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Delirium and Sedation in the Intensive Care Unit (ICU): survey of behaviors and attitudes of 1,384 healthcare professionals

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Abstract

Objective—A 2001 survey found that most healthcare professionals considered ICU delirium as a serious problem, but only 16% used a validated delirium screening tool. Our objective was to assess beliefs and practices regarding ICU delirium and sedation management.

Design and Setting—Between October 2006 and May 2007, a survey was distributed to ICU practitioners in 41 North American hospitals, 7 international critical care meetings and courses, and the American Thoracic Society email database

Study Participants—A convenience sample of 1,384 health care professionals including 970 physicians, 322 nurses, 23 respiratory care practitioners, 26 pharmacists, 18 nurse practitioners and physicians' assistants, and 25 others.

Results—A majority [59% (766/1300)] estimated that over 1 in 4 adult mechanically ventilated patients experience delirium. Over half [59% (774/1302)] screen for delirium, with 33% of those respondents (258/774) using a specific screening tool. A majority of respondents use a sedation protocol, but 29% (396/1355) still do not. A majority (76%, 990/1309) has a written policy on

spontaneous awakening trials (SATs), but the minority of respondents (44%, 446/1019) practice SATs on more than half of ICU days.

Conclusions—Delirium is considered a serious problem by a majority of healthcare professionals, and the percent of practitioners using a specific screening tool has increased since the last published survey data. While most respondents have adopted specific sedation protocols and have an approved approach to stopping sedation daily, few report even modest compliance with daily cessation of sedation.

Keywords

[MeSH Heading]; delirium; sedation; mechanical ventilation; critical care; survey

INTRODUCTION

Delirium is defined as an acute change in the course of a patient's mental status, plus inattention and either disorganized thinking or an altered level of consciousness (1, 2). The prevalence of this form of acute brain dysfunction (ABD) in the ICU varies widely depending on patient population and screening method, but can occur in 22% to 87% of patients (3-10). The risk factors associated with delirium are common in ICU and non-ICU patients, and include age, medical co-morbidities, preexisting cognitive impairment, excess sedation, and psychoactive medications (9, 11-17).

Delirium is an independent predictor of many adverse outcomes in critically ill patients, and therefore should not be considered an accepted part of the ICU patient's course. In mechanically ventilated patients, delirium is an independent predictor of 6-month mortality (18), and is associated with a prolonged length of hospital stay after adjusting for age, gender, race, and severity of illness (7, 19). Although this has not been determined in ICU patients, delirium may be related to negative long-term neuropsychological outcomes, such as cognitive impairment (20-26).

In 2001, our group conducted a survey of opinions and practices regarding delirium in the ICU (1). That survey found a significant discordance between the perceived importance of delirium in the ICU and the practices of delirium monitoring and treatment. Although most healthcare professionals (92%) considered delirium in the ICU a common and serious problem, only 16% used a validated instrument to monitor for this condition. One area that survey did not examine was sedation management, which is an integral part of delirium practices, and is outlined in clinical practice guidelines published by the Society of Critical Care Medicine (SCCM) (27).

Five years after the original survey was conducted, we conducted this follow-up study to 1) assess current behaviors and attitudes regarding delirium, 2) identify changes in behaviors and attitudes regarding delirium since 2001, and 3) assess behaviors and attitudes regarding sedation practices.

MATERIALS AND METHODS

Survey development and design

The survey was developed through a rigorous, multi-phase process. The 2001 survey questions that were considered informative were retained. Open-ended questions were reformatted as multiple-choice questions, using the 2001 data to determine the most common answer choices. We informally surveyed healthcare practitioners at Vanderbilt University for additional questions. Finally, we conducted a MEDLINE literature search using the

terms “sedation,” “delirium,” and “ICU” to look for other potential questions. The most pertinent questions were chosen to cover all areas of interest: incidence, screening protocols, treatment, and clinical opinions.

Experts on psychometrics revised the survey multiple times with focus on question format, structure, and validity. The survey was piloted twice, with 24 healthcare practitioners from across the United States. Each respondent was asked to take the survey and remark on clarity and face validity of each question. The survey was revised based on feedback from each of these pilots.

The final survey was an 11-item self-administered questionnaire with multiple choice and Likert-scale responses (**Appendix I**). The survey was administered in a paper format and electronic format via www.surveymonkey.com. The survey did not contain any data to identify the respondents. The study was approved by the Vanderbilt University Institutional Review Board who waived the requirement for informed consent.

Survey administration

From October 2006 to May 2007, the survey was distributed to a convenience sample at 41 Hospital Corporation of America hospitals, seven international critical care meetings and continuing medical education / board review courses, and through the American Thoracic Society email database. At the meetings, the authors were responsible for survey distribution. The ICU department chairs were responsible for distribution of the survey at the individual hospitals. A cover letter instructed practitioners not to complete the survey if they had already done so at another time.

