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Delirium's Arousal Subtypes and Their Effect on 6-month Functional Status and Cognition

Jin H. Han, MD, MSc^{1,2,6}, Christina Hayhurst, MD³, Rameela Chandrasekhar, PhD⁸, Christopher Hughes, MD³, Eduard Vasilevskis, MD, MPH^{1,4,6,10}, Jo Ellen Wilson, MD, MSc⁹, John F. Schnelle, PhD^{1,5,6,10}, Robert S. Dittus, MD, MPH^{1,5,6,10}, and E. Wesley Ely, MD, MPH^{1,6,7,10}

¹Center for Quality Aging, Vanderbilt University Medical Center, Nashville, TN, USA

²Department of Emergency Medicine, Vanderbilt University Medical Center, Nashville, TN, USA

³Department of Anesthesia, Division of Critical Care, Vanderbilt University Medical Center, Nashville, TN, USA

⁴Department of Medicine, Division of General Internal Medicine and Public Health, Section of Hospital Medicine, Vanderbilt University Medical Center, Nashville, TN, USA

⁵Department of Medicine, Division of General Internal Medicine and Public Health, Vanderbilt University Medical Center, Nashville, TN, USA

⁶Center for Health Services Research, Vanderbilt University Medical Center, Nashville, TN, USA

⁷Department of Medicine, Division of Allergy, Pulmonary, and Critical Care Medicine, Vanderbilt University Medical Center, Nashville, TN, USA

⁸Department of Biostatistics, Vanderbilt University Medical Center, Nashville, TN, USA

⁹Department of Psychiatry and Behavioral Sciences, Vanderbilt University Medical Center, Nashville, TN, USA

¹⁰Geriatric Research, Education, and Clinical Center, Department of Veterans Affairs Medical Center, Tennessee Valley Health Care Center, Nashville, TN, USA

Abstract

Background: We sought to determine how delirium subtyped by arousal affected 6-month function and cognition in acutely ill older patients.

Methods: This was secondary analysis of a prospective cohort study which enrolled hospitalized patients 65 years old. Delirium and arousal were ascertained daily in the emergency department

Send all correspondence to: Jin H. Han, MD, Vanderbilt University Medical Center, Department of Emergency Medicine, 312 Oxford House, Nashville, TN 37232, jin.h.han@vumc.org, Phone: 615-936-0253, Fax: 615-936-1316, Twitter: @jinhanMD.

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Conflicts of Interest

The authors have no conflicts of interest to disclose.

and the first 7 days of hospitalization using the modified Brief Confusion Assessment Method and Richmond Agitation Sedation Scale, respectively. For each day, patients were categorized as having no delirium, delirium with normal arousal, delirium with decreased arousal, or delirium with increased arousal. Pre-illness and 6-month functional status were determined using the Older American Resources and Services activities of daily living (OARS ADL) scale which ranges from 0 (completely dependent) to 28 (completely independent). Pre-illness and 6-month cognition were determined using the short form Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) which ranges from 1 (markedly improved cognition) to 5 (severe cognitive impairment). Multiple linear regression was performed adjusted for pre-illness OARS ADL and IQCODE and other relevant confounders.

Results: In 228 older patients, delirium with normal arousal was the only subtype independently associated with poorer 6-month function and cognition. For every day spent in this subtype, the 6-month OARS ADL decreased by 0.84 points (95%CI: −1.59 to −0.09) and the patient's 6-month IQCODE significantly increased by 0.14 points (95%CI: 0.06 to 0.23).

Conclusions: Delirium with normal arousal, as opposed to delirium with decreased or increased arousal, was the only arousal subtype significantly associated with worsening 6-month function and cognition. Subtyping delirium by arousal may have important prognostic value.

