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Original Study

Delirium During Acute Illness in Nursing Home Residents

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A B S T R A C T

Keywords:

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activities of daily living**Objectives:** To ascertain the incidence of delirium during acute illness in nursing home residents, describe the timing of delirium after acute illness onset, describe risk factors for delirium, and explore the relationship between delirium and complications of acute illness.**Design:** Prospective observational cohort study.**Setting:** Three nursing homes in metropolitan New York.**Participants:** Individuals who were expected to remain in the nursing home for at least 2 months, who, as part of a parent study, were receiving opioids, antidepressants, or antipsychotics on a routine basis, and who did not have an acute medical illness at the time of screening. Acute illness surveillance was performed twice weekly through communication with nursing home nursing staff and medical providers using established clinical criteria for incipient cases.**Measurements:** We followed patients for 14 days after illness onset, and, if applicable, an additional 14 days each after hospital admission and hospital discharge. Delirium was assessed 3 times weekly using the Confusion Assessment Method (CAM). Physical function decline was calculated using change in the Minimum Data Set Activities of Daily Living Scale (MDS-ADL) and cognitive function decline using change in the Minimum Data Set Cognitive performance scale (MDS-CPS). Falls were ascertained by record review.**Results:** Among 136 nursing home patients followed for a mean of 11.7 months, 78 experienced 232 acute illnesses, of which 162 (71%) were managed in the nursing home. The most common diagnoses were urinary tract infection (20%), cellulitis (15%), and lower respiratory tract infection (9%). Subjects experienced delirium during 41 (17.7%) of 232 acute illnesses. Female sex was associated with a greater risk of delirium (odds ratio 2.59; 95% confidence interval [CI] 1.04–6.43) but there were no other risk factors identified. Delirium was a risk factor for cognitive function decline (odds ratio 4.59; 95% CI 1.99–10.59; $P = .0004$), but not ADL function decline or falling.**Conclusion:** Delirium occurred frequently as a complication of acute illness in the nursing home, and was a risk factor for cognitive function decline. This finding supports the rationale to target individuals at the onset of an acute medical problem in the design of interventions to prevent delirium in the nursing home setting.

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Approximately one-third of older adults hospitalized with acute medical problems experience delirium.^{1–3} Hospitalized older adults who experience delirium are more likely to experience function decline, prolonged length of stay, and death, as compared with those without delirium.^{4,5} Like hospitalized older adults, nursing home

residents have acute medical problems that are managed in the nursing home and could cause delirium, including respiratory infections, urinary tract infections, and exacerbations of heart and lung disease.^{6–8} Because there is also a high prevalence of risk factors for delirium^{9–11} in long-term nursing home residents, including cognitive impairment, immobility, sensory impairment, and medication use, delirium would be anticipated to be a common complication of acute illness in nursing home patients, and would be anticipated to be associated with adverse events such as falls and functional decline.

To date, studies of the prevalence of delirium and delirium symptoms in nursing home residents have yielded a wide range of

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estimates, from 16% to 23% at the time of postacute care admission^{12,13} to 3% to 33% in long term care.^{14,15} This variation may be a result of variations in delirium ascertainment and in the sample and time frame (eg, subacute vs long term care) selected for study. In addition, these studies have not examined the relationship between onset of acute medical problems and delirium. This is important, because authoritative sources such as the American Psychiatric Association define delirium as caused by an acute medical problem (eg, a new infection) or its management (eg, a medication change).¹⁶

The objective of this study was to ascertain the incidence of delirium after onset of an acute medical problem in nursing home residents, regardless of whether the acute medical problem was managed in the nursing home or the hospital. We aimed to describe the timing of delirium after acute illness, risk factors for delirium, and the relationship between delirium and other complications of acute illness, such as falls and function decline.