Data entry and statistical analysis

The paper and electronic surveys were exported into a Microsoft Access database. The analysis included descriptive summaries of categorical variables, which are given as frequencies and percentage. When appropriate, Pearson's chi-squared tests (without a continuity correction) were used to test for differences between the distributions of responses. Only questions that had the same or very similar wording in the both surveys were compared. A p-value of <0.05 was considered statistical significant.

RESULTS

Demographics

A total of 1384 surveys were completed. Survey respondents' demographics are presented in detail in **Table 1**.

Attitudes and behaviors regarding delirium

When asked about the prevalence of delirium in mechanically ventilated patients in their ICU, 59% (766/1300) of healthcare professionals responded that at least a quarter experience delirium. When asked about non-mechanically ventilated patients, 33% (430/1297) thought that at least a quarter or more of these patients experienced delirium. Most respondents (86%, 1136/1313) agreed with the statement that delirium is an under-diagnosed syndrome in ICU patients. The respondents were asked to rate their agreement to a number of other statements about the outcomes of delirium in the ICU. The results are shown in **Table 2**.

A majority of respondents, 59% (774/1302), reported some type of screening for delirium (**Table 3**). Of those that did screen for delirium, 33% (258/774) reported using a specific screening tool. Most respondents (54%, 683/1270) reported screening for delirium at least

once a day, and 12% (159/1270) reported assessing for delirium four or more times per day. Antipsychotic drugs and sedatives were the two categories of medications most commonly chosen by the healthcare professionals to manage delirium. The medications and their frequency of use are shown in **Figure 1a**.

Sedation protocol and management

A majority (71%, 959/1355) of professionals reported using an ICU sedation protocol and a specific sedation scale (88%, 1163/1323). **Table 4** shows reported behaviors regarding the use of sedation protocols. The most commonly used sedative medications (**Figure 1b**) were the γ -aminobutyric acid (GABA) agonists, benzodiazepines (84%, 1166/1384) and propofol (81%, 1122/1384). A majority (76%, 990/1309) reported having a written policy of implementation of spontaneous awakening trials (SATs), also known as “drug holiday” or “daily sedation cessation.” A minority (44%, 446/1019) practiced SATs on more than half of the days in the ICU.

Analytical Comparison with 2001 Survey

The data from this study differed from the 2001 survey results with regard to demographics, perceived prevalence of delirium, and certain opinions on delirium. More of the new survey respondents (56%, 769/1362) were from non-academic hospital settings compared to 50% (424/851) of the original survey respondents ($p=0.003$). Fifty-nine percent (766/1300) of the new survey respondents compared to 72% (617/860, $p<0.0001$) estimated that at least 25% of ICU's mechanically ventilated patients experience delirium. Of the new survey respondents who reported screening for delirium, 33% (258/774) used a specific instrument other than general clinical assessment. This is a significantly higher rate of respondents using a specific delirium screening method than that found in the original survey (12%, 46/373; $p<0.0001$).

DISCUSSION

Delirium is a very common type of organ dysfunction in the ICU, and is associated with a multitude of negative outcomes. According to our 2001 survey (1), a majority of healthcare practitioners believed delirium was a prevalent problem, but few had protocols for managing delirium. This current survey showed that current attitudes and behaviors regarding delirium and sedation have changed in certain aspects, but continue to differ from recognized guidelines and peer reviewed literature. Specifically, there continues to be a low number of practitioners who use a validated delirium screening tool, a significant number who still do not use a sedation protocol, and a majority who do not implement spontaneous awakening trials.

In this follow-up study, over half of respondents now screen for delirium, but only a third use a specific screening tool. Nevertheless, this represents a nearly 3-fold higher rate (33% vs. 12%, $p<0.0001$) than the percent of original survey respondents who use a specific instrument for delirium screening. Two delirium screening tools—the CAM-ICU and the ICDSC—have been specifically validated for use in ICU patients (4, 6), but they remain infrequently used. Furthermore, only 12% of respondents screened for delirium four or more times a day. Considering that delirium is characterized by fluctuations in mental status, infrequent assessment will likely result in under-diagnosis.

The perceived prevalence of delirium was not only lower than that found in published literature, but it was also lower than that of the 2001 survey. These differences could be due to several reasons. The prevalence of delirium may vary at individual hospitals due to severity of illness or mechanical ventilation. Importantly, in the absence of objective

monitoring, delirium commonly goes unrecognized (28, 29). This is especially true for hypoactive or “quiet” delirium, which is often the most prevalent form of delirium in ICU studies (10, 30, 31). Lastly, the difference in the 2001 and current survey could be related to differences in the demographics, given that a larger percentage of new respondents are from non-academic medical centers.