Keywords

delirium; arousal; subtype; long-term function; long-term cognition

Introduction

Delirium is characterized by a disturbance in attention and awareness that is accompanied by an acute loss in cognition that cannot be better accounted for by a preexisting or evolving dementia.¹ This form of acute brain dysfunction affects 11 to 25% of older hospitalized patients.^{2,3} It is associated with higher mortality⁴ and accelerated functional^{2,5} and cognitive decline.^{5,6}

Delirium is a heterogeneous syndrome and this heterogeneity may have a differential impact on long-term outcomes. Most delirium screening tools used currently in research and clinical practice dichotomize its diagnosis into its presence or absence. Understanding the relationships between specific subtypes of delirium and patient outcomes could improve healthcare delivery and enhance the effectiveness of delirium interventions.

The most commonly studied delirium subtypes are based upon the patient's psychomotor activity: hypoactive, hyperactive, mixed, and none. Categorizing delirium by its psychomotor subtype is not standardized, which limits its reliability and its clinical utility.⁷ An alternative and simpler approach may be to subtype delirium by level of arousal which is one of the many determinants of psychomotor subtypes.^{8,9} Level of arousal is the patient's responsiveness to the environment and can be normal, decreased (drowsy, somnolent, or lethargic), or increased (anxious, agitated, or combative). Scales designed to quantify level of arousal are commonly performed in conjunction with, or have become a component of, delirium assessments.^{10,11}

Therefore, patients can be classified as delirious with normal arousal, delirious with decreased arousal, and delirium with increased arousal. There is some thought that impaired arousal is a requirement for delirium diagnosis, but normal level of arousal has been observed in 13% to 36% of patients who meet Diagnostic and Statistical Manual of Mental Disorders Fourth Edition Text Revision (DSM-IV-TR) criteria for delirium.^{12,13} This misconception stems from previous DSM versions which defined delirium as a “clouding of consciousness”.¹⁴ “Consciousness” was an imprecise term without a consensus definition and encompassed a multitude of domains.¹⁵ Plum and Posner described consciousness as having two interrelated domains of neurologic function: content and arousal.¹⁶ Thus, it is possible for the content of consciousness to be disrupted in the context of normal arousal. A patient with normal arousal can have significant inattention and be delirious. Due to such confusion, the DSM-5 removed “consciousness” and specified it as “inattention and decreased awareness”.¹

The prognostic significance of delirium arousal subtypes is unclear. We recently reported that delirium with normal arousal was the only arousal subtype significantly associated with 6-month mortality in 1,084 emergency department (ED) patients¹⁷ but did not investigate its effect on long-term function and cognition. As a result, we sought to determine how the total days spent in each delirium arousal subtype (normal, decreased, and increased) affected 6-month function and cognition compared with patients without delirium in hospitalized older patients admitted from the ED.

Methods

This was a pre-planned secondary analysis of the Delirium in the Emergency Department and Its Extension into Hospitalization (DELINEATE) prospective cohort study which was conducted at a tertiary care, academic hospital between March 2012 and November 2014.⁵ The local institutional review board reviewed and approved this study. Details and rationale of the study's methods have been previously described.⁵

Patients were consecutively enrolled during randomly selected 4-hour blocks for a total of 16 hours per week Monday through Friday. Patients were included if they were 65 years and older, in the ED for less than four hours at the time of enrollment, and unlikely to be discharged home according to the treating ED physician. Patients were excluded if they were non-English speaking, previously enrolled in the study, deaf, comatose, non-verbal or unable to follow simple commands prior to their current illness, were considered unsuitable for enrollment by the treating physician or nurse, were unavailable for enrollment with the 4-hour time limit secondary to clinical care or were discharged home from the ED. All older ED patients who were delirious at the time of screening were enrolled. Because 80 to 90% of older ED patients are non-delirious,^{18,19} one out of six (~16.7%) of these patients were enrolled during the enrollment block to enhance the feasibility of our study. Non-delirious patients were chosen by a computer random number generator.

Methods of Measurement

The primary independent variable was the total number of days spent in each delirium arousal subtype. We chose this independent variable to account for any fluctuations.

Delirium and level of arousal were determined daily by trained research assistants (RAs) who were involved in the validation of the scales used in this study.^{12,20,21} Delirium and level of arousal were assessed in the ED at the time of enrollment (0 hours), again at 3 hours, and then daily during the hospitalization for up to 7 consecutive days (including weekends) after the ED visit or until hospital discharge, whichever came first.

