality and safety of patients who are discharged into the community is affected. As medical care evolves and acuity rises, providers' knowledge about which patients fall and which develop delirium should lead to improved patient safety, functioning, and quality of life.

Data were collected at the Brigham and Women's Hospital and Massachusetts General Hospital.

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References

1. Sager MA, Rudber JA, Jalaluddin M, et al: Hospital Admission Risk Profile (HARP): identifying older patients at risk for functional decline following acute medical illness and hospitalization. J Am Geriatric Soc 1996; 44:251–257
2. Stevens JA, Corso PS, Finkelstein EA, et al: The costs of fatal and non-fatal falls among older adults. Inj Prev 2006; 12:290–295
3. Roudsari BS, Ebel BE, Corso PS, et al: The acute medical care costs of fall-related injuries among U.S. older adults. Int J Care Injured 2005; 35:1316–1322
4. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control: Web-Based Injury Statistics Query and Reporting System (2005), cited July 2008: *www.cdc.gov/ncipc/wisqars Falls Among Older Adults: An Overview, Facts-NCIPC. http://www.cdc.gov/ncipc/factsheets/adultfalls.htm*
5. Centers for Disease Control and Prevention: Fatalities and injuries from falls among older adults: United States, 1993–2003 and 2001–2005. MMWR 2006; 55:1222–1224
6. Centers for Disease Control and Prevention: Public Health Surveillance for Behavioral Risk Factors in a Changing Environment: Recommendations From the Behavioral Risk Factor Surveillance Team. MMWR 2003; 52 (No RR-9):7
7. Fuller GF: Falls in the elderly. Am Family Physician 2000; 61:2159–2169
8. Mahoney J, Palta M, Johnson J, et al: Temporal association between hospitalization and rate of falls after discharge. Arch Intern Med 2000; 160:2788–2795
9. Morse JM: Enhancing the safety of hospitalization by reducing patient falls. Am J Infect Control 2002; 30:376–380
10. National Center for Nursing Quality: Data Collection Guidelines. March 2000
11. Morse JM: Preventing Patient Falls. Newbury Park, CA, Sage, 1997
12. Morse JM, Morse RM, Tylko S: Development of a scale to identify the fall-prone patient. Can J Aging1989; 8:366–377
13. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 4th Edition. Washington, DC, American Psychiatric Press, 1994
14. Glick RE, Sanders KM, Stern TA: Failure to record delirium as a complication of intra-aortic balloon pump treatment: a retrospective study. J Geriatr Psychiatry Neurol 1996; 9:97–99
15. American Psychiatric Association: Practice Guidelines for the Treatment of Delirium. Am J Psychiatry 1999; 159:Suppl
16. Inouye SK, Rushing JT, Foreman MD, et al: Does delirium contribute to poor hospital outcomes? a three-site epidemiologic study. J Gen Intern Med 1998; 3:234–242
17. Francis J, Martin D, Kapoor WN: A prospective study of delirium in hospitalized elderly. JAMA 1990; 263:1097–1101
18. Inouye SK, Viscoli C, Horwitz R, et al: A predictive model for delirium in hospitalized elderly medical patients based on admission characteristics. Ann Intern Med 1993; 119:474–481
19. Levkoff S, Liptzin B, Cleary P, et al: Subsyndromal delirium. Am J Geriatr Psychiatry 1996; 4:320–239
20. Francis J, Kapoor WM: Delirium in hospitalized elderly. J Gen Intern Med 1990; 5:65–79
21. Lipowski AJ: Delirium (acute confusional states). JAMA 1987; 258:1789–1792
22. Foreman MD: The cognitive and behavioral nature of acute confusional states. Scholarly Inquiry for Nursing Practice 1991; 5:3–16
23. Boswell D, Ramsey J, Smith M, et al: The cost-effectiveness of a patient-sitter program in an acute care hospital: a test of the impact of sitters on the incidence of falls and patient satisfaction. Quality Management in Health Care 2001; 10:10–16
24. Foreman MD: Acute confusion in the elderly. Annu Rev Nurs Res 1993; 11:3–30
25. Inouye SK, van Dyck CH, Alessi CA, et al: Clarifying confusion: The Confusion Assessment Method: a new method for detection of delirium. Ann Intern Med 1990; 113:941–949
26. Massie JJ, Holland J, Glass E: Delirium in terminally ill cancer patients. Am J Psychiatry 1983; 140:1048–1050
27. Rolfson DB, McElhaney JE, Rockwood K, et al: Incidence and risk factors for delirium and other adverse outcomes in older adults after coronary artery bypass graft surgery. Can J Cardiol 1999; 15:771–776
28. McCusker J, Cole M, Abrahamowicz M, et al: Delirium predicts 12-month mortality. Arch Intern Med 2002; 162:457–463
29. Van Hemert AM, Van Der Mast RC, Hengeveld MW, et al: Excess mortality in general hospital patients with delirium: a 5-year follow-up of 519 patients seen in psychiatric consultation. J Psychosom Res 1994; 38:339–346