Respondents tended to share opinions regarding the potential consequences of ICU delirium. Most agreed that delirium in the ICU prolongs hospital stay (95%), affects re-intubation rate (90%), and is a risk factor for hospital-acquired pneumonia (78%). Although these statements had the highest agreement, they are controversial and are not supported by published literature. Opinions such as these can have significant effect on decisions regarding prognosis and treatment. Therefore, these areas are a fertile ground for future investigation and educational intervention, perhaps via continuing medical education courses.

The topic of antipsychotics as pharmacological management for delirium is an increasingly important topic requiring further review and comment in this survey report. A majority (86%) reported treating delirium with haloperidol and nearly 40% reported using atypical antipsychotics as well. Importantly, there are no large, placebo-controlled trials examining the efficacy of these agents in treating ICU delirium. Haloperidol and more recently atypical antipsychotics are considered the standard pharmacological treatments for delirium. The dearth of data in this area were emphasized in recent systematic reviews (32-35). Haloperidol has been touted for well nearly two decades as a preferred delirium treatment in case series (36-38) and a double blind, randomized investigation of delirium in AIDS patients found that haloperidol was equal to chlorpromazine regarding delirium outcomes, and both were superior to lorazepam, which exacerbated delirium (39). More recently, a large, placebo-controlled prophylaxis study in elderly hip fracture patients (n=430) showed reductions in the severity ($p<0.001$) and duration ($p<0.001$) of delirium, though no change in the incidence of delirium (~16% in both groups) (40). A retrospective cohort study concluded that the use of haloperidol in ventilated patients was associated with lower mortality (41). In contrast, however, 4 retrospective cohort studies (42-45) have reported an association between increased mortality rates and long-term use (e.g., 2 to 3 months or longer) of both typical and atypical antipsychotics in elderly patients (46). Atypical antipsychotics — clozapine, ziprasidone, olanzapine, risperidone, aripiprazole, and quetiapine — are used at varying rates anecdotally throughout the world, though very sparse data exist in both non-ICU patient populations (47-52) and even less in ICU patient populations (53). Risperidone (in non-ICU patients) (51) and olanzapine (in ICU patients) (53) have been randomized against haloperidol treatment, and in both studies there was a gradual reduction in delirium without differences between groups. In our 2002 survey (1), the most frequently mentioned adverse effects of haloperidol were oversedation, extrapyramidal symptoms (EPS), neuroleptic malignant syndrome (NMS), QT interval prolongation and torsades de pointes, respiratory complications, dystonia, and worsening delirium. It is held that orally administered haloperidol has been associated with EPS, while intravenously administered haloperidol may have a lower incidence of EPS. In sum, the potential adverse effects of haloperidol appeared to exceed those of atypical antipsychotics (54, 55), but recent data on adverse events such as EPS, NMS, tardive dyskinesia, glucose and cholesterol abnormalities, and venous thromboembolism appear largely to counter balance one another between typical and atypical agents (56-63) and have called into question the safety profile of both typical and atypical antipsychotics in older patients (especially demented elderly) (42, 44-46, 64).

Although guided sedation management is more common than delirium management, almost a third of respondents still do not use a sedation protocol. However, most (88%) use a

specific sedation scale. Approximately a quarter of respondents (26%) used the Richmond Agitation and Sedation Scale (RASS) (65), which has been shown to have high reliability and validity (66). More respondents (37%) used the Ramsay scale, which has been shown to have adequate inter-rater reliability (67). The most commonly used sedative medications were benzodiazepines (84%) and propofol (81%). Benzodiazepine use has been found to be a risk factor for developing delirium in the ICU (68). Recent data may support a reduction in the reliance on benzodiazepines as the primary mode of sedation in ICU patients (69).

Proper sedation monitoring is important to prevent unnecessary, excess administration of sedatives. Daily interruption of sedatives, or SATs, has been shown to decrease the duration of mechanical ventilation and the length of stay in the ICU (70-73). Most of the respondents (76%) reported practicing daily SATs. However, further questioning revealed that very few (22%) have daily SATs, with a majority reporting SATs occurring on fewer than 75% of ICU days.

Assessment of sedation management was one of the multiple improvements made to this survey. This follow-up study had a more meticulous design, including careful attention to validity and clarity. However, as with many surveys, self-reporting could lead to inaccuracies through misinterpretation of questions or poor recollection of experiences. Also, the sample was not an equal representation of the entire healthcare team and may suffer from biases more heavily weighted towards physicians. Finally using a convenience sample can result in bias, with responses skewed to reflect opinions of individuals within the sample population and who chose to complete the survey. Despite these limitations, this large of pool of respondents came from diverse professional and geographical backgrounds, which likely resulted in a broad sample of current opinions.