The RAs assessed delirium with the modified brief Confusion Assessment Method (modified bCAM) in non-mechanically ventilated patients and Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) in mechanically ventilated patients. The modified bCAM is a brief (< 2 minutes) delirium assessment²¹ based upon the short form Confusion Assessment Method (CAM) diagnostic algorithm.²² The modified bCAM is 82% to 86% sensitive and 95% to 96% specific for delirium as diagnosed by a psychiatrist using the DSM-IV-TR criteria in older non-mechanically ventilated patients; the kappa between raters is 0.87 indicating excellent inter-observer reliability.²¹ In mechanically ventilated patients, the CAM-ICU is 93% to 100% sensitive and 98% to 100% specific for delirium with a kappa of 0.96 indicating excellent inter-observer reliability.¹⁰

We subtyped delirium by level of arousal using the Richmond Agitation Sedation Scale (RASS),²³ which was conducted as part of the modified bCAM and CAM-ICU assessments to determine the presence of altered level of arousal (feature 3 of the modified bCAM or CAM-ICU). The RASS ranges from -5 (coma) to +4 (combative); a RASS of 0 represents normal level of arousal (alert and calm), a RASS < 0 represents decreased arousal, and a RASS > 0 represents increased arousal. A patient with a RASS other than 0 (alert, normal) is considered to have an altered level of arousal. The RASS' weighted kappa was 0.63 between a research assistant and physician indicating very good inter-rater reliability.¹² The patient's delirium and level arousal status were blinded to the treating physicians. Aside from treating the underlying etiology, no specific treatment for delirium was performed by the clinical or research team.

Post-hoc, we assigned each patient day a delirium arousal subtype based upon the modified bCAM or CAM-ICU and the RASS for that day: (a) no delirium (modified bCAM negative or CAM-ICU negative), (b) delirium with normal arousal (modified bCAM positive or CAM-ICU positive, RASS = 0), (c) delirium with decreased arousal (modified bCAM positive or CAM-ICU positive, RASS < 0), or (d) delirium with increased arousal (modified bCAM positive or CAM-ICU positive, RASS > 0). Because delirium and arousal subtype were determined at 0 and 3-hours in the ED, fluctuations between delirium or arousal states were possible. In our previous work, we observed that delirium with normal arousal portended the highest mortality risk followed by delirium with decreased arousal.¹⁷ Therefore, patients who had two different delirium arousal subtypes at 0 and 3 hours were assigned the delirium arousal subtype that carried the poorer prognosis based upon our previous study (delirium with normal arousal > delirium with decreased arousal > delirium with increased arousal > no delirium). The total number of days spent in each subtype was then determined.

The primary outcome variables were 6-month function and cognition. Function was assessed at baseline (pre-illness) and 6-months using the in the Older American Resources and

Services (OARS) activities of daily living (ADL) questionnaire (OARS ADL) which consists of 14 items pertaining to basic and instrumental ADLs.²⁴ The OARS ADL score ranges from 0 (completely dependent) to 28 (completely independent). This score was completed by an informant who knew the patient well, however the patient was allowed to complete the OARS ADL if no informant was available and if he/she was able to provide informed consent demonstrating capacity. Pre-illness and 6-month global cognition was measured using the short form Informant Questionnaire on Cognitive Decline in the Elderly score (IQCODE).²⁵ This informant-based cognitive screen was used because global tests of cognition would not accurately reflect baseline cognition during a delirium episode. The IQCODE has previously been used to assess for cognitive decline and trajectories.^{5,26,27} The IQCODE was completed by informants who knew the patient for at least 10 years. The IQCODE ranged from 1 (markedly improved cognition) to 5 (markedly worse cognition, severe cognitive impairment), where a score of 3 represented no change in cognition. To establish pre-illness OARS ADL and IQCODE, these assessments were obtained in the ED at the time of enrollment; patients and/or their informants were asked to rate the patient's function or cognition 2 weeks prior to the ED visit. An RA who was blinded to the delirium assessments and hospital course obtained the 6-month OARS ADL and IQCODE via phone interview.