30. Inouye SK: Delirium in older persons. N Engl J Med 2006; 354:1157–1165
31. Souder E, O'Sullivan PS: Nursing documentation versus standardized assessment of cognitive status in hospitalized medical patients. Appl Nurs Res 2000; 13:29–36
32. Milisen K, Foreman MD, Wouters B, et al: Documentation of delirium in elderly patients with hip fracture. J Gerontol Nurs 2002; 28:23–29
33. Wakefield BJ: Behaviors and outcomes of acute confusion in hospitalized patients. Appl Nurs Res 2002; 15:209–216
34. Ludwick R, O'Toole AW: The confused patient: nurses' knowledge and interventions. J Gerontol Nurs 1996; 22:44–49
35. Folstein MF, Folstein SE, McHugh PR: Mini-Mental State: a practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975; 12:189–198
36. Lou M, Dai Y, Huang G, et al: Postoperative cognitive changes among older Taiwanese patients. J Clin Nurs 2003; 12:44–49
37. Ely EW, Margolin R, Francis J, et al: Evaluation of delirium in critically ill patients: validation of The Confusion Assessment Method for the intensive care unit (CAM–ICU). Crit Care Med 2001; 29:1370–1379
38. Alverzo J: A review of the literature on orientation as an indicator of level of consciousness. J Nurs Scholarship 2006; 38: 159–164
39. Murray A, Levkof W, Wettle T, et al: Acute delirium and functional decline in the hospitalized elderly patient. J Gerontol 1993; 48:M181–M186
40. Trzepacz P, Teague, Lipowski A: Delirium and other organic mental disorders in a general hospital. Gen Hosp Psychiatry 1985; 7:101–106
41. Rothschild J, Bates D, Leape J: Preventable medical injuries in older patients. Arch Intern Med 2000; 160:2717–2728
42. Bates D, Pruess K, Souney P, et al: Serious falls in hospitalized patients: correlates and resource utilization. Am J Med 1995; 99:137–143
43. Inouye SK, Foreman MD, Mion LC, et al: Nurses' recognition of delirium and its symptoms: comparison of nurse and researcher ratings. Arch Intern Med 2001; 161:2467–2473
44. Williams C, Fitzgerald JT: Brief instrument to assess geriatrics knowledge of surgical and medical subspecialty house officers. J Gen Intern Med 2006; 21:490–493
45. Tanner CE, Eckstrom E, Desai SS, et al: Uncovering frustrations: a qualitative needs-assessment of academic general internists as geriatric care providers and teachers J Gen Intern Med 2006; 21:51–55
46. Sullivan-Marx EM, Strumpt NE: Restraint-free care for acutely ill patients in the hospital. Adv Pract Acute Crit Care 1996; 7:572–578
47. McCusker J, Cole M, Dendukuri N, et al: Delirium in older medical inpatients and subsequent cognitive and functional status: a prospective study. Can Med Assoc J 2001; 165:575–583
48. Moylan KC, Binder E: Falls in older adults: risk assessment, management, and prevention. Am J Med 2007; 120:493–497
49. Fick DM, Cooper JW, Wade WE, et al: Updating the Beers criteria for potentially inappropriate medication use in older adults: results of a U.S. consensus panel of experts. Arch Intern Med 2003; 163:2716–2724
50. Anglalkuditi M, Coley KC, Kirisci L, et al: A case–control study to assess the impact of anemia and other risk factors for in-hospital falls. J Patient Saf 2007; 3:16–21
51. Krauss MJ, Evanoff B, Hitcho E, et al: A case–control study of patient, medication, and care-related risk factors for inpatient falls. J Gen Intern Med 2005; 20:116–122
52. Morley JE: Falls: where do we stand? MO Med 2007; Jan–Feb 1–4:63–67
53. Oliver D, Hopper A, Seed P: Do hospital fall-prevention programs work? a systematic review. J Am Geriatr Soc 2000; 48: 1679–1689
54. Coussement J, De Paepe L, Schwendimann R, et al. Interventions for preventing falls in acute- and chronic-care hospitals: a systematic review and meta-analysis. J Am Geriatr Soc 2008; 56: 29–36