In conclusion, the results of this survey continue to show discordance between the opinion that delirium is an important factor in patient outcome and the current practices in delirium monitoring and treatment. Healthcare practitioners recognize delirium as a common problem in the ICU, but their perceived prevalence of delirium continues to be lower than established data. Although the number of people using a validated screening tool for delirium has increased significantly, this number is lower than expected. Most healthcare practitioners reported using a sedation protocol. However, only one in five practitioners complies with daily spontaneous awakening trials. This follow-up study shows that attitudes and behaviors regarding delirium and sedation are becoming more in line with current literature, yet more education is needed to improve specific practices in delirium and sedation management.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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ABBREVIATIONS

CAM-ICU Confusion Assessment Method for the Intensive Care Unit

ICDSC	Intensive Care Delirium Screening Checklist
ICU	Intensive Care Unit
MMSE	Mini-Mental State Examination
SAT	Spontaneous Awakening Trial
SCCM	Society of Critical Care Medicine

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Medications used for Sedation Management

Figure 1.

a) *Medications used for the management of delirium.* This histogram shows the frequency of use of various medications for the management of delirium. **b)** *Medications used for sedation management.* This histogram shows the frequency of use of medications for the management of sedation. Respondents were permitted to check all the medications that they used for management of **(a)** delirium **(b)** sedation. Therefore, each percentage refers to the percentage of 1384 total respondents that use that particular medication.

TABLE 1**Demographics of Survey Respondents**

	N (%)
Type of Healthcare Professional ^a	
Physician	970 (70)
Nurse	322 (23)
Respiratory Care Practitioner	23 (2)
Pharmacist	26 (2)
Nurse Practitioner or Physician Assistant	18 (1)
Other	25 (2)
Main Practice Setting ^a	
Academic Medical Center	593 (44)
Nonacademic Medical Center	769 (56)
Type of ICU ^b	
Medical	1135 (82)
Surgical	807 (58)
Years of Practice ^a	
1-5	350 (26)
6-10	273 (21)
11	698 (53)
Number of ICU beds ^a	
1-10	293 (22)
11-20	575 (42)
20	490 (36)

^aN does not total 1384 because not all of the respondents answered each question.

^bN does not total 1384, respondents were allowed to indicate >1 type of ICU.

TABLE 2

Attitudes Regarding Delirium Management and Outcomes

Statement. (N) ^a	Strongly Disagree				Strongly Agree			
	1	2	3	4	5	6	7	8
Delirium is an under-diagnosed syndrome. (N=1313)	1%	3%	9%	50%	36%			
Delirium impairs extubation from the ventilator. (N=1300)	<1%	3%	7%	56%	34%			
Delirium is a risk-factor for hospital-acquired pneumonia (N=1294)	<1%	4%	18%	55%	23%			
Delirium in the ICU prolongs hospital stay. (N=1303)	<1%	1%	4%	53%	42%			

^aN does not total 1384 because not all of the respondents answered each question.

TABLE 3

Reported Behaviors Regarding Delirium Screening

	N (%)
Don't screen for delirium	528 (41)
Do screen for delirium	774 (59)
General Clinical Assessment ^b	482 (62)
CAM-ICU ^b	185 (24)
Delirium Rating Scale ^b	28 (4)
MMSE ^b	28 (4)
Intensive Care Delirium Screening Checklist ^b	17 (2)
Other ^b	34 (4)

^aN does not total 1384 because not all of the respondents answered each question.

^bPercentage is equal to N over 774, or the number of respondents who do screen for delirium.

TABLE 4**Behaviors related to the management of sedation**

	N (%)
Sedation Protocol ^a	
Has protocol	959 (71)
Does not have protocol ^a	396 (29)
Sedation scales used ^a	
None	160 (12)
Ramsay	495 (38)
RASS	342 (26)
SAS	111 (8)
Other	215 (16)
Written policy on SATs ^{a,b}	
Has a written policy	990 (76)
Does not have a written policy	319 (24)
Percentage of ICU days SATs are practiced ^a	
<10%	129 (13)
10-25%	210 (20)
26-50%	234 (23)
51-75%	221 (22)
75-100%	225 (22)

^aN does not total 1384 because not all of the respondents answered each question.

^bSAT is “spontaneous awakening trial,” also known as “daily interruption of sedatives,” “daily wake-up,” and “sedation holiday,” all of which refer to the practice of complete cessation of sedatives, rather than simply titrating to a specific sedation goal.