Medical record review was performed to collect dementia status, comorbidity burden, severity of illness, and delirium etiology; we performed double data entry to minimize any errors during the chart abstraction process. A patient was considered to have dementia if they had: (i) documented dementia in the medical record, (ii) a pre-illness IQCODE greater than 3.38 out of 5.00 which is 79% sensitive and 82% specific for dementia,²⁸ or (iii) prescribed cholinesterase inhibitors prior to admission. The Charlson Comorbidity Index was used to quantify the patient's comorbid burden.²⁹ The Acute Physiology Score (APS) of the Acute Physiology and Chronic Health Evaluation II (APACHE II) score was used to quantify severity of illness.³⁰ The age component of the APACHE II was incorporated into the APS. The Glasgow Coma Scale was not included in the APS calculations because we utilized the delirium and arousal assessments to indicate mental status. The presence of a central nervous system diagnosis (meningitis, seizure, cerebrovascular accident, transient ischemic attack, intraparenchymal hemorrhage, epidural hematoma, subdural hematoma, subarachnoid hemorrhage, cerebral edema, etc.) was determined by two physician reviewers via medical record review. Any disagreement was adjudicated by a third physician reviewer.

Statistical Analysis

To determine the independent association between total number of days spent in each arousal subtype and 6-month function and cognition, multivariable linear regression was performed. All the delirium arousal subtypes were incorporated into each linear regression model. We did not use change () in OARS ADL or IQCODE as the dependent variables, because the effect of delirium arousal subtypes on OARS ADL and IQCODE are modified by their baseline function and cognition, respectively. A 2-point decrease in 6-month OARS ADL from a baseline score of 24 may be different than a 2-point decrease from a baseline OARS ADL score of 10. For the 6-month function multiple linear regression model, the primary outcome variable was the 6-month OARS ADL and the model was

adjusted for pre-illness OARS ADL, dementia, comorbidity burden (Charlson Comorbidity Index), severity of illness (APS), the presence of any central nervous system diagnosis, and hospital length of stay. For the 6-month cognition multiple linear regression model, the primary independent variable was the 6-month IQCODE and the model was adjusted for premorbid IQCODE, premorbid function (OARS ADL), comorbidity burden (Charlson Comorbidity Index), severity of illness (APS), the presence of any central nervous system diagnosis, and hospital length of stay. These covariates were chosen a priori based expert opinion and our previous work.^{5,17} We limited the multiple regression models to 9 degrees of freedom to avoid overfitting.³¹ All statistical analyses were performed with SAS version 9.4 (SAS Institute, Carey, NC) and open source R statistical software, version 3.0.2 (<http://www.r-project.org/>).

Results

During the study period, 3,383 older patients were screened in the ED; 102 delirious and 126 randomly-selected non-delirious older patients were enrolled (Figure 1). The characteristics of the cohort stratified by delirium arousal subtype status at enrollment can be seen in Table 1. Of the 102 patients who were delirious at initial presentation, 20 (19.6%) were delirious with normal arousal, 72 (70.6%) were delirious with decreased arousal, and 10 (9.8%) were delirious with increased arousal. Table 2 lists the median number of days spent in each delirium subtype stratified by delirium arousal subtype status at enrollment. While patients predominantly remained in the same delirium arousal subtype, fluctuations between subtypes did occur.

Of those enrolled, 228 (100.0%) patients had a baseline OARS ADL, 42 (18.4%) patients died within 6-months, 13 (5.7%) patients opted out of the follow-up phone call, and 14 (6.1%) patients were lost to follow-up, leaving 159 older ED patients available for the delirium arousal subtype and 6-month function analysis. The only delirium arousal subtype that was significantly associated with poorer 6-month function was delirium with normal arousal. On average, for every day spent in this subtype, the 6-month OARS ADL decreased by 0.84 points (95%CI: - 1.59 to -0.09, Figure 2) after adjusting for baseline OARS ADL and other confounders. Delirium with decreased arousal (p-value = 0.140) and increased arousal (p-value = 0.535) were not significantly associated with 6-month function.