Methods

Design and Participants

This study is an analysis of data from a parent study entitled Continuity of Care for Pain, Depression, and Psychosis in Older Adults that has been described previously.¹⁷ Briefly, the study was a prospective observational study of nursing home residents designed to examine patterns of medication prescribing for pain, depression, and psychosis in the nursing home. It took place in 3 nursing homes in metropolitan New York, chosen because during acute illness many of the residents needing hospital care could be followed at the referral hospitals by study staff. One of the nursing homes was a Department of Veterans Affairs (VA) Community Living Center long term care facility. Residents were eligible to be enrolled in the parent study if they were receiving opioids, antidepressants, or antipsychotics on a routine basis, did not have an acute medical illness at the time of screening, and were expected to remain in the nursing home for at least 2 months (ie, excluding those likely to be discharged after a typical postacute care stay or expected to die). Acute illness surveillance was performed twice weekly at the nursing home through communication with nursing home nursing staff and medical providers using established clinical criteria¹⁸ for incipient cases. Acute illness surveillance was meant to be sensitive for all acute medical problems experienced by nursing home residents. Potential triggers or “chief complaints” included symptoms such as chest pain, dyspnea, diarrhea, or acute change in mental status; signs such as persistent increase or decrease in blood pressure, fever, or hypothermia; and laboratory abnormalities such as a drop in hematocrit of more than 5 points with signs of acute bleeding. Informed consent was obtained from each patient or a legal surrogate. The study was approved by institutional review boards at Jewish Home Lifecare and the James J. Peters VA Medical Center, in Bronx, New York.

Measures

At baseline, we collected information on chronic medical conditions and medication use through medical record abstraction, and on physical and cognitive function by interviews with patients, or proxies, and nursing home staff. We followed patients for 14 days after illness onset and, if applicable, an additional 14 days each after hospital admission and hospital discharge. Functional status was measured using items from the Minimum Data Set Activities of Daily Living Scale (MDS-ADL) adapted for interview with nursing home staff.¹⁹ Cognitive function was measured using items from the Minimum Data Set Cognitive performance scale (MDS-CPS)²⁰ adapted

for interview with nursing home staff. Both the MDS-ADL and MDS-CPS scales range from 0 to 6 (eg, “intact” to “very severe impairment”) with higher scores indicating poorer functional status. We also administered the Mini Mental Status Examination (MMSE).²¹ Illness severity was measured using the Inpatient Physiologic Failure Score (IPFS),²² a summative score based on abnormal laboratory values and vital signs for use in acutely ill older adults.

In the setting of acute illness, participants were assessed for delirium using the Confusion Assessment Method (CAM),²³ which recognizes delirium as present in the presence of the following features: (1) acute onset or fluctuating course of mental status change, (2) inattention, and (3) disorganized thinking or altered level of consciousness. At each delirium assessment a standard interview and observation was conducted that adapted established instruments to assess delusions and hallucinations,²⁴ pain (Brief Pain Inventory²⁵), depression (Geriatric Depression Scale²⁶), and signs of sympathetic activation (Clinical Opiate Withdrawal Scale²⁷; eg, irritability and tachycardia). Based on this interaction, the rater assessed level of consciousness, disorganized thinking, and acute change in mental status, and made a judgment about the respondent's level of attention based on focus and distractibility while answering questions. If the level of attention was uncertain, the rater asked the respondent to name the months of the year backwards. The rater then applied the CAM algorithm. We considered delirium as definitely present if acute onset of mental status change was present with inattention and 1 other cognitive feature. We considered delirium as possibly present if acute onset of mental status change was present with inattention or 1 other cognitive feature. The CAM was repeated 3 times a week during acute illness episodes, and was performed the same way whether the participant was in the nursing home or the hospital. Falls and demographic information, including age, gender, and race of each participant, were collected by chart review.

Analysis

More than 1 acute illness per resident, if it occurred, was included. Characteristics of residents and their acute illnesses are summarized using descriptive statistics. Cognitive and physical function decline were defined as change in function between acute illness onset and end, or decrease in function from pre-illness to either acute illness onset or end. Cases of delirium and possible delirium were combined. Bivariate associations between resident or illness characteristics and delirium were calculated using generalized regression models, which account for repeated observations in the same individuals. Bivariate associations between delirium and function decline and falls were calculated in the same way. Confidence intervals (95% CIs) were calculated. All analyses were done with SAS software version 9.2 (SAS, Inc, Cary, NC).

Results

Characteristics of Subjects and Acute Illnesses

Among 136 nursing home patients followed for a mean of 11.7 months (SD 10.8, median 6, range 1–37), 78 patients (57%) experienced 232 acute illnesses, for an incidence of 1.75 acute illnesses per patient per year. Overall, 60% of patients were male, 65% were white, 30% were African American, and 9% were Hispanic. The mean age was 76.2 years (SD 11.7) and patients had been residents of the nursing home for a median of 7.7 months (interquartile range 2.6–26.9) at the time of enrollment. Patients had a mean of 5.5 chronic medical conditions (SD 2.2), a baseline MDS-CPS cognitive function score of 1.0 (SD 1.4), indicating “borderline” cognitive impairment, and a baseline MDS-ADL function score of 2.5 (SD 1.9),

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