Of those enrolled, 199 (87.3%) patients had a baseline IQCODE, 41 (18.0%) died within 6 months, 10 (4.4%) opted out of follow-up, and 38 (16.7%) did not have a 6-month IQCODE leaving 116 patients available for the delirium arousal subtype and 6-month IQCODE analysis. The only delirium arousal subtype that was significantly associated with poorer 6-month cognition was delirium with normal arousal. On average, for every day spent in this subtype, the patient's 6-month IQCODE significantly increased by 0.14 points (95%CI: 0.06 to 0.23, Figure 2) after adjusting for baseline IQCODE and other confounders. Delirium with decreased arousal (p-value = 0.451) and increased arousal (p-value = 0.833) were not significantly associated with 6-month cognition.

Discussion

In our cohort of acutely ill older hospitalized patients admitted from the ED, delirium with normal arousal was the only arousal subtype that was significantly associated with poorer 6-month function and cognition. This study adds to our previous investigation that demonstrated delirium with normal arousal was the only arousal subtype significantly associated with poorer 6-month mortality.¹⁷ These findings suggest that dichotomizing delirium as present or absent is an oversimplification, and that arousal-based subtypes may carry important prognostic information. Because arousal-based subtypes are fairly easy to measure, this method of delirium subtyping is feasible to perform in busy clinical environments such as the ED and the inpatient settings.

Delirium is most commonly subtyped by psychomotor activity (hypoactive, hyperactive, mixed, or none) and is based upon the patient's motor activity, speech, and level of arousal.⁷ Prior studies have evaluated its role in outcomes with mixed results. In the post-acute care and palliative care settings, hypoactive delirium was significantly associated with 1-year mortality.^{32,33} In patients with hip-fracture, however, hypoactive delirium had a protective effect on mortality.³⁴ Such discordant observations may be related to the patient populations studied or the method of psychomotor subtype determination. To our knowledge, no study has examined how delirium's psychomotor subtypes affect long-term function and cognition.

Subtyping delirium by level of arousal may be a more feasible and efficient method to identify those at highest risk for adverse outcomes. Because level of arousal is a component of psychomotor activity, overlap between these subtyping methods exist. While decreased arousal is a characteristic of hypoactive delirium and increased arousal is a characteristic of hyperactive delirium, it is unclear how delirium with normal level of arousal corresponds to each psychomotor subtype. Previous studies have classified patients with a RASS of 0 as hypoactive delirium,^{35,36} but it may represent delirium with no psychomotor abnormalities, which can occur in 24% to 35% of the cases.^{37,38} Further study is needed to investigate the relationship between level of arousal and psychomotor subtypes. In addition, these studies should evaluate if one method of delirium subtyping is superior in identifying patients with poorer outcomes.

Subtyping delirium by arousal may have important clinical ramifications for the delirium management in the acute care setting. While all patients with delirium should undergo a comprehensive diagnostic evaluation, health care providers may need to have heightened concern for a life-threatening illness in delirious patients with normal arousal. Our findings also have the potential to alter the paradigm in which delirium is currently managed. Most delirium interventions studied to date have been shown to have limited efficacy,³⁹ and this may be secondary to their dichotomization of delirium without taking into account its subtypes. Thus, focusing these resource-intensive interventions on patients with delirium who present with normal arousal (and have worse outcomes) may be one way to improve long-term outcomes in this high-risk subtype. This approach would be analogous to what has taken place in acute coronary syndromes. Only patients with ST-segment elevation myocardial infarction receive and benefit from urgent revascularization.⁴⁰

The mechanisms for the association between delirium with normal arousal and poorer 6-month outcomes are unclear. It is possible that delirious patients with normal arousal may receive suboptimal clinical care. Delirium may be missed and their cognitive impairment may be erroneously attributed to dementia. These patients may be continually exposed to deliriogenic medications or interventions, or they may not receive optimal physical or occupational therapy. Delirious patients with normal arousal may also have different pathophysiologic processes or etiologies that are driving these adverse outcomes. It is possible that delirium with normal arousal may have more significant impairments in attention or cognition (with arousal spared). Future studies should investigate the mechanisms of why delirium with normal arousal is a predictor of poorer long-term outcomes.

Limitations

Five hundred seventy six patients refused to participate in the study, and this may have introduced selection bias; patients who refused to participate were likely more vulnerable as they were slightly older, were less likely to be non-white, and slightly more likely to reside in a nursing home.⁵ The number of enrolled patients was relatively small and the 95% CIs were wide. As a result, we did not have sufficient statistical power to evaluate if one delirium arousal subtype had more prognostic value over the other. Our study requires confirmation with a larger number of delirious patients enrolled from multiple centers. While the RASS' kappa is 0.63 (indicating very good inter-observer reliability),¹² misclassification of the arousal subtype may have still occurred. Eighteen percent of our cohort died and our analysis considered only those who were alive and were able to participate in follow-up. While this may have introduced survival and attrition bias, we believe that this would bias our findings towards the null. Patients who died before the 6-month follow-up were probably more likely to be functionally and cognitively impaired. If they were hypothetically able to perform follow-up assessments, then the association between delirium with normal arousal and 6-month cognition and function would likely be strengthened. We did not adjust for marital status or social status which may confound the relationship between the delirium arousal subtypes and long-term outcomes. While hospital length of stay was adjusted for, we did not account for other hospital factors such as sedative-hypnotic medications administered which may have contributed to poorer long-term function and cognition. As a result, residual confounding may still exist. Because global tests of cognition would not have accurately reflected baseline cognition in delirious patients, we relied upon the IQCODE, which is an informant based dementia screen. The IQCODE is a relatively crude measure of dementia and may not have adequately characterized dementia severity, and thus may have also further contributed to residual confounding. This study was conducted in a single center, urban, academic hospital and enrolled patients who were 65 years or older. Our findings may not be generalizable to other settings or different populations (e.g., younger patients).

Conclusions

Delirium with normal arousal was the only arousal subtype significantly associated with worse 6-month functional status and cognition. This suggests that subtyping delirium by

arousal may have prognostic value and may identify a subgroup at higher risk for adverse outcomes, and who would most benefit from an intervention. Because our study was a secondary analysis in a small sample of patients, our findings require confirmation in a larger cohort of patients.

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Figure 1.

Enrollment Flow Diagram. Older American Resources and Services Activities of Daily Living, OARS ADL; short form Informant Questionnaire on Cognitive Decline in the Elderly, IQCODE. *Six month IQCODE were only obtained from surrogates of patients with baseline IQCODEs collected at enrollment (n=199).

Figure 2.

Delirium arousal subtype days and their effect on 6-month function and cognition. Six-month function was measured by the Older American Resources and Services Activities of Daily Living (OARS ADL) scale which ranged from 0 (completely dependent) to 28 (completely independent); the functional status model was adjusted for baseline OARS ADL, dementia, comorbidity burden, severity of illness, central nervous system diagnoses, and hospital length of stay. Six month cognition was measured using the short form Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) which ranged from 1 to 5 (severe cognitive impairment); the cognition model was adjusted for baseline IQCODE, baseline OARS ADL, comorbidity burden, severity of illness, central nervous system diagnoses, and hospital length of stay. Delirium with normal arousal was the only subtype significantly associated with both worsening 6-month function and cognition. For every day spent in this subtype, the 6-month OARS ADL decreased by 0.84 points (95%CI: -1.59 to -0.09) and the 6-month IQCODE increased by 0.14 points (95%CI: 0.06 to 0.23).

Table 1.
Patient baseline characteristics.

Patient characteristics and demographics of enrolled patients. Continuous and ordinal variables are expressed in medians and interquartile (IQR) ranges. Categorical variables are expressed as frequency (percentage).

	No Delirium at 0-hours n=126	Delirious ED Patients at 0-hours n=102	Delirium with Normal Arousal at 0-hours n=20	Delirium with Decreased Arousal at 0-hours n=72	Delirium with Increased Arousal at 0-hours n=10
Median Age (IQR)	73 (69, 81)	74 (68, 82)	76.5 (70.5, 84.5)	74 (67.5, 81.5)	70.5 (69, 85)
Female gender	61 (48.4%)	65 (63.7%)	13 (65.0%)	44 (61.1%)	8 (80.0%)
Non-white race	12 (9.5%)	18 (17.7%)	4 (13.3%)	12 (16.7%)	2 (20.0%)
Dementia	33 (26.2%)	75 (73.5%)	14 (70.0%)	52 (72.2%)	9 (90.0%)
Median (IQR) pre-illness OARS ADL [#]	26 (21, 27)	17 (11, 23)	19 (12, 25.5)	16 (10, 22.5)	18.5 (15, 23)
Median (IQR) pre-illness IQCODE [†]	3.19 (3.00, 3.56)	4.06 (3.38, 4.69)	4.19 (3.13, 4.69)	4.09 (3.18, 4.69)	4.00 (3.75, 4.69)
Median (IQR) Charlson [‡]	3 (2, 5)	3 (2, 5)	2 (2, 4)	3 (2, 5)	3.5 (2, 5)
Median (IQR) APS [§]	4 (1, 6)	9 (8, 12)	9 (8, 10)	9 (8, 13.5)	9.5 (7, 17)
CNS Diagnosis	16 (12.7%)	22 (21.6%)	7 (35.0%)	13 (18.1%)	2 (20.0%)
Residence					
Home alone	24 (19.1%)	11 (10.8%)	3 (15.0%)	7 (9.7%)	1 (10.0%)
Home with others	95 (75.4%)	68 (66.7%)	11 (55.0%)	51 (70.8%)	6 (60.0%)
Assisted living	3 (2.4%)	8 (7.8%)	3 (15.0%)	4 (5.6%)	1 (10.0%)
Nursing home	3 (2.4%)	4 (57.1%)	0 (0.0%)	4 (5.6%)	0 (0.0%)
Rehabilitation	1 (0.8%)	9 (8.8%)	2 (10.0%)	5 (6.9%)	2 (20.0%)
Other	0 (0.0%)	2 (2.0%)	1 (5%)	1 (1.4%)	0 (0.0%)
Median (IQR) Hospital Length of Stay	3 (2, 5)	5 (3, 8)	5.5 (2, 7.5)	5 (3, 8)	4.5 (2, 7)
Median (IQR) Delirium Duration	0 (0, 0)	4 (2, 6)	4 (2, 6.5)	3.5 (1, 6.5)	5 (2, 6)

[#]Older American Resources and Services Activities of Daily Living (OARS ADL) scale was used to determine function. Lower scores represent poorer function.

[†]Short form Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) was used to determine cognition. Higher scores represent poorer function.

Abbreviations: IQR, Interquartile range; ED, Emergency Department; CNS, central nervous system; ICU, intensive care unit.

[‡]Charlson Comorbidity Index was used to quantify the patient's comorbid burden.

[§]The Acute Physiology Score (APS) of the Acute Physiology and Chronic Health Evaluation II (APACHE II) score was used to quantify severity of illness. The age component of the APACHE II was incorporated into the APS.

Table 2.

The median and interquartile ranges (IQR) of the number of days spent in each delirium arousal subtype stratified by the initial delirium arousal subtype at enrollment.

	No Delirium at 0-hours n=126	Delirium with Normal Arousal at 0-hours n=20	Delirium with Decreased Arousal at 0-hours n=72	Delirium with Increased Arousal at 0-hours n=10
Median (IQR) delirium duration	0 (0, 0)	4 (2, 6.5)	3.5 (1, 6.5)	5 (2, 6)
Median (IQR) days spent with delirium with normal arousal	0 (0, 0)	2 (1, 3.5)	1 (0, 2)	1 (1, 3)
Median (IQR) days spent with delirium with decreased arousal	0 (0, 0)	1 (0, 2)	2 (1, 4)	2 (0, 2)
Median (IQR) days spent with delirium with increased arousal	0 (0, 0)	0 (0, 0.5)	0 (0, 0)	1 (0, 2)